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Message from the Editor-in-Chief

Happy new year to all colleagues and researchers. Up to 2013, The Online Journal of Science And Technology(TOJSAT) has a rich nature by covering interdisciplinary researches. It has a mission to underline different practices and researches in different methodologies. Selected papers become a mirror for the field of sciences by the efforts of academicians and researches. In this respect, i would like to thank to editorial board, reviewers and the researchers for their valuable contributions to the journal and this issue.

Prof. Dr. Aytekin İŞMAN

Editor-in-Chief of TOJSAT

Message from the Editor

Dear Readers,

Hello again for 3rd volume of journal and after 3rd International Science, Technology and Engineering Conference 2012 hold in Dubai, United Arab Emirates. Almost two years have been past since the journals' first issue published on-line. In this issue of journal, selected papers such as Impact of air pollution on the lichen flora in the region of Annaba (East of Algeria); Heavy Metal Scavenging Evaluation of in Vitro Grown Brassica Campestris Var. Sarsoon from the Tanneries Contaminated Soil Using Atomic Absorption Spectroscopy; The role of using Facebook in improving English; Value of Blended Learning in Supporting Leadership Development Programs; Query Based Context Awareness Architecture for Healthcare Systems will be published.

I will thank to the readers for supports by sending their valuable scientific works to publish in journal.

Prof. Dr. M. Şahin DÜNDAR

Editor, TOJSAT

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"ScoreA" - Online Tutoring Programme in Malaysia

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Abstract: In many societies, parents are willing to provide additional resources to ensure that their children excel in their education. An example of such an investment is private tutoring, which has increasingly become an important component of educational investments. Unlike other countries that have attempted to ban private tutoring, it is legally allowed in Malaysia. "ScoreA" is an online tutoring programme that is endorsed by the Malaysian Ministry of Education. This is a fully interactive programme to help students prepare for the examinations and equips the younger generation with knowledge and skills in information technology. This paper describes the features of ScoreA programme as an online tutoring tool in education.

Keywords: online tutoring; impact on education; Malaysia

Introduction

In many parts of the world, households are willing to spend a great deal for private tutoring. For instance, in Korea, household expenditures for private tutoring amounted to 2.9 percent of GDP in 1998 (Kim and Lee, 2001). Similarly, in Turkey, households spent more than 1.4 percent of GDP for private tutoring (Tansel and Bircan, 2006). Likewise in Singapore, households spent about S$820 million (US$680 million) on center and home-based private tutoring in 2008. This was an increase from the S$470 million a decade earlier (Basu 2010). Private tutoring is often seen as an additional investment for their children's education. Private tutoring is commonly defined as additional coaching in academic subjects that is given to students outside school hours for a fee (Foondun, 2006).

In Malaysia, private tutoring is becoming a common phenomenon. It is used not only for remedial purpose but it is often used to boost the performance of students who are already well-performing. Though parents do not have any strong evidence of the effectiveness of tutoring, there is a strong shared belief in the efficacy of tutoring. Tan (2011) surveyed 1,600 students in eight schools in Selangor and Kuala Lumpur and found that 88.0% had received tutoring during their primary schooling.

Unlike other countries in the world (such as South Korea and Mauritius) that have attempted to ban private tutoring on the premise that it fosters social inequalities, it is legally allowed in Malaysia. The Malaysian government has adopted a moderate approach to monitor and control the quality of private tutoring (Kenayathulla, 2012).

There are various forms of face-to-face tutoring: individualized, small group and large group tutoring. The payment differs according to the type of tutoring and the place of tutoring. If the tutoring is conducted in the student's home, the fees will be higher since it includes tutor's travelling fees. Another type of tutoring that is becoming famous is online tutoring. Such tutoring may be conducted live, using Skype and other softwares, or it may be in the form of self-service lessons. Online tutoring is not bounded by geographic locations. The tutors and their clients may be in different countries or even continents. For example, TutorVista, a new age consumer Internet company in education services space caters to over 20,000 students in US and UK and employs over 3000 tutors across India (Blakely 2007; Venture and Jang, 2010). Tutor Vista offers its services at US$2.50 per hour of tutoring for a student opting for 2 hours a day and 5 days a week. The online tutoring is considered much cheaper compared to face-to-face tutoring. For instance, the typical face-to-face tutoring in the US is US$100 per hour and online tutoring is US$40 (which is offered in US) (Vora and Dewan, 2009).

In Malaysia, ScoreA programme was launched on the 3rd March 2006 by the former Malaysia's Minister of Education, Dato Sri Hishammuddin Bin Tun Hussein. ScoreA programme is a fully interactive programme based on the official government syllabus that helps students to learn at their own pace. It emphasizes both input and output based learning. The latest innovation is the i-teacher. The students are given option to choose their

intelligent Avator. The i-teacher will help them to answer the questions. In addition, there are interactive diagrams, comprehensive notes as well as notes in the form of power points (KISB, 2012).

Previous studies both in Malaysia and international literature mainly focus on face–to-face tutoring. Not many studies have examined the online tutoring services and its impact on students learning. This paper describes the features of Scores A programme in Malaysia as the online tutoring tool.

Literature Review on the effect of tutoring

There have been variations in the results of studies that focus on the effects of private tutoring on students' academic achievement. For instance, in Vietnam, Ha and Harpham (2005) find that attending private tutoring does not result in significant increases in 8-year-old childrens' writing and numeracy test scores; however, it doubles those same children's reading test scores On the other hand, a seminal study in Singapore finds that private tutoring has a negative effect on secondary students' grades (Cheo and Quah, 2005). The authors claim that such a finding might be due to excessive studying in Singapore, which might result in diminishing returns.

The results from these two studies should be interpreted with caution as these studies did not explicitly test for the possible endogeneity of private tutoring. If unobserved factors, such as parental taste, concern for their children's education and students' motivation for studies, are not controlled in regression analysis, they will contribute to the error term, rendering inconsistent parameter estimates (Dang and Rogers, 2008; Ireson, 2004). After controlling for community and school characteristics, Dang (2007) finds that for both primary and lower secondary students in Vietnam, higher spending on private tutoring decreased the probability that students performance would be in either the poor or average categories but increased the probability that the students would be in either good or excellent academic rankings.

Kuan (2011) examined the impact of private tutoring on mathematics achievement of 10,013 grade 9 students in Taipei, China. After controlling for students' socio-economic status, ability, and attitude, he found that student who had attended tutoring were more achieving and from higher social classes. But the gains in achievements were small. Bray (2012) contends that in this study, tutoring is treated as a single variable, and distinction was not made between one- to- one tutoring and large classes. In addition, he argues that the data that is used in that study was limited to a single semester of grade 9, and this prevents long term inferences.

On the other hand, studies have shown that supplemental tutoring programs can be effective at increasing academic achievement, especially for low income students and low achieving students (Zosky and Crowford, 2003). A report from the National Longitudinal Study of No Child Left Behind (2007) finds that, on average, across the seven districts examined, the average effect of supplemental education services in both reading and math are positive and statistically significant. The report also states that students participating in supplemental education for multiple years experienced gains twice as large as those experienced by students participating for a single year. In terms of specific subgroup populations, African-American students, Hispanic students, and students with disabilities also experienced positive gains in achievements (Zimmer et al, 2007).

Online tutoring

Traditionally, tutoring is conducted in face-to-face settings in which the tutor and tutee meet at a specified place and time. However, with the advancement in communication and technology, and the increase in access to the internet, it is possible for tutoring to be conducted via the internet (Fleisher, 2006). In this case, tutoring is not limited to a particular place or time. The tutor can be any expert with online connections. Although both face-to-face and online tutoring enables interaction between the tutor and the tutee, online tutoring allows partial anonymity in communication.

Online tutoring supports both synchronous (real time) and asynchronous (delayed) communication. However, the nature of interactions and the type of instructor support permitted by those environments differ. In a synchronous environment, real-time interaction allows the simulation of a real classroom learning situation and immediate, interactive clarification of meaning (Goodyear, Jones, Asenio, Hodgson and Steeples, 2005). In contrast, asynchronous communication requires that the sender wait for a response in a time delayed fashion. Although there is ample research on face-to-face tutoring environments, research on online tutoring especially at the school level is scarce.

One key study examined the effect of online-tutoring (Kersent, Dogbey, Barber and Kephart, 2011) on college algebra students' outcome (achievement, attitude and retention). Students in the experimental groups were provided access to online tutoring unlike the students in the control group. Collected data included algebra content knowledge test, attitude survey, online tutoring logs, and retention data. The findings indicated that content knowledge gain scores of students in the experimental group who used the online tutoring service (*E-Users*) were significantly higher than the students in the experimental who did not use the service (*ENon-Users*). E-Users reported better attitudes about help seeking than ENon-Users. The findings suggest that more students in the experimental group persisted and remained in the course than the students in the control group.

The features of ScoreA programme

ScoreA programme consists of various interactive features that helps to enhance students' understanding. It is expected that online tutoring such as ScoreA can help students who are weak and motivate them to study at their own pace. ScoreA programme is considered cheap compared to face-to-face tutoring. For a student in Malaysia, the charge is about RM66 per month for a family with two children. This is much cheaper compared to fees for a typical face-to-face tutoring which is RM50 per hour for each child (KISB, 2012).

ScoreA consists of various online evaluation mechanisms. **eTopic** is a revision module that allows students to do short regular exercises and provides instant Output Learning to assess a student's understanding of a particular topic taught in school. With eTopic, answers are corrected instantly to allow the student to learn from their mistakes. Each question allows the student four attempts to find the right answer. When the wrong answer is selected, the student will be informed instantly, thus the student is forced to re-read the question before his or her 2nd, 3rd or 4th attempt. This instills the habit of reading the question carefully and understanding it before attempting an answer. Parents will be able to monitor their children's academic progress and identify their children's strength and weaknesses so that timely measures can be taken to correct any shortcomings (KISB, 2012) (Appendix 1)

eAssessment™ allows students to perform exercises as needed and provides instant Output Learning to assess children's understanding of a particular subject taught in school. Children can select a subject at any one time and instantly find out if they have understood what they have learnt and review their understanding of that subject. Parents will be able to identify their child's strength and weaknesses so that timely measures can be taken to correct any shortcomings before the actual examinations (KISB, 2012) (Appendix 2).

ePastYearExam consists of 13 years past examination questions for centralized examinations at the primary (UPSR), lower secondary (PMR) and secondary (SPM) level. This type of questions provides students the opportunity to practise on actual past years' examination papers. Students are trained to answer the questions within the allocated time (KISB, 2012) (Appendix 3).

eTrial Exam™ module is designed to simulate actual exam environment for UPSR, PMR and SPM. It further enhances children's exam readiness. This module will train children to complete the questions under exam pressure and within the limited time. Students will have to submit it for correction or grading after they have completed it. The grading is instant (KISB, 2012)(Appendix 4)

eProgress is a monitoring chart that allows parents keep track of their children's performances on eTopic. This feature is an effective monitoring tool that is designed to keep parents informed of their children's work schedule; ensuring parents that their children eTopic exercises are done and completed accordingly. Parents would be updated on the number of attempts their children has done on each topic, thus specifically emphasizing the "difficult topics" faced by their children. This information will help parents identify specific topics in a subject that their children have difficulties in, instead of generalising weaknesses by subjects (KISB, 2012) (Appendix 5).

eReport Card™ records all your children's output learning sessions, be it eAssessment or eTrial Exam. This feature gives parents unprecedented 1st hand knowledge of their children's strong and weak subjects. It records and displays their children's average scores for each subject for that month (KISB, 2012) (Appendix 6).

Conclusion

According to the latest Malaysian Educational Blueprint 2013-2025, the Malaysian education system needs to be transformed to prepare future generations that fit the needs of the 21st century. A key component of this blueprint is to maximise the usage of Information, Communication and Technology (ICT) to scale up quality learning across Malaysia (MOE, 2012). However, it is important to conduct further studies to analyze the impact of ScoreA programme on academic achievement. Such investment is worthwhile if it results in positive effect on academic outcome. Another issue that needs to be addressed is equity aspect. Students from lower income households might not have internet access at their home and might not be able to benefit from such program. Thus, it is essential for the Malaysian government to sponsor such program at school so that all the children regardless of their socio-economic background have equal opportunity for quality education.

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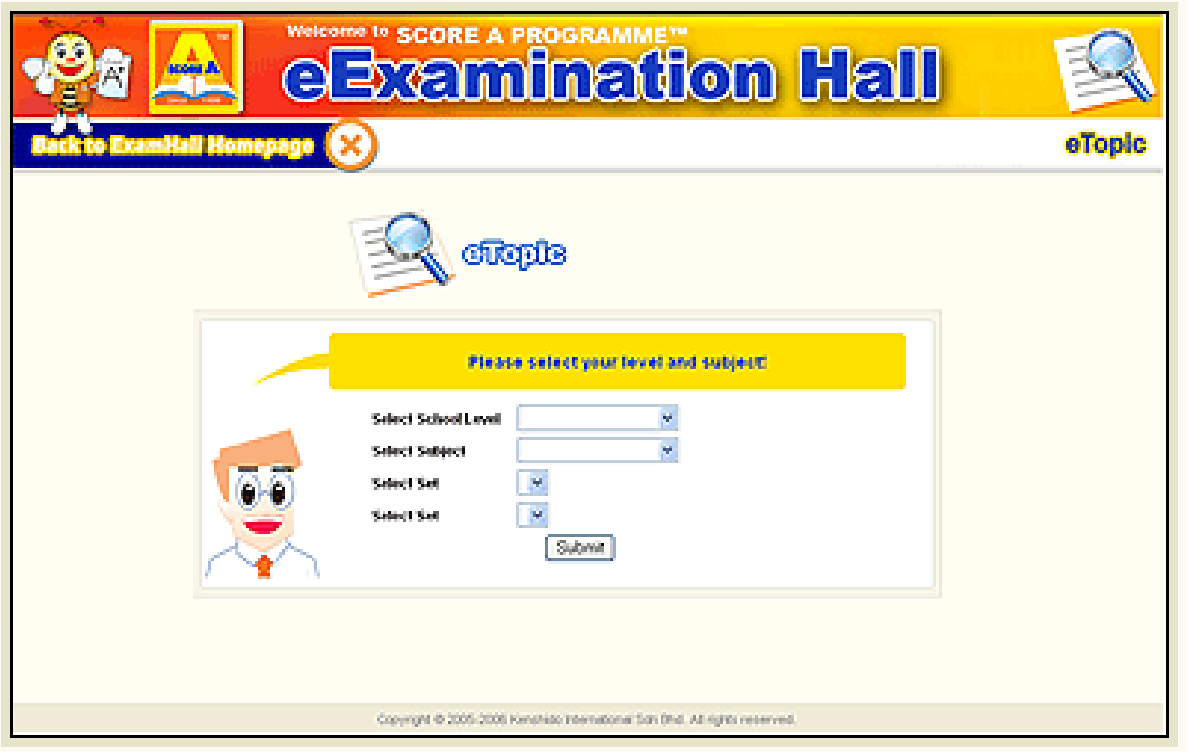
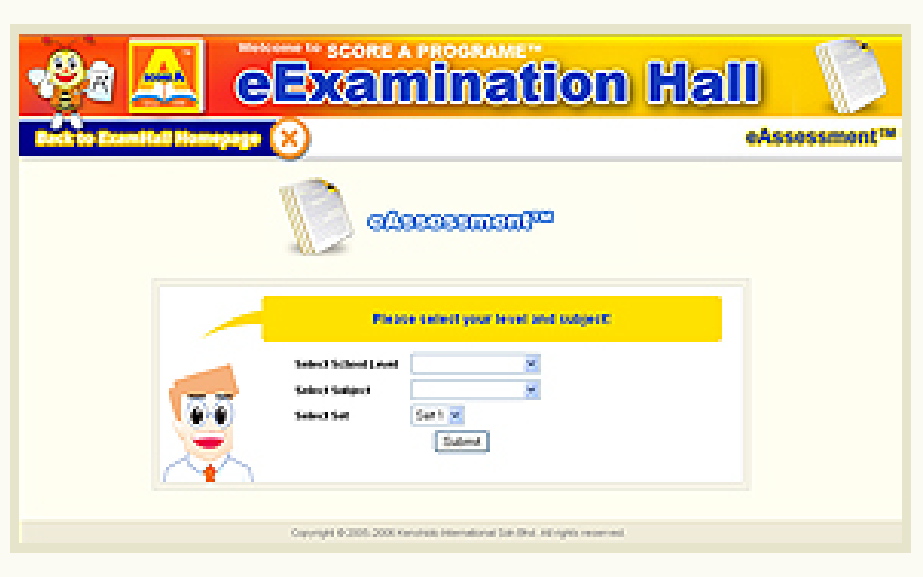
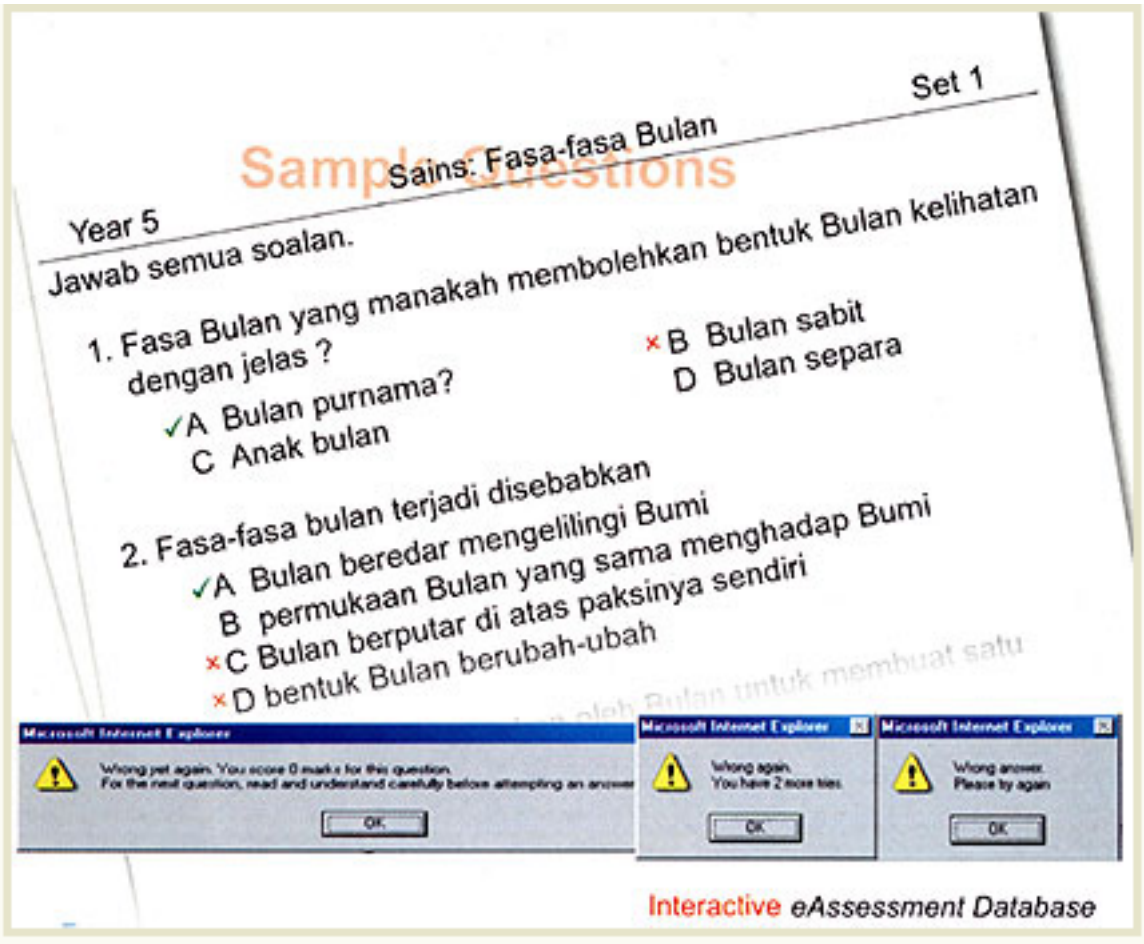
Appendix 1: **eTopic**



Source: KISB(2012)

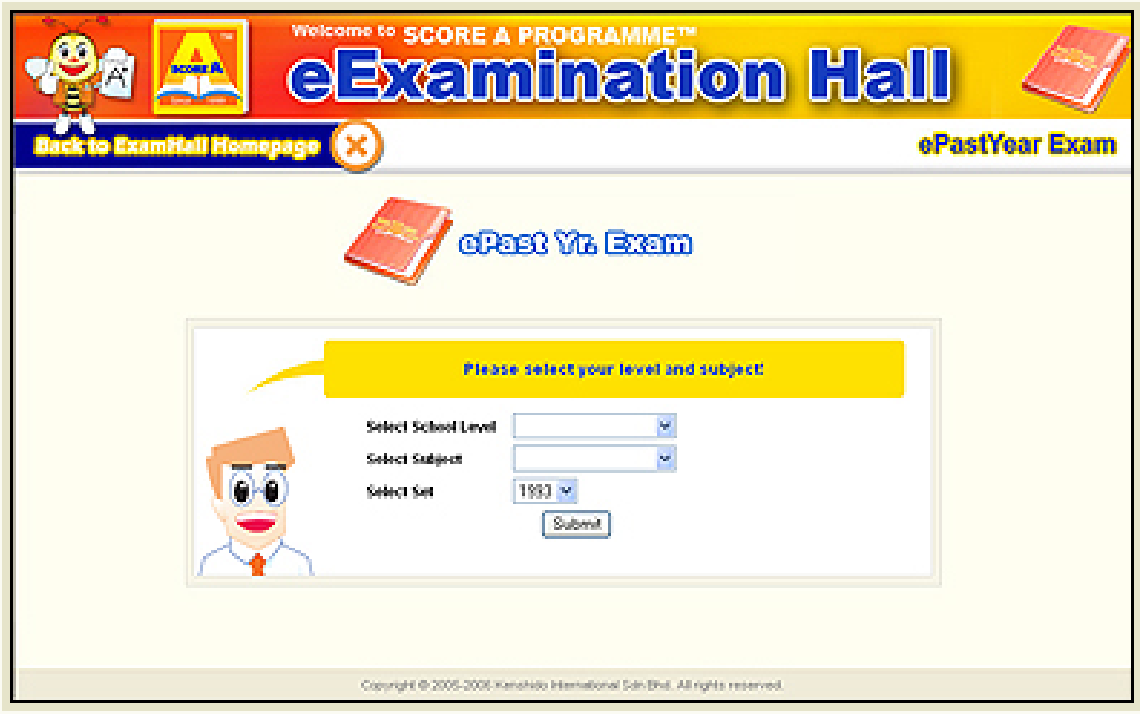
Appendix 2: **eAssessment**





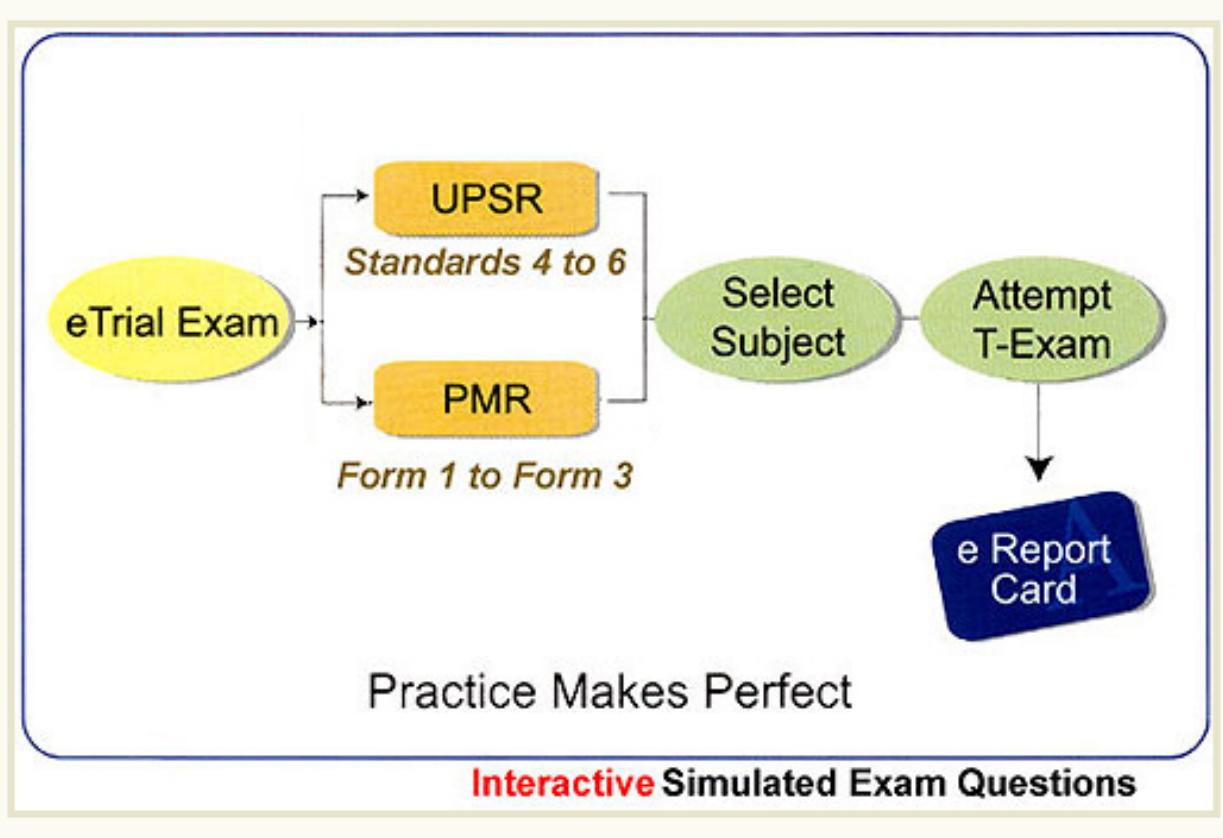
Source: KISB (2012)

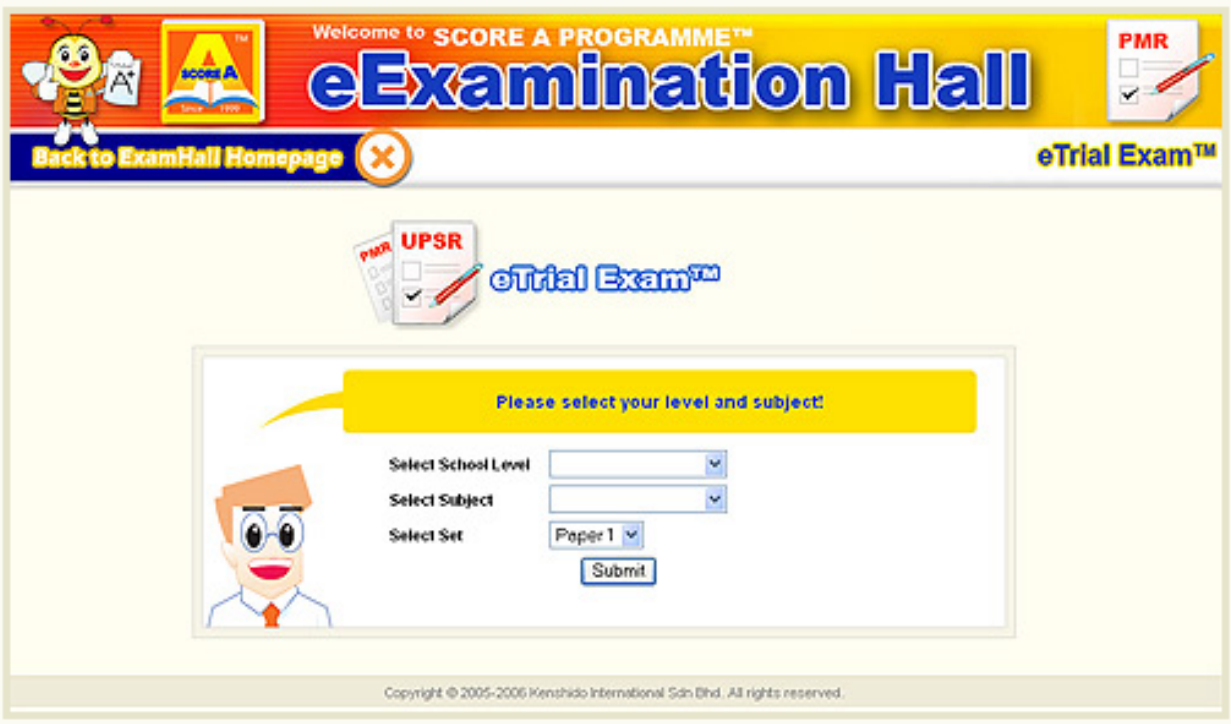
Appendix 3: **ePastYearExam**



Source: KISB (2012)

Appendix 4: **eTrialExam**





Source: KISB (2012)

Appendix 5: **eProgress**

Subject \ Week	1	2	3	4	5
Bahasa Melayu			Attempts = 2 Percentage = 62.27%	Attempts = 6 Percentage = 76.29%	Attempts = 1 Percentage = 62.20%
Bahasa Inggeris				Attempts = 1 Percentage = 100.00%	Attempts = 2 Percentage = 74.47%
Bahasa Cina					
Matematik Cina					
Sains Cina					
Matematik			Attempts = 1 Percentage = 97.80%	Attempts = 3 Percentage = 87.44%	Attempts = 1 Percentage = 55.60%
Sains			Attempts = 1 Percentage = 75.53%	Attempts = 6 Percentage = 87.07%	Attempts = 3 Percentage = 85.96%
Science					
Mathematics					

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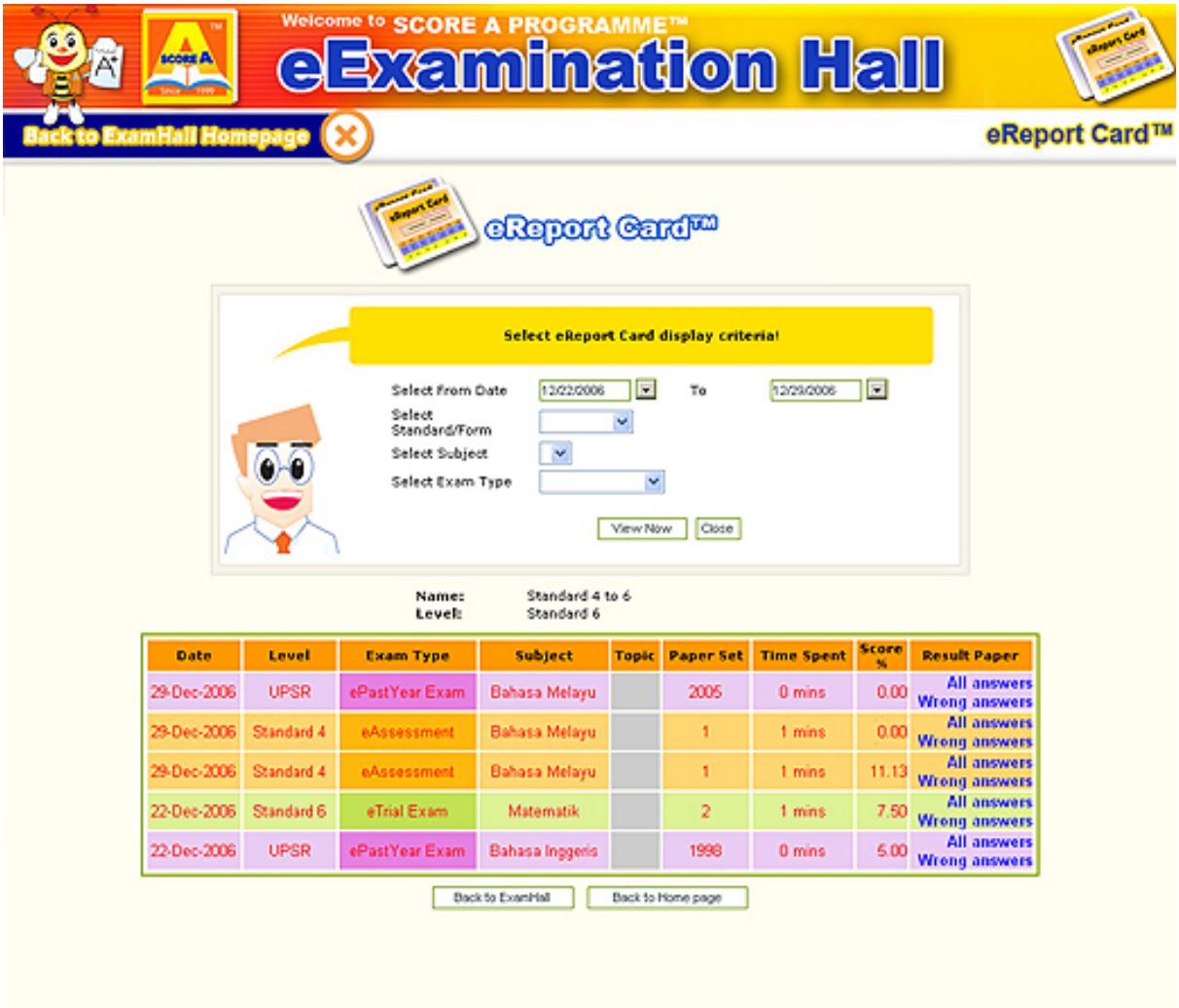
Source: KISB(2012)

Appendix 6: **eReportCard**



Date	Level	Exam Type	Subject	Topic	Paper Set	Time Spent	Score %	Result Paper
29-Dec-2006	UPSR	ePastYear Exam	Bahasa Melayu		2005	0 mins	0.00	All answers Wrong answers
29-Dec-2006	Standard 4	eAssessment	Bahasa Melayu		1	1 mins	0.00	All answers Wrong answers
29-Dec-2006	Standard 4	eAssessment	Bahasa Melayu		1	1 mins	11.13	All answers Wrong answers
22-Dec-2006	Standard 6	eTrial Exam	Matematik		2	1 mins	7.50	All answers Wrong answers
22-Dec-2006	UPSR	ePastYear Exam	Bahasa Inggeris		1998	0 mins	5.00	All answers Wrong answers

Source: KISB(2012)

An Agent Based Approach for Project Management in Construction

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Abstract: Project management has an important role in terms of time, cost and flexibility. An agent-based architecture provides additional robustness, scalability, flexibility that is particularly appropriate for problems with a dynamic and distributed nature. Integrated agent based project management covers design and construction planning. It is combined with plan execution, tolerating both the design and plan, which may be changed as necessary. In this reason, the decision making process requires that the right effects of change need to be propagated through the plan and design in dynamic environment. It is difficult to estimate the operation times and costs exactly. A numerical simulation is presented at the end of this paper to illustrate the procedures of the proposed model.

Key words: Agent systems, construction activities, project management

Introduction

Agent based project management system includes a design agent, planning agent, knowledge agent, cost estimation agent and project manager agent. Agent based system consists of system analysis, program development, testing, installation, and user training skills. Main activities of the suggested system include the control and information flow which are assisting the whole system in every time.

Control activity means by which management control operations. In a project management system, control includes procedures specified for specific tasks, milestones to mark completion of project phases, and the expertise available within the project team to solve problems when they are encountered. Giving information activity provides management with measures of how the system is accomplishing its objectives. Project information systems need to record the current status of activities and list responsibilities, planned and actual durations of activities, and cost expenditures.

We use multi-agent systems as a technique to support project management in a distributed environment. All information relevant to the project as a whole should be passed to the project manager. Information of interest for other team members is often transferred via the project manager as well, even if it is not crucial from the project's point of view. Project Manager agent have been taken on coordinator role. It implements the distribution of the task among the Design Agent, Planning Agent, Knowledge Agent and Cost Estimate Agent.

The next section includes building of model structure in construction activities; then the simulation of the agent based project management in random PERT method presented. The last section reviews the conclusion and results.

Building of Model Structure

The project management is the organizational structure used by the project manager to get things done. The project management system includes the information system to provide project team members with necessary information, because coordination between groups is critical to integrate activities. Organizational structure involves procedures to endure accurate communication and completeness of activities.

Elonen and Artto reviews the problem areas in project management in detail. Love and Irani assessment the quality cost information mechanism in project management. Ugwu et al.(2004) design processes the procurement route selection and effective communication of design parameters between the stakeholders. They reviewed the steel frame structures of the project management. Tserng and Ling are developed an activity based knowledge

management system for contractors. They addressed the application of knowledge management the construction phase with IDEF (Integrated DEFinition function modeling). Sadeghpour at al. modeled the CAD-based construction sites. They defined the tasks and activities in detail. Kasvi et al. defined the managing knowledge competences in project organizations. They determined the several potential outputs. They grouped the knowledge management in four different cases such as knowledge creation, administration, dissemination and utilization. Mahaney&Lederer reviews the information systems of the project management in agency approach. They determined the goal conflicting in the system and task programming type.

Multi agent systems are branch of the Distributed Artificial Intelligence. The term of agent represents a hardware or more usually software-based computer system that has properties of autonomy, social ability, reactivity, and pro-activeness. A stronger notion of the agent adopts mentalistic notions, such as knowledge, belief, intention, and obligation (Wooldridge and Jennings, 1995)

Wu et al. suggested public investment project in Chine with quality self-control and co-supervision mechanism. Udeaja et al. (2008) described a web-based prototype (CAPRI.NET) that was developed to facilitate the live capture and reuse of project knowledge. Xue et al. (2008) suggested the framework, which integrates the construction organizations in construction supply chain and multi-attribute negotiation model into a multi-agent system (MAS), provides a solution for supply chain coordination in construction through multi-attribute negotiation mechanism on the Internet. Kim and Kim (2010) focused on to develop a multi-agent-based simulation system to evaluate the traffic flow of construction equipment in construction site. Adhau et al., proposed A multi-agent system for distributed multi-project scheduling which can solve complex large-sized multi-project instances without any limiting assumptions regarding the number of activities, shared resources or the number of projects. Additionally our approach further allows to random project release-time of projects which arrives dynamically over the planning horizon. Hadikusumo et al. used the e-portal system for the construction material procurement .They proposed the decentralized database system equipped with electronic agents for material procurement.

We represented the multi agent system that is an implementation of a distributed project management tool. Activites, resources, and important functions are represented in a agent‘s task ability. System contains five main agents. Among of the agent relations are modeled and evaluated in random PERT method.

Project level activities, and applied of the methods, commitment, unclear roles and responsibilities are modeled in agent based structure. Process of project information in construction is reviewed in probability PERT mechanism. Summary of construction activities in MAS system in Table 1, analyzed of the probability PERT approach then obtained the project finish time .This procedure repeated in 100 times, and data are evaluated and system decision mechanism obtained the average project completion time. Suggested system provides the managing of the project scheduling mechanism.

Construction projects are complex and time-consuming, which have usually been characterized by their complexity, diversity and the non-standard nature of the production. Whatever successful and unsuccessful projects have been executed by the general contractors, a valuable record of each one should be kept to identify best and worst company practices. During the construction phase of projects, an effective means of improving construction management is to share experiences among engineers, which helps to prevent mistakes that have already been encountered in past projects. Drawing on experience knowledge, activity-related information or knowledge normally includes specifications/contracts, reports, drawings, change orders and data.

MAS system architecture influences information exchanging patterns and relationships between individual agents. One of the advantages of MAS comes from the cooperation among agents. We adopt multi agent system as information infrastructure to support project management in a highly distributed environment. The project management agent takes the functions of coordinator. Agent-based systems have the advantage of being more robust, flexible and fault tolerant than traditional system. Furthermore, the simple patterns of agent behavior are easier to program. In addition, this approach often provides a means to solve problems that have previously been unsolvable and to address problems in way that is more natural, easy and efficient.

The information and knowledge that relates to the whole project and can be clearly classified into activity units can save the category of the project. Inferred knowledge may include process records, problems faced, problems solved, expert suggestions, know-how, innovations and notes on experience. Information and knowledge is better saved in activity-based units to facilitate classification and searching by the system. Moreover, users may search and refer to related information and knowledge from related activities in past projects.

System decision mechanism are effected the some function as follows;

• Goals, expected results, scope of project.
• Plans and schedules: start date, end date, major milestone activities, data items and reports.
• Management organization: the customer’s organization, their key players, their evaluators, and the decision-makers involved in awarding a contract.

• Operational systems: the procedures of selection of the contractors, what is to be done, when it is to be done, who will do it, and how it will be done.
• Technical approach: technical standards and specications, new technology added and the necessary skills for key persons.
• Related and future work: the importance of the project to the customer, future work and the customer's future capital expenditure.
• Competition for the project: who are the competitors and do they have any special advantages? Customer has biased toward a particular competitor.

Agent based project management includes the processes, tasks and issues to consider in planning and designing for construction of building domain, and formulating the knowledge structures and framework for automated knowledge acquisition, and learning for constructability assessment in infrastructure design and construction. It describes the use of interviewing techniques to understand problem solving and the development of knowledge models for automated constructability assessment.

Constructability assessment is critical to achieving project goals. Consequently, it is often undertaken as part of value engineering exercise. The broad goal of a constructability assessment program is to proactively identify potential sources of problems especially during the construction and/or installation of a designed facility, and to identify measures that would mitigate or minimize the problems and their effects on achieving the project goals. Thus adequate assessment and planning for identify some of these issues.

Upon receiving an order, the project management agent is stimulated, and it activates the system decision mechanism. Within this system, there are choices of building like factories, schools, bridges, houses, blocks, malls, etc. Project management in cooperation with the other agents supervises the working of the system. When it comes to the application, one of the choices is taken as a base model, and the simulation process is run with Random PERT. This way, we obtain information as to when the project is likely to end.

Simulation for Agent Based Project Management

Construction projects are full of the uncertainties, including weather, labor skills, site conditions, and management quality. Therefore many probabilistic scheduling models, including program evaluation and review technique (PERT) have been proposed in a construction project as uncertain in multi-agent system. Simulation is a very valuable tool for analyzing models involving elements described by probability durations. Projects involve interrelated activities, many of which are probabilistic. Agent based project management activities are modeled on spreadsheets in Excel.

Model scheduled earlier involved five agent activities. A through E. Assume that the all activities involve some uncertainty. The best way to proceed is to gather statistics on past agent activities (if possible) so that sound data can be used to estimate the expected durations and probability distribution for specific activities. Uncertain activities are generated using random numbers.

The PERT method is also based on independence of activity durations. However, this is not true in projects. If one activity is late, there is a tendency for management to rush following activities to compensate. This would result in a case of negative correlation between durations. There also can be similar underlying causes of lateness that might be positively correlated, such as skill shortages.
PERT addresses the widely recognized uncertainty involved in project management activities, but it makes a rigid assumption about the distribution of durations, and the calculation of probability of completion by a specified time disregards no critical activities, simulation provides a flexible means of evaluation probability of projects being completed by specific time. Any distribution of duration can be assumed. The distribution used should be based on empirical data if possible. All activity paths are considered in the simple spreadsheet network. For instance, observed data may not be symmetric. The triangular distribution might provide a better fit to such data than does the normal distribution.

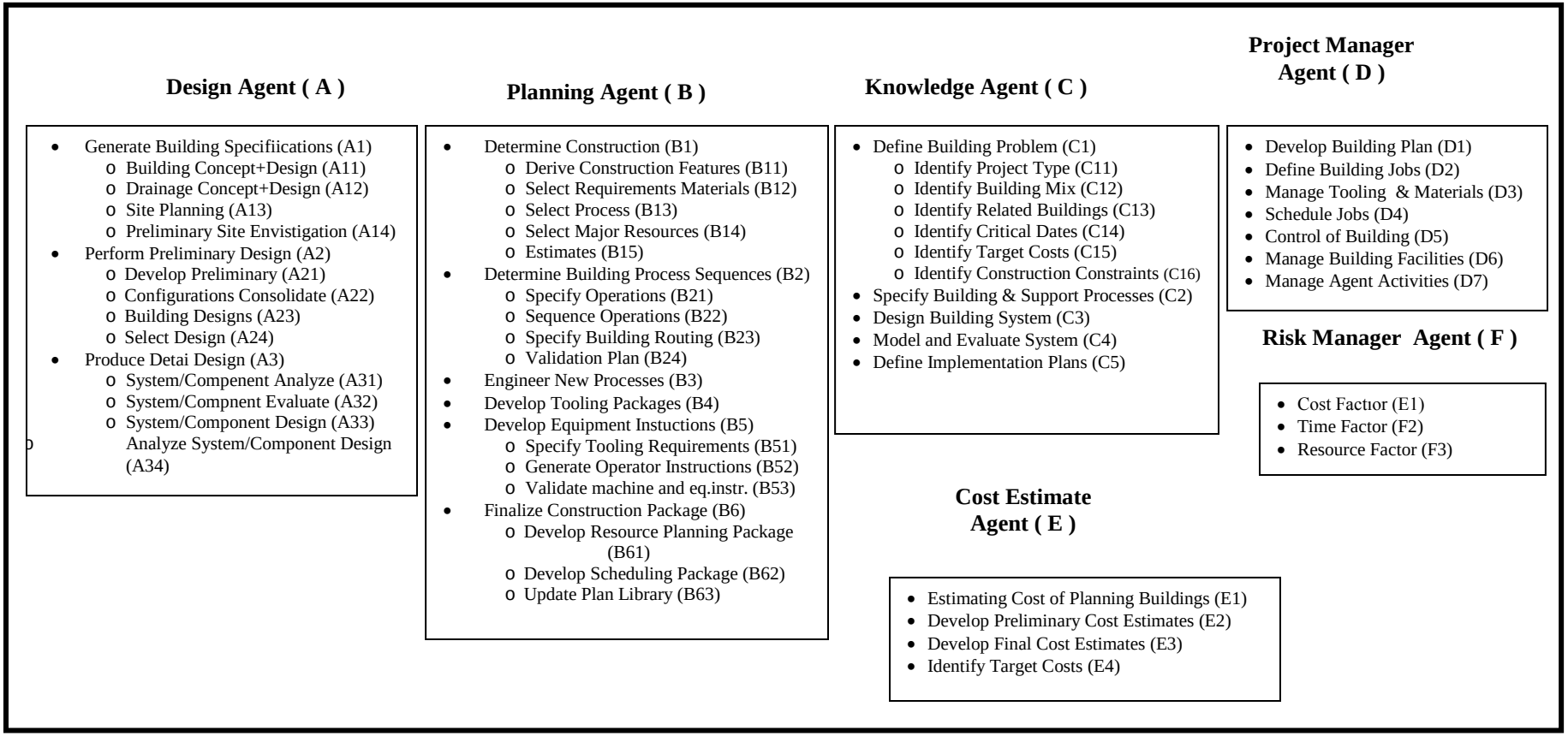

Figure 1. Agent Based Construction Project Management Activities

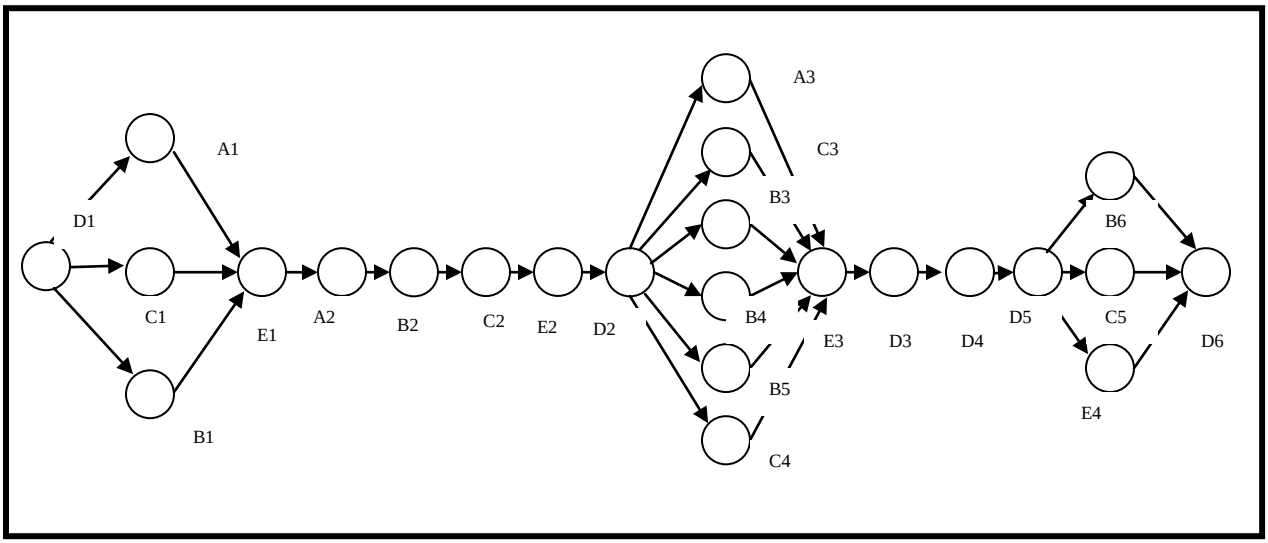

Figure 2. Standart building's process flow diagram

Table 1. Standart building's project process and considering time values.

Task	Min	Mode	Max	Random	Duration	Start	Finish
• Develop Building Plan (D1)	9	8	15	0,4808	10,3303	0	10,33
* Generate Building Specifiications (A1)					8,49664	10,33	18,83
o Building Concept+Design (A11)	1	2	3	0,7267	2,26063		
o Drainage Concept+Design (A12)	1	1	2	0,8096	1,56368		
o Site Planning (A13)	1	3	4	0,4957	2,7245		
o Preliminary Site Envistigation (A14)	1	1	2	0,9973	1,94783		
• Define Building Problem (C1)					12,5656	10,33	22,9
o Identify Project Type (C11)	1	1	2	0,1521	1,07918		
o Identify Building Mix (C12)	1	3	3	0,9059	2,90356		
o Identify Related Buildings (C13)	1	2	3	0,8802	2,51045		
o Identify Critical Dates (C14)	1	1	2	0,3568	1,19803		
o Identify Target Costs (C15)	1	3	4	0,7688	3,16711		
o Identify Construction Constraints (C16)	1	2	3	0,2501	1,70727		
• Determine Construction (B1)					9,36559	10,33	19,7
o Derive Construction Features (B11)	1	1	2	0,6111	1,37638		
o Select Requirements Materials (B12)	1	2	3	0,792	2,35508		
o Select Process (B13)	1	1	2	0,8057	1,55926		
o Select Major Resources (B14)	1	3	4	0,4571	2,65602		
o Estimates (B15)	1	2	3	0,0877	1,41885		
• Estimating Cost of Planning Buildings (E1)	2	3	4	0,2675	2,73149	22,896	25,63
• Perform Preliminary Design (A2)					8,8183	25,627	34,45
o Develop Preliminary (A21)	1	1	2	0,8857	1,66188		
o Configurations Consolidate (A22)	1	3	4	0,4314	2,60881		
o Building Designs (A23)	2	3	4	0,7617	3,30957		
o Select Design (A24)	1	1	2	0,4194	1,23804		
• Determine Building Process Sequences (B2)					9,28968	34,446	43,74
o Specify Operations (B21)	1	2	2	0,5826	1,76325		

Table 1. Standart building's project process and considering time values (continue).

o Sequence Operations (B22)	1	3	4	0,4607	2,66266		
o Specify Building Routing (B23)	1	2	3	0,1229	1,49571		
o Validation Plan (B24)	1	3	4	0,8669	3,36806		
• Specify Building & Support Processes (C2)	2	3	5	0,7191	3,70179	43,735	47,44
• Develop Preliminary Cost Estimates (E2)	3	5	6	0,8299	5,28566	47,437	52,72
• Define Building Jobs (D2)	2	3	4	0,9798	3,799	52,723	56,52
• Produce Detai Design (A3)					8,73297	56,522	65,25
o System/Compenent Analyze (A31)	1	2	3	0,6957	2,21992		
o System/Compnent Evaluate (A32)	1	1	2	0,016	1,00801		
o System/Component Design (A33)	1	2	3	0,9968	2,92017		
o Analyze System/Component Design (A34)	1	2	3	0,9138	2,58487		
• Design Building System (C3)	3	4	5	0,7062	4,23339	56,522	60,76
• Engineer New Processes (B3)	3	5	6	0,3623	4,47442	56,522	61
• Develop Tooling Packages (B4)	5	6	7	0,5396	6,04038	56,522	62,56
• Develop Equipment Instuctions (B5)					9,808	56,522	66,33
o Specify Tooling Requirements (B51)	1	2	3	0,2297	1,67774		
o Generate Operator Instructions (B52)	1	1	2	0,7296	1,48003		
o Validate machine and eq.instr. (B53)	1	3	4	0,8785	3,3962		
• Model and Evaluate System (C4)	2	3	4	0,7218	3,25404	56,522	59,78
• Develop Final Cost Estimates (E3)	3	5	6	0,175	4,02464	66,33	70,35
• Manage Tooling & Materials (D3)	2	3	4	0,5113	3,01141	70,354	73,37
• Schedule Jobs (D4)	2	3	5	0,8445	4,03423	73,366	77,4
• Control of Building (D5)	1	2	3	0,3235	1,8043	77,4	79,2
• Finalize Construction Package (B6)					3,37634	79,204	82,58
o Develop Resource Planning Package (B61)	1	1	2	0,3101	1,16942		
o Develop Scheduling Package (B62)	1	3	4	0,0853	1,71521		
o Update Plan Library (B63)	1	2	3	0,9468	0,49171		
• Define Implementation Plans (C5)	3	4	6	0,4107	0,7287	79,204	79,93
• Identify Target Costs (E4)	2	3	5	0,2041	0,81088	79,204	80,02
• Manage Building Facilities (D6)	2	3	4	0,8365	0,83261	82,581	83,41

Conclusions

The main research contributions include the development of conceptual knowledge structures (i.e. concept maps and task models) for (i) distributed management of constructability knowledge, (ii) developing intelligent agents, (iii) collaborative working, and (iv) a framework for automated knowledge acquisition, teaching and learning, for design and construction of steel frames.

Fig3 represents the standart deviation of the project management finish time. Fig.4 shows the project finish time frequency.

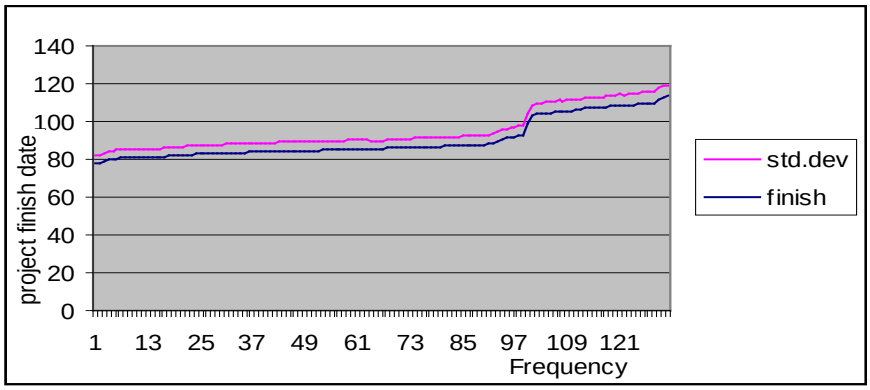

Figure 3. Represents the standart devision for project finish day.

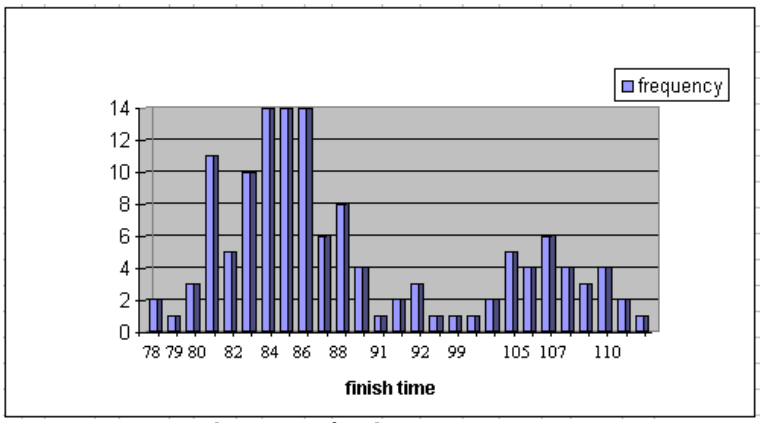

Figure 4. Reprents the project finish time.

Agent based project management activities can: (i) minimize travel time; (ii) decrease time and effort spent on material handling; (iii) increase productivity; and (iv) improve safety, and hence decrease construction cost and time. Agent based planning could be a challenging task that requires good knowledge of different aspects of the construction processes involved, as well as related procurement schedules.

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Antiviral Activity of Polyphenols Extracts From *Daucus carota* against Herpes Simplex Virus type 1

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Abstract: Herpes Simplex Virus type 1 (HSV-1), is a common and recurrent human virus with no medical cure. Polyphenols, on the other hand, are known to exhibit very strong oxygen scavenging properties; therefore they are considered a very rich source of antioxidants.

In this research, the effect of extraction method using different solvents on the content of polyphenols extracted from the leaves and roots of *D.carota* was studied, and their relationship with antioxidant activity was investigated.

The examined extracts were tested for cytotoxicity on Vero cell line, with reference to IC_{50}, and other non-toxic concentrations of all the extracts. The antiviral activity against HSV-1 for all non-toxic concentrations of the extracts was determined using plaque reduction assay, which revealed that the inhibitory activity of the HSV-1 virus was dose dependent on the polyphenol content of the examined extracts. The MIC for all the extracts was also determined as well as the EC_{50} and the SI for all the extracts. Calculated SI values for the examined extracts showed promising SI on the aqueous extracts of the *D.carota* roots and leaves, and hence can be used as therapeutic medication for HSV-1.

Direct contact between the HSV-1 and the examined extracts in cell-free assay system showed different degrees of virucidal activity depending on the polyphenolic content of these extracts. In order to study other possible mode of action, Vero cells were treated with the examined extracts before, during, and after virus infection to give an insight on the interference of the extract in each step in the virus life cycle. Examined extracts exhibited the antiviral activity against HSV-1 via blocking of the virus attachment and penetration and inhibition of the early stage of viral replications.

Keywords: antiviral activity, HSV-1, polyphenols

Introduction

Polyphenol compounds from green tea, berries, olive oil, fruits, and vegetables have been linked recently with good health, due to the fact that they have a strong preventive role for chronic and inflammatory diseases, as they have redox properties, which allow them to act as reducing agents, hydrogen donors, singlet oxygen quenchers, metal chelators and reductants of ferryl hemoglobin (Ciz et al., 2008; Gebicka and Banasiak, 2009). It is sort of commonly known now that the greater the human consumption of these compounds is, the better the health will be. Recently, however research has been conducted on the safe levels of consumption of these polyphenolic compounds, as it was reported in the American Chemical Society's Journal that that regardless the fact that the consumption of phytochemicals like polyphenols and flavonoids can boost the general health, and have plenty of beneficial biological effects, there are evidences that these precious values come on the expense of some risk. Hence, polyphenolic compounds can be very beneficial and can be very risky, and the solution is to use them with moderation as food supplements, and in specified doses if used as drug components.

The real value of Phenolic compounds is that they possess antioxidant activity which allows them to scavenge both active oxygen species and electrophiles, to inhibit nitrosation and to chelate metal ions, to have the potential for autoxidation and the capability to modulate certain cellular enzyme activities (Rice et al., 1995). Carrots are known for their richness in vitamin A, and they are also very rich in α- and β- carotenes (Urrea et al., 2011). Carotenes have been proved to possess antioxidant activity (Block 1994). There is little known information about phenolic compounds in carrots, their antioxidant properties, and their relation to antiviral activity against HSV-1.

HSV-1 on the other hand, is a DNA virus that causes fever blisters, and the primary symptoms of this virus infection are flu-like with fever, followed by the itching and finally those painful papules (Khan et al., 2005). Now the real problem with this virus is not about those painful papules, it is about how this virus remains in a latent state in the sensory neurons for a recurrent infection. This recurrent infection, or virus reactivation, is

usually triggered by stresses like radiation, and other related factors such as sunlight, menstruation and therapeutic irradiation (Collier and Oxford, 2000; Wagner et al., 2008). Hence, if the HSV-1 reactivation is triggered by stress which triggers the oxidative stress, then maybe using antioxidants can cause the oxidative stress to return to the balance state and inhibit the HSV-1 infection. The real problem with herpes is that there is no real cure for it, once a person has the virus, it remains in the body. The virus lies inactive in the nerve cells until something triggers it to become active again. Treatments however can relieve the symptoms, and decrease the pain. Treatments can also shorten healing time and decrease the total number of re-infection that is why antiviral agents from plants with new effective compounds exhibiting different modes of action against viral infections are urgently needed.

The objective of this work is to extract polyphenolic compounds from the leaves and roots of carrots using two different extraction methods to compare which combined method with plant part gives the maximum polyphenolic content, and which gives better antioxidant activity. The effect of all the extracts on the cell viability will be assayed, and then anti-HSV-1 virus activity screening will take place afterwards to check the effect of the extracts on virus infectivity. Afterwards, safe concentrations will be selected to determine their effect on each step of the virus life cycle.

Materials and Methods

Chemicals

Chemicals used for the study were from Sigma-Aldrich, USA. All other chemicals were of analytical grade.

Plants

Carrot (*Daucus carota* L.) is a very common little plant with lacy, pinnately leaves. Fresh carrot plants were purchased from the local farm market with the roots and leaves, packed in paper bags and stored at suitable temperature prior to the analysis.

Extraction

Extractions were done for both roots and leaves of the carrots in two ways using acetone and water. Acetone extracts were prepared according to Donglin (2004) with modifications, by sampling 20g from each leaves and roots in 30ml of acetone and extracted for 60mins. The homogenate was centrifuged at 7000xg for 20mins. The supernatant was collected and the residue was added with 20ml of 80% acetone for two successive re-extraction. The collected supernatants were combined and the residue was discarded. Acetone was removed from the supernatant by evaporation under vacuum at 35°C, pigments and fatty acids were eliminated by two successive extractions with petroleum ether (2:1, v:v). The aqueous phase was collected as a crude extract.

Water extracts were prepared according to Kratchanova et al., (2010) with little modifications as follows: 10g of the plant powder (roots or leaves) was added to 400 ml water (90 ºC). Plant leaves were incubated for 30 min, whereas roots were incubated for 1 hour. The extract was centrifuged (7000 × *g)* and supernatants were used for further analysis. Both extracts were obtained from acetone and aqueous extracts subjected to lyophillization.

Determination of total phenolic content

The total phenolic content was determined spectrophotometrically using the Folin–Ciocalteu method. This test is based on the oxidation of phenolic groups by phosphomolybdic and phosphotungstic acids (FC reagent). This reagent, based on the Slinkard and Singleton method (1977), and the early work of Singleton and Rossi (1965) is a colorimetric oxidation/reduction method for phenolic compounds. The products of the metal oxide reduction have a blue color that exhibits a broad light absorption with a maximum at 764 nm. The intensity of light absorption at that wavelength is proportional to the concentration of phenols. Briefly, a 20 µL of the diluted sample was added to 100 µL of Folin–Ciocalteu reagent. After 8 min, 300 µL of saturated sodium carbonate solution (25%) was added. The absorbance was measured at 764 nm. The calibration curve was prepared with gallic acid solutions ranging from 0 to 500 mg/L, and the results are given as gallic acid equivalents (GAE).

Antioxidant Activity

Antioxidant activity was evaluated based on the method reported by Taga et al., (1984) of coupling the oxidation of β-carotene and linoleic acid. 6 mg of β-carotene was dissolved in 20ml chloroform. 3ml of the solution was added to 40µl linoleic acid and 400µl Tween 20. Rotary evaporator was then used under vacuum at 35°C to remove the chloroform. Oxygenated distilled water (100 ml) was added to the β-carotene emulsion and mixed well. 3 ml aliquot of the β-carotene emulsion and 0.2 ml of the diluted extract were placed in a test tube and mixed well. The tubes were immediately placed in a water bath and incubated at 50ºC. Oxidation of β-carotene emulsion was monitored spectrophotometrically by measuring absorbance at 470 nm. Sample absorbance was measured at 10, 20, 30, 40, 50, and 60 min after incubation. A control consisted of 0.2 ml distilled water, instead of the extract. The degradation rate of the extracts was calculated by first order kinetics:

Sample degradation rate = ln (a/b) ×1/t

where: ln = natural log; a = initial absorbance at time 0; b = absorbance at 10, 20, 30, 40, 50 and 60 min; t = time (min). Antioxidant activity (AA) was expressed as % inhibition relative to the control using the equation:
AA(%) =
(Degradation of control – Degradation of sample) x 100 / Degradation of control

Cells and Viruses

For the anti HSV-1 activity screening, African Green Monkey kidney cells (Vero), were grown in minimum essential medium supplemented with 10% fetal bovine serum, penicillin (100 U/ml), streptomycin (100 µg/ml) and amphotericin B (25 µg/ml). Cell cultures were maintained at 37°C in a humidified 5% CO2 atmosphere. The HSV-1 was propagated in Vero cells, while stock viruses were prepared as previously described (Simões et al. 1999). After three cycles of freezing/thawing, the fluids were titrated on the basis of PFU count as previously described (Burleson et al. 1992) and stored at -80°C until use. The virus titer expressed by ($TCID_{50\%}$)was determined by cytopathic effect in cell culture.

Effect of acetone and water extracts of leaves and roots of *D.carota* on cell viability (cytotoxicity)

For each extract, 400mg of lyophilized powder was diluted in 200ml od dimethylsulfoxid (DMSO) and 800ml of strile phosphate buffer solution (PBS) to obtain a stock solution with concentration 400µg/ml. Two fold dilution were prepared in minimal essential medium (MEM) complemented with 2% fetal calf serum, sodium bicarbonate and penicillin / streptomycin / amphotericinb. Confluent Vero cell mono-layers were overlayed with the different dilutions of the extract and were incubated at 37°C with 5% CO_2 during five days. Toxicity was determined by observation of the morphology of the cells in comparison with the cell control without the extract. After five days of incubation, neutral crystal violet was added for confirmation of cell viability. The cell monolayer was examined by microscopic assessment of changes cell morphology or visible toxic effect (Ojo et al., 2009). The cells grown in the absence of extracts were used as 100% cell survival. The concentration at which the cell number was reduced to 50% is cytotoxic concentration CC_{50}(or inhibitory concentration IC_{50}) The concentration which had no or little effect on the cell number, maximum tolerated concentration or minimum inhibitory concentration (MIC) was also observed.

Viral plaque number reduction assay

Confluent cell monolayers in 24-well tissue culture plates were adsorbed with 100-200 PFU of HSV for 1 h at room temperature. Then, the infected cells were incubated with the different minimum inhibitory concentration of the examined extracts, 230µg/ml for water roots, 86.37µg/ml for water leaves, 72.6µg/ml for acetone roots, and 48.4µg/ml for acetone leaves. Infected cells were then overlaid with medium, containing 1.5% carboxymethylcellulose. After incubation for 5 days at 37°C in 5% CO2, infected cells were stained with 0.1% crystal violet, in 1% ethanol, for 15 min. Percentage of viral inhibition after treatment with the extracts was calculated as percentage inhibition compared with untreated viral infected cells control from triplicate experiments.

Virucidal Activity

It was tested by incubation of virus with aqueous and acetone extracts from the leaves, and root of *D.carota*, directly before inoculation of virus onto cells. Briefly, 6- well plate was cultivated with Vero cells, and 50µl of virus diluted to 100-200 PFU/ml was added to equal volume (V/V) of each extract at concentrations giving maximum viral inhibition to give total volume of 100µl. After 1hr of incubation with shaking at 37ºC, the mixture was diluted by 10 fold dilution in a way that still gave suitable count of viral particles. Then 100µl of the mixture were added to the cell monolayer sheet, and incubated with shaking for 1hr at 37ºC, and 3ml of overlay medium was added. The plates were left to solidify and incubated at 37ºC and observed daily until the development of the viral plaques. Cell sheets were fixed in 10% formalin solution for 2hr, and stained with crystal violet staining solution. Virus inoculums inoculated only to cells and treated identically without addition of the examined extract and served as control. Viral plaques were counted and the percentage of viral reduction was calculated (Schuhmacher *et al*., 2003).

Effect of aqueous and acetone extracts from the leaves, and roots of *D.carota* on Vero cells before HSV-1 adsorption (effect on pretreated cells)

It was tested by subjecting the extract to the monolayer sheet of cells for 2hr before virus inoculation. Briefly, 6-well plate was cultivated with Vero cells and non cytotoxic concentrations of all examined extracts were added to the monolayer sheet cells at concentrations giving high percentage of viral inhibition and incubated for 2hr at 37ºC. Extract was removed by washing the cells three successive times with media without supplements. Virus was diluted to 100-200 PFU/ml then 50µl of the virus stock was applied to the monolayer confluent sheet of cells, and then incubated with shaking for 1hr at 37ºC for virus adsorption. Un-adsorbed viral particles were removed by washing the cells sheet three successive times with medium without supplements, and 3ml of overlay medium was added to the cell monolayer sheet. The plates were left to solidify and incubated at 37ºC and observed daily until the development of the viral plaques. Cell sheets were fixed in 10% formalin solution for 2hr, and stained with crystal violet staining solution. Virus inoculums inoculated only to cells and treated identically without addition of the examined extract and served as control. Viral plaques were counted and the percentage of viral reduction was calculated (Zhang *et al*., 1995).

Effect of aqueous and acetone extracts from the leaves and roots of *D.carota* on HSV-1 during viral adsorption (effect on attachment and penetration)

Confluent cell monolayers, cultivated in 24-well plates, were infected with 100-200 PFU of HSV-1. Various non toxic concentrations of each examined extract was added into the cell monolayers and incubated for 1 h at room temperature during virus adsorption. After that, the inoculum was removed and infected cells were overlaid with overlay medium, and incubated at 37°C in 5% CO_2 for 5 days**.** The virus plaques were stained with 0.1% crystal violet in 1% ethanol for 15 min. The 50% effective concentration was calculated and compared with the untreated viral infected cell controls.

Effect of aqueous and acetone extracts from the leaves, and roots of *D.carota* on virus replication

It was tested by post inoculation of extracts after HSV-1 virus application to cells. A 6-well plate was cultivated with Vero cells and incubated for 1-2 days at 37ºC for formation of confluent sheet. Virus was diluted to 100-200 PFU/ml then 50µl of the virus stock was applied to the monolayer confluent sheet of cells, and then incubated with shaking for 1hr at 37ºC. Un-adsorbed viral particles were removed by washing the cells sheet three successive times with medium without supplements. Non cytotoxic concentrations with high antiviral activity were applied at different time intervals after virus adsorption at 1, 4, 8, 24, and 48. After each time interval, 3ml of overlay medium was added to the cell monolayer sheet. The plates were left to solidify and incubated at 37ºC and observed daily until the development of the viral plaques. Cell sheets were fixed in 10% formalin solution for 2hr, and stained with crystal violet staining solution. Virus inoculums inoculated only to cells and treated identically without addition of the examined extract and served as control. Viral plaques were counted and the percentage of viral reduction was calculated (Amoros *et al*., 1994).

Results and Discussions

Determination of total polyphenolic content

Results in table (1) show a variation in the poyphenol content according to the type of extract used and the part of the plant. Some studies encourage the use of different extraction systems like ethanol (Djeridane et al., 2006), and methanol (Wojdylo et al, 2007) to extract polyphenols with antioxidant activities. Some other studies preferred the use of water extraction methods of polyphenols (Zheng and Wang, 2001; Katalinic et al., 2006; Dalva et al., 2009).

The obtained results in table (1) indicate that the total polyphenol content in acetone extracts for leaves and roots showing 387.2 mg/100g and 290.6 mg/100g are higher than the corresponding values in the aqueous extracts showing 345.5 mg/100g and 230 mg/100g The variation in values of polyphenol content between acetone and aqueous extracts maybe due to variation of polarity of polyphenols according to the type of solvent used (Wojcikowski et al., 2007). Also, the total polyphenol content of *D.carota* leaves had the higher amount showing 387.2 mg/100g, and 345.5 mg/100g in acetone and aqueous extracts compared with the content in roots showing 290.6 mg/100g, and 230 mg/100g in acetone and aqueous extracts respectively. These results show different values for the polyphenol content of the *D.carota* roots than those reported by Donglin, and Yasunori (2004) on the carrot's peel. This difference may be caused by the difference in the extraction methods and the tissue of the plant under study. Comparable results were also reported by Trouong et al., (2011) on the sweet potatoes.

Table 1: Polyphenol content of water and acetone extracts of leaves and roots of *D.carota*

Part of the plant	Polyphenol content in mg/100g	
	Water Extract	Acetone Extract
Leaves	345.5	387.2
Roots	230	290.6

Antioxidant Activity

Results in table (2) show that the antioxidant activities of polyphenols from acetone extracts are higher than those of the aqueous extracts for each of the leaves and roots of the *D.carota* showing 96.4% and 84% for leaves and roots respectively, whereas, the aqueous extract showed antioxidant activity of 92%, and 76% for leaves and roots respectively. Also, acetone and water extracts of the leaves of *D.carota* showed higher antioxidant activity than the corresponding values in the roots extracts showing 96.4%, and 92% for leaves and 84%, and 76% respectively. This same result was reported by Donglin et al., (2004), who stated that the choice of solvent used in the extraction may have a significant impact on the antioxidant properties.

Table 2: Antioxidant activity of water and acetone extracts of leaves and roots of *D.carota*

Part of the plant	Antioxidant activity (%)	
	Water Extract	Acetone Extract
Leaves	92	96.4
Roots	76	84

From our results, a certain relation between the amount of polyphenol in the extracts and their corresponding antioxidant activities has been identified. When polyphenols content increase, a noticeable increase in antioxidant activity happens; this is indicated by the fact that the highest amount of polyphenols detected in the acetone extract of the leaves, showing 387.2 µg/ml, gave the highest antioxidant activity of 96.4%. Same results were reported by Donglin, and Yasunori, (2004).

Effect of aqueous and acetone extracts from the leaves, and roots of *D.carota* on cell viability (cytotoxicity)

The evaluation of the effects of all examined extracts on the growth and morphology of the Vero cell line using the cytotoxic assay is shown in table (3) and figure (1) below. Two-fold dilutions for aqueous and acetone lyophilized extracts of the leaves and roots of *D.carota* were prepared. These dilutions were used for biological activity toward the viability of Vero cell line. Determination of cytotoxicity of the used extract is an important

factor in the evaluation of any antiviral substance, since the potent extract should be chosen for the antiviral activity with little or no effects on the metabolism of host cells. All the different dilutions of the aqueous extract of the roots of *D.carota* (figure 1C) had no apparent cytotoxic effect with IC_{50} of 506 µg/ml and cell-safe concentrations <=230µg/ml. The different dilutions of the aqueous extracts of the leaves (figure 1A) showed variant degrees of toxicity especially on higher concentrations (345.5 µg/ml, and 172.8 µg/ml), while the lower concentrations showed no cytopathic effect on the Vero cell line with IC_{50} of 129.5 µg/ml and cell-safe concentrations <=86.3 µg/ml.

On the other hand, all dilutions of acetone extracts of the roots (figure 1D) showed different degrees of the cytopathic effect especially on higher concentrations (290.6 µg/ml, and 145.3 µg/ml) , while the lower concentrations showed no cytopathic effect on the Vero cell line with IC_{50} of 108.9 µg/ml and cell-safe concentrations <=72.6 µg/ml. Finally, all dilutions of acetone extracts of the leaves (figure 1B) showed different degrees of the cytopathic effect especially on higher concentrations (387.2 µg/ml, 193.6, and 96.8 µg/ml) , while the lower concentrations showed no cytopathic effect on the Vero cell line with IC_{50} of 72.6 µg/ml and cell-safe concentrations <= 48.4 µg/ml.

Table 3: Cytopathic effect % of acetone and water extracts of the leaves and roots of *D.carota*

Dilution	Water		Acetone	
	Leaves	Roots	Leaves	Roots
1	90	22.5	100	82.1
½	76.1	8.2	92.4	64
¼	22	0	68.3	21.3
1/8	17.4	0	28.1	12.1
1/16	7.2	0	13.6	7.5
1/32	0	0	2.5	0

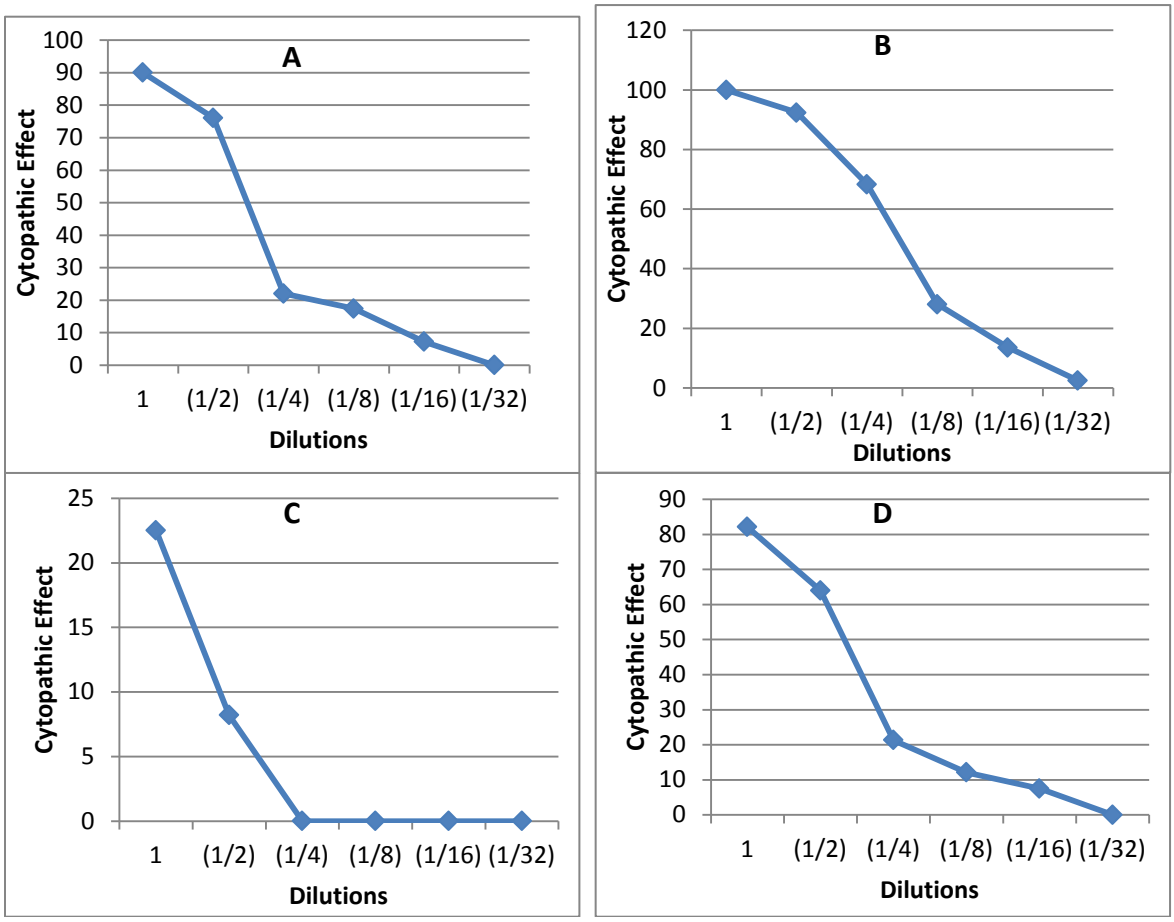

Figure 1: Cytopathic effect % of the water and acetone extracts of leaves and roots of *D.carota*. A: Water leaves; B: acetone leaves; C: water roots; and D: acetone roots.

Viral plaque number reduction assay

The experiment of the cytotoxic effect of the aqueous and acetone extracts from the leaves, and roots of *D.carota* extracts on the Vero cell line gave the safest concentrations, and those concentrations were used in the evaluation of the antiviral activity of the extracts in the following experiments to study the effect of the extract on the virus life cycle, and determine the EC_{50}, which is the 50% viral inhibitory concentration, and the selectivity index (SI) which is calculated as the IC_{50}/EC_{50} and finally, to choose the minimum inhibitory concentration (MIC) that is the concentration with no or little cytotoxicity and maximum antiviral activity.

The antiviral activity of the polyphenol extracts of leaves and roots of *D.carota* were assayed by plaques number reduction assay. Results in table (4) below show that the aqueous roots extract (figure 2C) started with a very strong antiviral activity of 95% at dilution 1, which is equivalent to concentration 230 µg/ml. This extract lost a considerable part of its antiviral ability when diluted to 1/2 giving antiviral activity of 72%, which started to drop gradually afterwards as the extract's dilutions increase, the extract have EC_{50} of 60.3 µg/ml, SI of 8.39, and MIC of 230 µg/ml, as this is the concentration giving the maximum antiviral activity for the minimum cell cytotoxicity.

As for, the antiviral activity of the aqueous leaves extract (figure 2A) started with a moderate antiviral activity of 70% at dilution 1/4, which is equivalent to concentration 86.3 µg/ml. This extract started to lose its antiviral activity gradually, the extract have EC_{50} of 39.1 µg/ml, SI of 3.3 and MIC of 86.3 µg/ml. The acetone extract of the roots (figure 2D), on the other hand started also with a moderate antiviral activity of 67% at dilution 1/4 which is equivalent to concentration 72.6 µg/ml. This antiviral activity almost disappeared at dilution 1/8 giving 39.2% antiviral activity, the extract has EC_{50} of 51.9 µg/ml, SI of2.09 and MIC of 72.6 µg/ml. Finally, the acetone extract of the leaves (figure 2B) started already with a moderate to low antiviral activity of 59% at dilution 1/8, which is equivalent to concentration 48.4 µg/ml. This extract started to drop further until it almost vanished, the extract has EC_{50} of 67.6 µg/ml, SI of 1.07 and MIC of 48.4 µg/ml.

Hence, it can be concluded from the above results that as the polyphenol content increases in the extract the antiviral activity increases as well.

As efficient SI values should have very little cytopathic effect on the cells, and very high antiviral effect on the virus, It can be concluded from the results that the aqueous extract of the roots has the most promising results as a therapeutic treatment for HSV-1, followed by the aqueous extract of the leaves, then the acetone extract of the roots, and finally the worst SI value was recorded by the acetone extract of the leaves. So, although the fact that acetone extract of the leaves has the greatest polyphenol content in all the used extracts, it has the worst SI because it requires to use a very low concentration of it in order to be safe on the cell, and consequently will have a low antiviral activity, which means a weak effect as a therapeutic agent. On the other hand, the aqueous extract of the roots had the least amount of polyphenol content in all the used extracts, but since almost all of its concentrations used were safe and consequently a high concentration can be used which will give a high antiviral activity and a strong effect as a therapeutic agent (figure 2`).

Table 4: Plaque reduction assay of each of the cell-safe dilutions of water and acetone extracts for leaves and roots of *D.carots*

	Water Leaves				Acetone Leaves			Water Roots						Acetone Roots			
Dilutions	1/4	1/8	1/16	1/32	1/8	1/16	1/32	1	1/2	1/4	1/8	1/16	1/32	1/4	1/8	1/16	1/32
% Inhibition	70	54.2	29.3	9.5	59	33.3	4.5	95	72	61.5	34.1	15.0	2.3	67	39.2	13.2	4.9

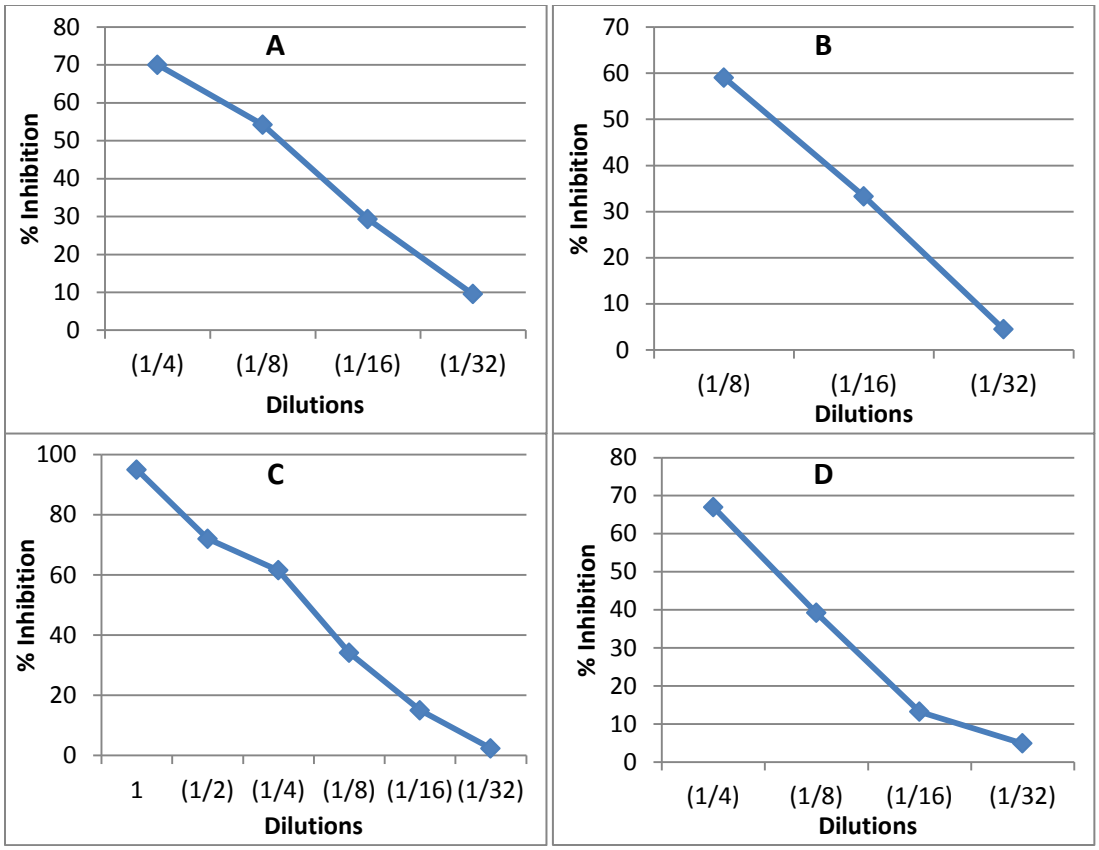

Figure 2: Plaque reduction assay of each of all cell-safe dilutions of water and acetone extracts for leaves and roots of *D.carots*. A: Water leaves; B: acetone leaves; C: water roots; and D: acetone roots.

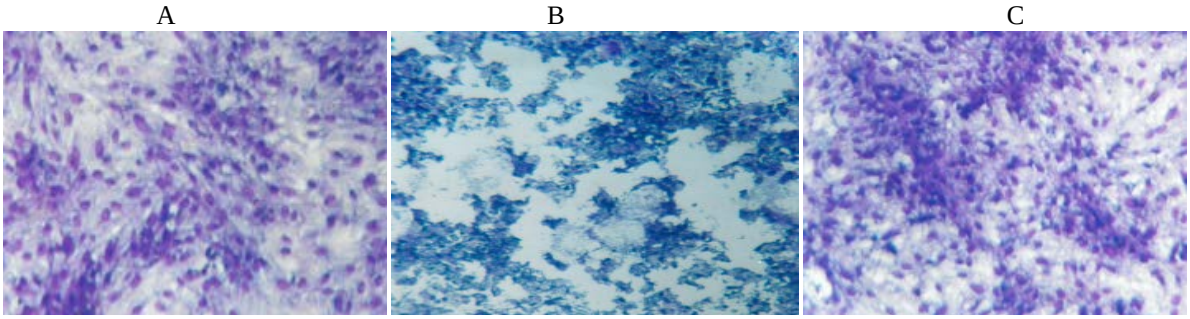

Figure 2`: Reduction of HSV-1 cytopathic effect using the acetone extract of *D.carota* leaves. A:control Vero cells; B:viral cytopathic effect; and C:Vero cells infected with HSV-1 in the presence of the aqueous extract of the *D.carota* roots

Virucidal Activity

After determination of toxic and safe concentrations of all aqueous and acetone extracts from the leaves, and roots of *D.carota* on Vero cell line, all MIC concentrations of all extracts were individually incubated with HSV-1 in cell free culture media for one hour. Results in table (5) and figure (3) below show that considerable amount of the virus inhibition was due to direct virus inactivation by all concentrations of the examined extracts, showing maximum virucidal activity of 98.2% at the aqueous root extract with concentration of 230 µg/ml, and 91.2% at the aqueous leaves extract with concentration 86.37 µg/ml, followed by 87% at the acetone root extract with concentration 72.6 µg/ml, and finally 82% at the acetone leaves extract with concentration 48.4 µg/ml. These results indicate that all the extracts examined showed different degrees of viral inactivation due to the direct contact with the virus particles. The degree of viral inhibition is directly correlated with the

concentration of the polyphenol of the extract. Those results come in accordance with Schuhmacher et al., (2003), Kratz et al., (2008), Raenu et al., (2010), and Danaher et al., (2011), who stated that the exposure of the cell free HSV-1 to black berry for 15mins in room temperature had a virucidal activity.

Table 5: Virucidal activity of selected extracts' concentrations

Concentration (µg/ml)	Water Leaves	Acetone Leaves	Water Roots	Acetone Roots
	86.37	48.4	230	72.6
% Inhibition	91.2	82	98.2	87

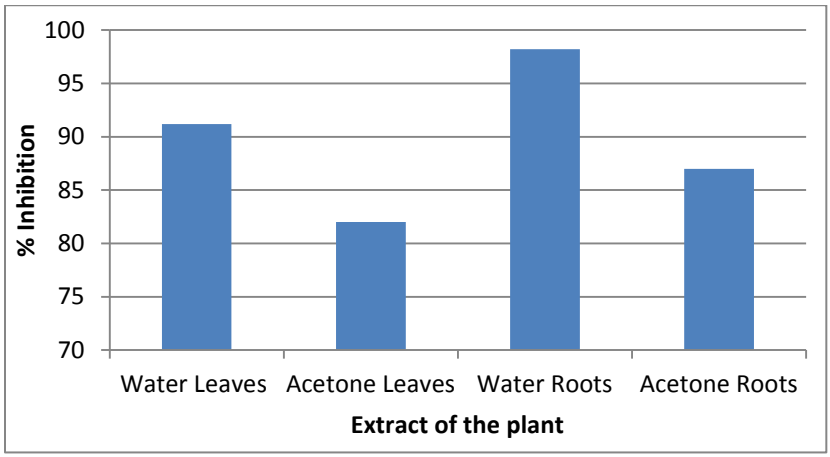

Figure 3: Virucidal activity of MIC concentrations

Effect of aqueous and acetone extracts from the leaves, and roots of *D.carota* on pretreated cells

In order to determine the mode of antiviral action, the examined *D.carota* extracts, were added to the Vero cells at different time intervals before, during, and after the virus adsorption.

All MIC concentrations of all extracts were individually added to the Vero cells for 1 hour and completely removed by washing the cells, before HSV-1 inoculation. Plaque reduction assay showed that all the extracts showed very low degree of virus inhibition as shown in table (6) and figure (4) below. It can be concluded from these results that pretreatment of cells of tissue culture with the examined *D.carota* extract before virus inoculation has no effect on virus infectivity. Comparable results were reported by Raenu et al.,(2011), who concluded their research stating that the extracts they used did not have any effect on the HSV-1 virus infectivity when used on the Vero cells before the virus inoculation.

Table 6: Plaque reduction assay before virus inoculation on selected extracts' concentrations

	D.carota Extract			
	Water leaves	Acetone leaves	Water roots	Acetone roots
%Inhibition	7.6	9.2	11.7	8.9

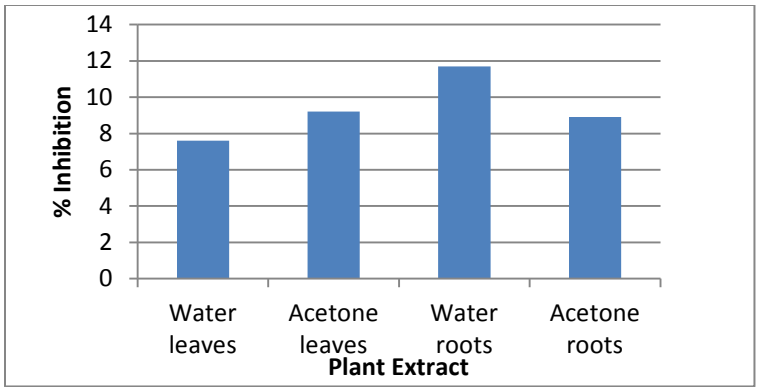

Figure 4: Plaque reduction assay before virus inoculation on selected extracts' concentrations

Effect of aqueous and acetone extracts from the leaves, and roots of *D.carota* on HSV-1 during viral adsorption (effect on attachment and penetration)

All MIC concentrations of all extracts were individually added at the same time of the HSV-1 inoculation. Results in table (7) and figure (5) below, show that the interference of the examined extracts on the viral adsorption was significantly observed at 230 µg/ml for aqueous roots extract, 86.37 µg/ml for aqueous leaves extract, 72.6 µg/ml for acetone roots extract, and 48.4 µg/ml for acetone leaves extract, giving 96.1%, 74.8%, 70.5%, and 64.3% respectively.

Those results indicate that all examined extracts inhibited the virus replication at different degrees according to the concentration via blockage of the adsorption of the virus either by the deactivation of binding of the surface glycoprotein of the viral envelope of virus particles to the cell receptor sites or inhibiting the viral cell fusion in the early replication stage and finally, preventing the initial stages of the viral reproduction. Same results were reported by Pujol et al., (2002), Kratz et al., (2008) and Xiang et al., (2011), who stated that the extracts they used directly inactivated HSV-1 particles, leading to the failure of early infection, including viral attachment and penetration (Arthanari et al., 2012).

Table 7: Antiviral activity of selected extracts' concentrations during viral adsorption

Concentration (µg/ml)	Water Leaves	Acetone Leaves	Water Roots	Acetone Roots
	86.37	48.4	230	72.6
% Inhibition	74.8	64.3	96.1	70.5

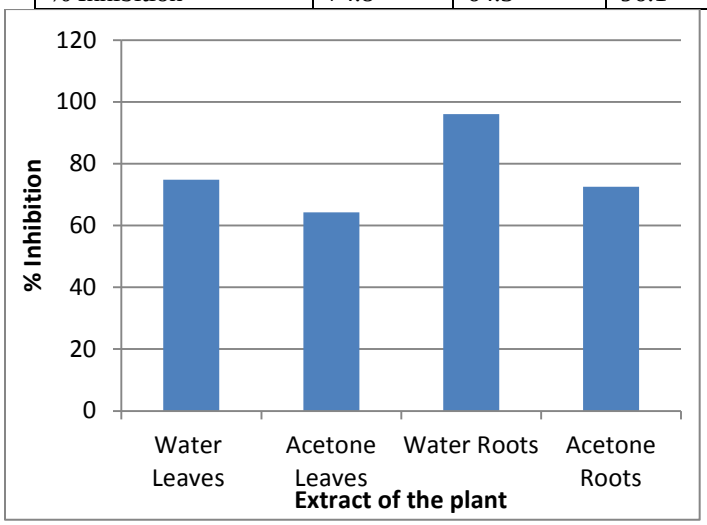

Figure 5: Antiviral activity of selected extracts' concentrations during viral adsorption

Effect of aqueous and acetone extracts from the leaves, and roots of *D.carota* on virus replication

The activity of all MIC concentrations of all examined extracts on viral replication was demonstrated at different time intervals (1, 4, 8, 24 and 48 hours) after virus inoculation. Results in table (8) and figure (6) below show that different extracts caused different degree of inhibition depending on the time of addition after virus inoculation. Also, treatment of Vero cells one to four hours after virus inoculation showed the highest virus inhibition of 95.5% for aqueous roots extract, 73% for aqueous leaves extract, 69% for acetone roots extract, and 61% for acetone leaves after the first hour and 61% for aqueous roots extract, 52% for aqueous leaves extract, 51% for acetone roots extract, and 49% for acetone leaves extract, after four hours of virus inoculation.

From the results, it can be concluded that, as the time interval increases, between the virus adsorption and addition of the extract, the inhibition of virus activity decreases significantly after four hours until it vanishes. These results indicate that the viral inhibition observed at the early hours just after the virus inoculation happens via the interference of the examined extract with the viral protein biosynthesis and transcription through the early phase of viral replication. Comparable results were reported by Sayed et al., (2012).

Table 8: Antiviral activity of selected extracts' concentrations at different time intervals after virus inoculation

Time after virus inoculation in hours	Water Leaves 86.37 µg/ml	Acetone Leaves 48.4 µg/ml	Water Roots 230 µg/ml	Acetone Roots 72.6 µg/ml
1	73	61	95.5	69
4	52	49	61	51
8	26	18	34	21
24	18	11	19	7
48	11	1.5	14	4

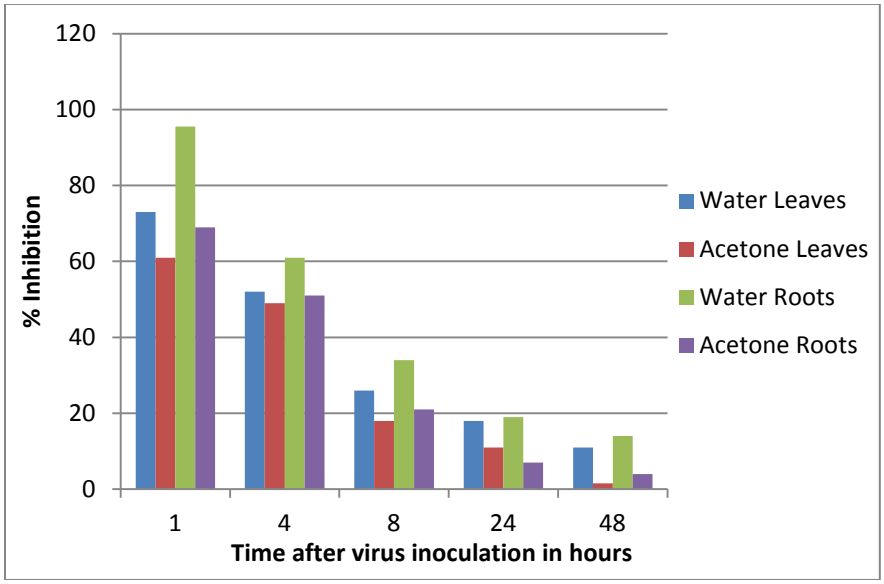

Figure 6: Antiviral activity of selected extracts' concentrations at different time intervals after virus inoculation

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Cement Stabilization of Compacted Expansive Clay

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Abstract: This paper presents and analyzes the results of a series of laboratory tests of compaction, penetration and free swelling performed on an expansive clay obtained from a site situated in Sidi-Aissa city (wilaya of M'sila, Algeria), where important disorders frequently appears in the road infrastructures and in the small buildings. Tests results obtained show that the parameters values deduced from these tests are concordant and confirm the bearing capacity improvement of the expansive clay treated with cement.

Key words: Expansive clay, stabilization, cement, bearing capacity, Proctor, CBR, free swelling.

Introduction

Urban areas of the wilaya of M'sila in Algeria nowadays experience a considerable development because of an unceasingly increasing demography, from where its extension towards virgin zones often less favorable than those already urbanized. This wilaya is located in a zone classified as semi-arid, characterized by weak precipitations and significant variations in temperature between winter and summer (cold and wet winters and hot and dry summers). Geology of this zone comprises clays formations characterized by a high variation of volume when the conditions of their equilibrium are modified (natural climatic phenomena due to a prolonged dryness, human activity by modification of the ground water level because of excessive pumping, configuration of constructions in their environment). A former study shows that these natural clays are very over-consolidated, low permeable and very low sensitive to creep (Khemissa et al., 2008); their overconsolidation being due to the phenomenon of shrinkage resulting from a more-or-less thorough desiccation. The use in fills and in base and sub-base courses, in the natural state of this clay, is normally not considered. At dry state, it is very difficult to compact since its consistency varies from hard to very hard and, at wet state, it is very sticking. However, its employment can be possibly decided on the basis of specific treatment with cement.

This paper presents the results of a study carried out on expansive clay obtained from a site situated in Sidi-Aissa city (wilaya of M'sila, Algeria), where significant disorders frequently appear in the road infrastructures and in the small buildings. Study carried out aims at determining the physical and mechanical parameters of this clay treated with an artificial Portland cement locally manufactured in Lafarge Company of Hammam Dalâa (wilaya of M'sila, Algeria). Influence of treatment on its mechanical properties is then analyzed.

Brief Description of the Studied Clay

The soil samples used were collected between 1.5 and 2.0 m of depth in a waste area intended to receive a project of 200 residences located in Sidi-Aissa city (wilaya of M'sila, Algeria). Table 1 gives the identification test results carried out on these samples. These low dispersed values for the carried out sampling seem to indicate a homogeneous soil massif. The sieve analysis of soil samples tested indicates that they are composed of 15% sand and 85% fillers (silt+clay), which can be classified, according to Bureau of soils triangular chart for textural classification, as silty clay. The Methylene blue values indicate a muddy-clayey soil with traces of montmorillonite. According to French classification (Magnan, 1980) compatible to the Unified Soil Classification System (USCS), it is about low plastic muddy clay (CL), very consistent with normal activity of its clayey fraction. The modifications of its water content are accompanied by shrinkage or swelling. The Casagrande plasticity chart adapted to expansive

soils shows that this clay is characterized by a weak-to-medium swelling potential according to Dakshanamurthy and Raman (1973) and by a medium-to-high swelling potential according to Chen (1988) (Figure 1). Also, classifications of Seed et al. (1962), Ranganatam and Santyanarayana (1965), Williams and Donaldson (1980) and Bigot and Zerhouni (2000) indicate a medium-to-high swelling potential. In addition, Building Research Establishment classification (BRE-UK 1980) led to a medium-to-high shrinkage potential.

Table 1. Geotechnical properties for Sidi-Aissa clay (wilaya of M'sila, Algeria)

Parameters	Range of variation	Mean values
Natural water content, w_{nat} (%)	14.63-16.20	15.26
Wet unit weight, γ_h (kN/m^3)	21.26-21.62	21.43
Dry unit weight, γ_d (kN/m^3)	18.49-18.68	18.59
Liquid limit, w_L (%)	40.37-48.39	43.80
Plastic limit, w_P (%)	18.14-21.00	19.04
Plasticity index, I_P (%)	21.87-30.25	24.76
Methylene blue value, VBS (%)	5.23-5.80	5.56
Over to 0.080 mm	85.31-86.09	85.70
Over to 2 µm, C_2 (%)	24.2-55.0	37.6
Activity of clay, A_c	0.4-1.7	0.90
Optimum water content, w_{opt} (%)	-	11.1
Maximum dry density, $\gamma_{d\text{-}max}$	-	1.93
Swelling pressure, σ'_g (kPa)	-	195
Free swelling, ε_g (%)	-	18.44

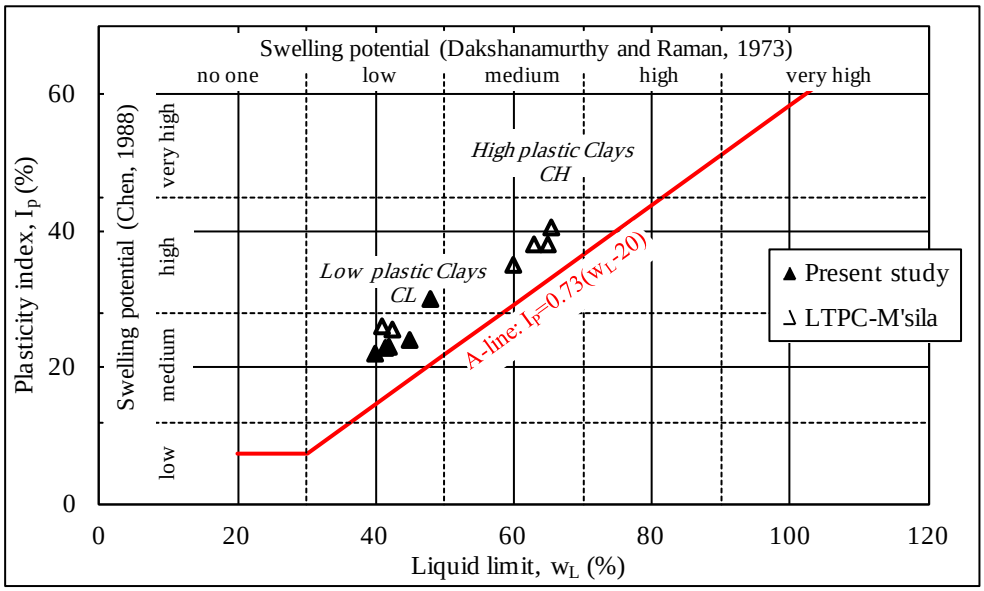

Figure 1. Classification of Sidi-Aissa clay (wilaya of M'sila, Algeria)

Experimental Program and Test Procedures

Experimental program comprises modified Proctor compaction tests, California bearing ratio tests and free

swelling tests. These tests were performed on untreated soil (control sample) and on treated soil with various contents of an artificial Portland cement called CHAMIL (CPJ-CEM-II/B 32.5 R NA 442). Cement used is locally manufactured in Lafarge Company of Hammam Dalâa (wilaya of M'sila, Algeria). Physical and chemical properties for this cement are given in table 2.

Table 2. Physical and chemical properties for CHAMIL cement

Physical properties	
Normal consistency of the cement paste	27-31
Blaine Fineness	4550-5500 µm/m
Initial setting	120-180 min
End setting	200-300 min
Compressive strength at 28 days	3.25-5.25 MPa
Chemical composition	
Loss on ignition	12-15 %
Soluble residues	0.8-1.3 %
Sulfates	1.9-2.1 %
Magnesium Oxide	1.7-2.1 %
Chlorides	0.01-0.03 %
Tricalcic Silicates	55-62 %
Content alkalis	6.5-8.2 %

Cement contents considered are 0% for untreated sample (control sample), 1%, 2%, 3%, 4%, 5%, 6%, 7% and 8% by weight for treated samples. The samples were made starting from mixture of the necessary quantity of finely crushed dried soil to desired cement content; the whole being intimately mixed at dry then humidified with optimum water content w_{opt} (i.e. maximum dry density $\gamma_{d\text{-}max}$ corresponding to optimum Proctor). The paste was remixed thoroughly before performing the compaction. All tests were conducted at room temperature.

Experimental procedures followed in each test type were in conformity as much as possible with the usual testing methods. Interpretation techniques of the test results adopted are many inspired from the knowledge obtained on clayey soils throughout the world.

Figure 2 presents the modified Proctor compaction test results conducted on the clay treated with various cement contents under optimum Proctor conditions (w_{opt} and $\gamma_{d\text{-}max}$ given on untreated soil). These results constitute a pledge of good repeatability of the compaction test and indicate a good reconstitution of the soil under the necessary conditions to which the soil massif is expected to be subjected in the field.

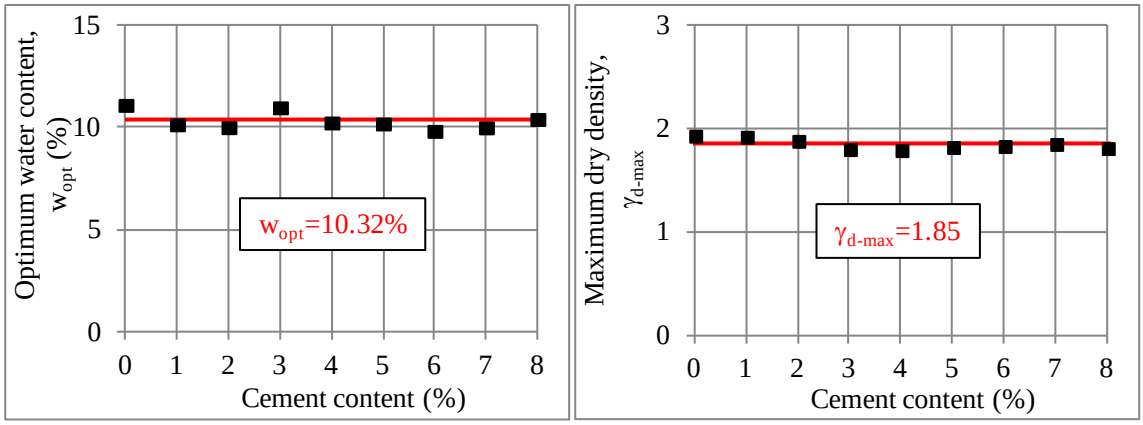

Figure 2. Compaction test results for various cement contents under optimum Proctor conditions

Test Results and Discussion

Only the principal results interesting the object of this paper are exposed hereafter, i.e. influence of the cement treatment on the strength and deformability properties of compacted expansive clay.

Characteristics of swelling

Figures 3 and 4 present the evolution curves of the swelling pressure of clay and of the corresponding free swelling according to the cement content.

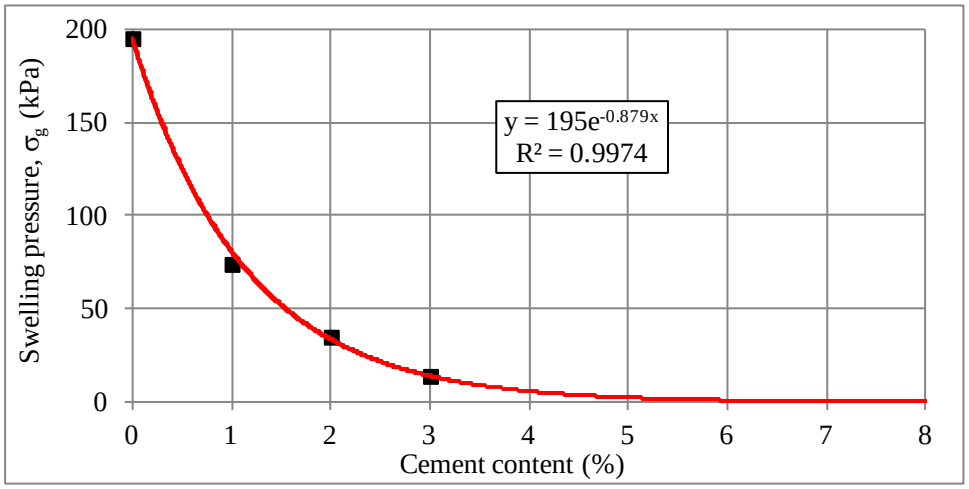

Figure 3. Swelling pressure of the clay versus cement content

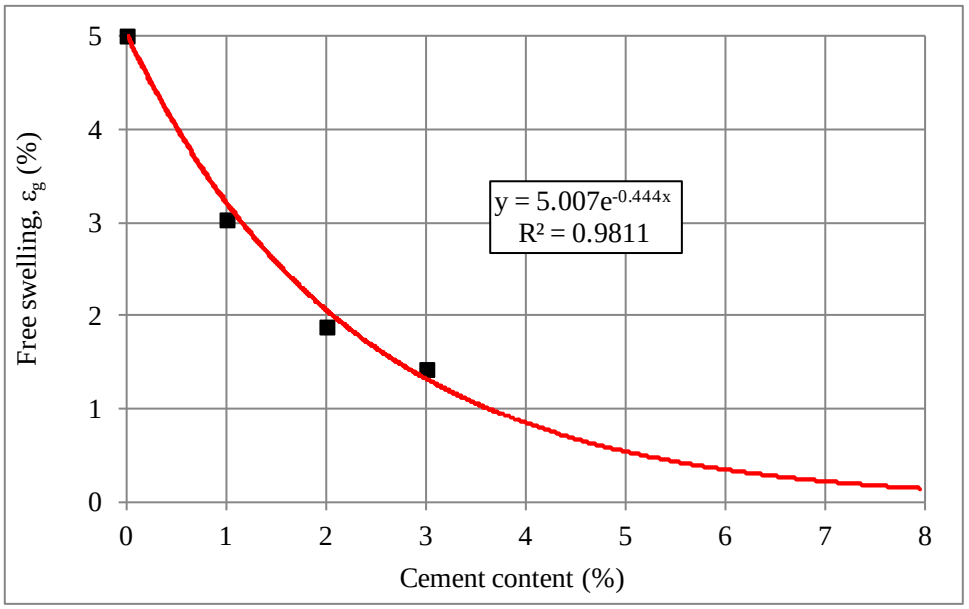

Figure 4. Free swelling of the clay versus cement content

It can be noted that the swelling pressure of clay and the corresponding free swelling decrease in an appreciable way with cement content. This mitigation is due to the soil stabilization by effect of cementing, which seems to indicate that the clay becomes insensitive with swelling from 3% of cement content roughly.

California Bearing Ratio (CBR)

Figure 5 presents the load-penetration curves of samples tested before and after their soaking for various cement contents. Figure 6 presents the corresponding unsoaked and soaked CBR values according to the cement content.

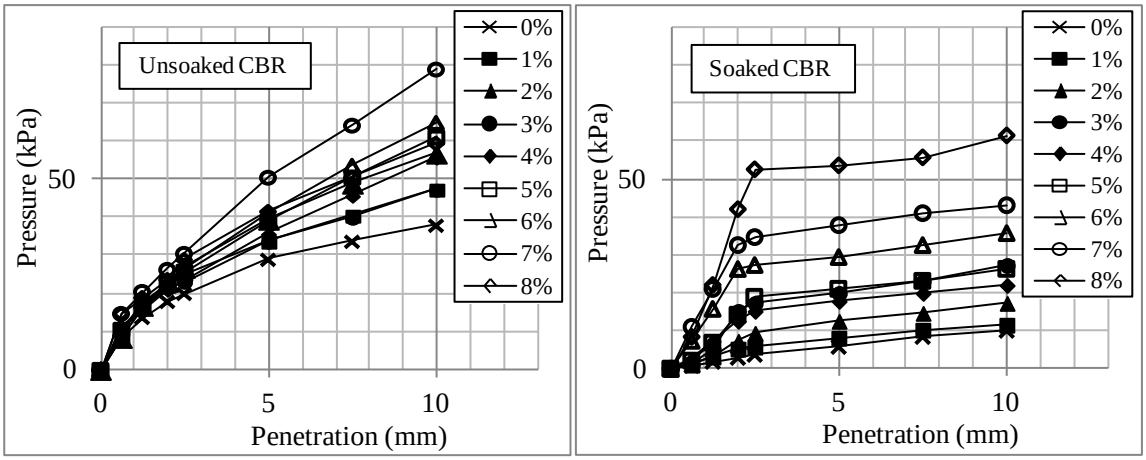

Figure 5. Pressure versus penetration curves for various cement contents

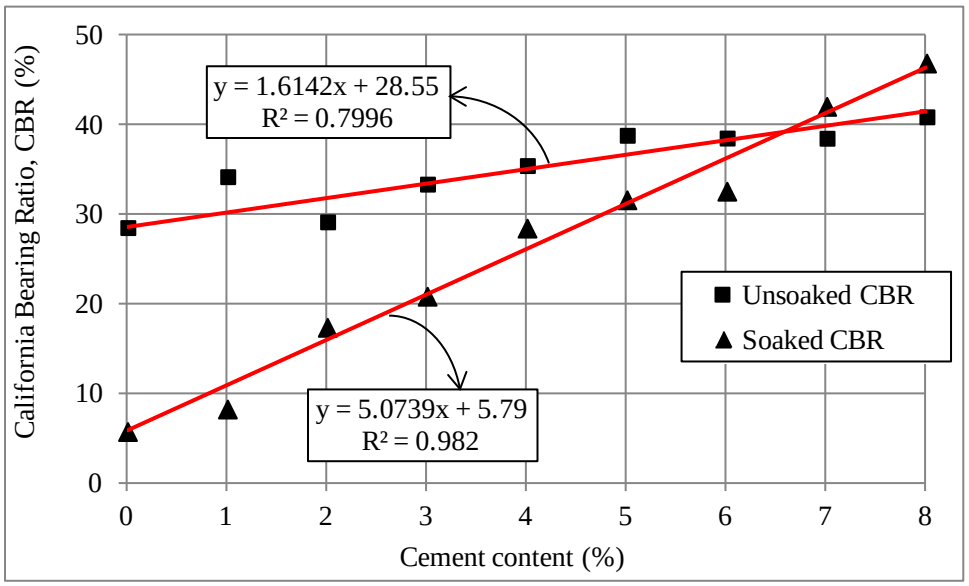

Figure 6. Californian bearing ratio values versus cement content

It can be noted that the unsoaked and soaked CBR values increase linearly with cement content. The treatment of this clay with cement is translated, in both cases, by a clear improvement of its bearing capacity and a very sensitive lowering of its deformability resulting from an excessive humidification after her compaction under the optimum Proctor conditions.

Summary and conclusions

This paper has the aim of characterizing the laboratory behavior of expansive natural clay treated with cement for its use in the road works as roadway foundation (fills, base and sub-base courses). Choice of Sidi-Aissa urban site (wilaya of M'sila, Algeria) was justified because of its extension towards zones at risk, where significant disorders frequently appear in road infrastructures and in small buildings.

The soils tested were identified as low plastic muddy clay. Various classifications based on the geotechnical properties show that this clay is characterized by a medium-to-high swelling and shrinkage potentials; swelling and shrinkage being to some extent due to the mineralogical structure of soils (presence of montmorillonite) and to the variations of their water content (cycles of desiccation-humidification of soils).

Treatment of this clay was carried out by using an artificial Portland cement locally manufactured in Lafarge Company of Hammam Dalâa (wilaya of M'sila, Algeria). Tests results obtained make it possible to show a sensitive improvement of the mechanical properties of expansive clay compacted under the optimum Proctor conditions. Moreover, it can be noted that the treatment allows:

- to decrease the swelling pressure of clay and the corresponding free swelling, clay becomes no expansive and better compactable;
- to increase the unsoaked and soaked CBR, allowing of this fact of increasing the bearing capacity of clay and reduction of its expansibility.

Performances acquired by this expansive clay treated with cement get stability, durability and better resistance.

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Chemical analysis to identify organic compounds in pre-Columbian monumental earthen architecture

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Abstract: In 2012 we started a program of chemical analysis on organic extracts of 14 samples of fills, adobes, floors and renders, dated AD 200–400, obtained during the excavations of monumental earthen buildings at the archaeological site of La Joya, Veracruz, Mexico, located on the humid tropical coastal plain of the Gulf of Mexico. The interest in identifying organic additives derives from the observation that the conservation conditions of buildings is better than expected, considering the mineral composition of construction materials in which smectite (montmorillonite), an expansive clay, dominates. This brought us to suspect the presence of certain compounds which served as consolidant and/or water-repellent. The organic compounds from the building samples are extracted in hexane and methanol, and analyzed by Thin Layer Chromatography [TLC], Fourier Transform Infrared Spectroscopy [FTIR], Nuclear Magnetic Resonance Spectroscopy [NMR] (^{1}H and ^{13}C) and Mass Spectrometry [MS] (Fast Atom Bombardment [FAB+]). The results of these analyses confirm the presence of the same organic compounds in all samples, especially more abundant in adobe samples. The compounds identified up to now are hydrocarbons, a triglyceride and a sugar. At the same time, the mucilage of plants used in the vernacular construction in humid tropical environments in Central America is analyzed using a similar process in order to compare it with the organic substances of the original materials. The importance of identifying additives in pre-Columbian earthen buildings resides not only in understanding what made a tradition of earth construction possible in humid tropical environments, which contributes to the history of technology, but also in the possible use of such an additive in the conservation of archaeological remains, as well as in modern construction.

Key words: organic additives, archaeology, Veracruz, México, Classic Period, adobe, Nuclear Magnetic Resonance Spectroscopy, Fourier Transform Infrared Spectroscopy

Introduction

The archaeological site of La Joya is located on the coastal plain of the Gulf of Mexico, close to the modern city and major merchant port of Veracruz. Though the site is occupied since the Olmec period, the monumental earthen architecture dates between 200 BC and AD 1000, spanning what is locally called the Late Preclassic and Classic period. Excavations in the severely damaged site since 2004 have revealed evidence of a sophisticated building tradition that used only raw earth, all the more surprising because of the adverse tropical conditions of heavy rainfall in the summer (>1500 mm/year) and strong winds and hurricanes in the winter. Since 2009 a coordinated effort uniting archaeologists, architects, engineers, chemists, and biologists, is under way to understand the building technique. Initially we analyzed 20 structural samples of structure fills, adobes, floors and facings for composition (sediment analysis, petrography, X-ray Fluorescence, X-ray Diffraction, FTIR, botanical analysis of chopped grass component), and mechanical properties (density, porosity and resistance to compression), the results of which are reported elsewhere (Daneels & Guerrero-Baca, 2011 and Liberotti & Daneels, 2012).

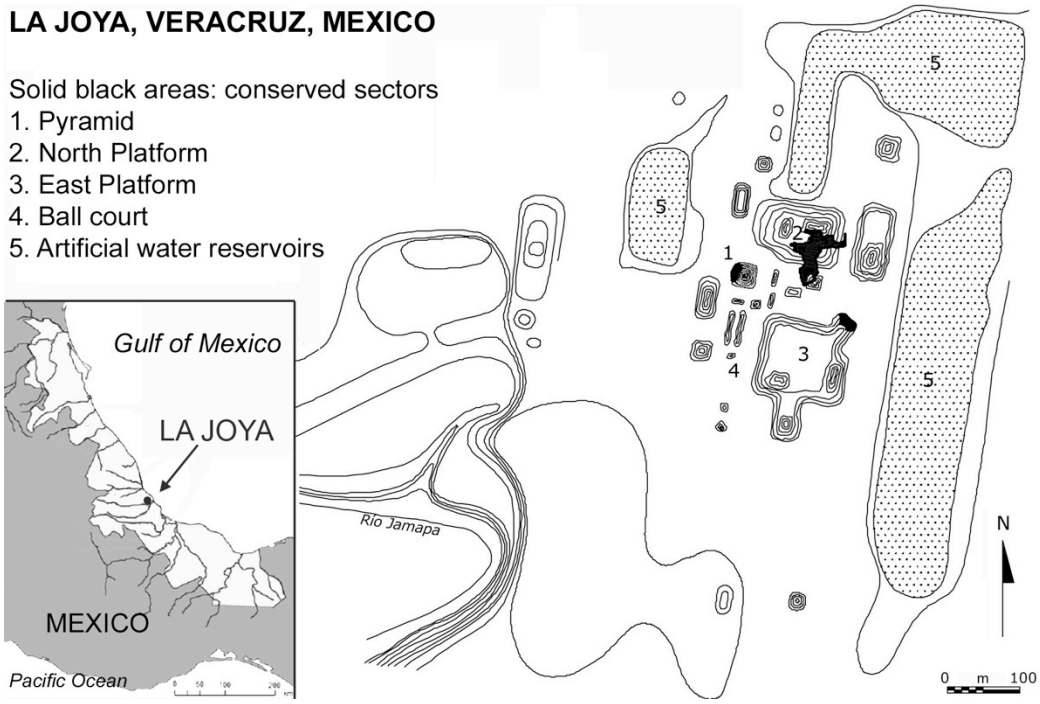


Figure 1: Layout of the La Joya site in the State of Veracruz (in white), and its location on the Gulf Coast of Mexico

The results showed materials to be of a medium to poor quality. This is especially due to the fact that the mineral composition analysis by X-ray diffraction revealed that smectite dominates in the composition of earthen construction materials. This is highly expansive clay, very difficult to manage with the strong seasonal variation in humidity conditions. This lead us to believe that the mineral mix was combined with a modifier that helped the earthen structure to resist the expansion-contraction cycles of smectite due to changes in environmental conditions such as precipitation, floods and hurricanes.

Organic additives such as fibers and polymers are often added to inorganic materials such as lime, earth, and sand to make mortar and adobe blocks. Today we can observe a large variety of natural organic additives used especially in vernacular architecture. These additives tend to be considered as "traditional materials" as well as "appropriate restoration materials" for archaeological and historical buildings, even though we do not know how long those materials have been used as additive. Interpretation of organic substances relies on the information based on local practice. Since the mucilage of a cactus called "nopal" (*Opuntia ficus-indica*) is used for vernacular construction in central Mexico (where semiarid conditions prevail)and is widely applied for restoration in Mexico, organic substances found in archaeological remains usually are supposed to be nopal mucilage. Although there are native and cultivated nopals in the region of La Joya, they are not as abundant as in the central highland of Mexico, due to the humid tropical climate. Also, the FTIR analysis of the initial sample series revealed the presence of an agglutinant that did not bear close resemblance to nopal mucilage (Daneels & Guerrero 2011). Therefore it was necessary to broaden the scope of the investigation. A promising lead comes from Central America,where traditional builders in humid tropical regions will use extracts of leaves and stems of the mallow shrub(*Sida rhombifolia*) or bark of the guacima tree (*Guazuma ulmifolia*) as additive for adobe, and apply it in archaeological restoration as additive for earth paste or as consolidant of earthen architecture surface (Ohi & Girón, 2000).

The formal research to identify the organic compounds in the pre-Columbian building materials started in 2011, testing a facing sample by Nuclear Magnetic Resonance Spectroscopy at The Institute of Chemistry of the National Autonomous University of Mexico. The ^{1}H NMR spectra of the methanolic extract from 105g of the sample in deuterated methanol (CD_3OD) recorded at 400 MHz showed signals of hydrocarbons, as well as signals between δ 3 and 3.8 which indicate the possible existence of a sugar, a signal indicative of a double bond at δ 5.34. This first

result justified the design of a complete research protocol to identify the pre-Columbian substance that apparently made earthen architecture possible in humid tropical environments. In this paper, we present the preliminary results of this research.

Sample and Method

Encouraged by the 2011 results, we started a set of analysis based on a new series of 14 pre-Columbian construction samples from the La Joya site, consisting of 8 floor layers, 2 facings, 2 adobe and 2 fills, dated to AD 200 – 400, from two buildings: The North Platform, a palace, and the altar annexed to the main Pyramid (Table 1). These analyses, applied on extracts, are geared towards defining the possible modifiers added to the mineral mix, and were carried out by author Dr. Yuko Kita under the supervision of Dr. Alfonso Romo de Vivar at the Institute of Chemistry in the National Autonomous University of México.

Table 1: Sample list. Location: La Joya, Municipality of Medellín, Veracruz, Mexico (19˚04'00''N96˚09'00''W; UTM zone 14 799799E 2110514N).

No.	Structure	Description	Date
1	North Platform	Base layer and lower floor layer	AD 200-400
2	North Platform	3 layers of the surface floor	AD 200-400
3	North Platform	2 superposed floors (a sandy layer and a loamy layer)	AD 200-400
4	North Platform	Adobe found loose in fill	AD 200-400
5	North Platform	Superior line of adobe at east perimeter wall	AD 200-400
6	North Platform	4 facings	AD 200-400
7	Pyramid SE	Sandy fill under the level of plaza	AD 200
8	Pyramid SE	Mixed fill under the floor	AD 200
9	Pyramid SE	2 layers of floor	AD 200-400
10	Pyramid SE	2 layers of floor	AD 200-400
11	Pyramid SE	2 layers of floor	AD 200-400
12	Pyramid SE	2 layers of floor	AD 200-400
13	Pyramid SE	3 layers of floor	AD 200-400
14	Pyramid SE	Clayey facing (exfoliated)	AD 200-400

The analyses were carried out according to the following procedure: a 300g portion of each ground earthen sample was weighed out, soaked in methanol (MeOH), stirred with a glass rod and left to settle for 24 hours to dissolve organic components. Then, the sample in methanol was heated up at ± 60°C for 30 minutes, stirred and filtered. This process was repeated thrice. The residue was concentrated by rotary evaporator. Each extract was then analyzed by Fourier Transform Infrared Spectroscopy [FTIR] and/or ^{1}H NMR.

Because the residues obtained from each sample are so scant, it was not possible to run ^{13}C NMR spectra, much less with hetero nuclear experiments. But, as all extracts were very similar, they were put together, obtaining a 101.2 mg combined residue sample, which was mixed with celite and then concentrated. To be able to have a better idea of the structures of the diverse components, the extract was separated into each component by column chromatography with hexane, ethyl-acetate and methanol. These extracted substances were analyzed by FTIR, ^{1}H NMR, with 2-dimensional homonuclear experiment: Correlation Spectroscopy [COSY], ^{13}C NMR, with 2-dimensional heteronuclear experiment: Heteronuclear Multiple-Quantum Correlation Spectroscopy [HMQC], and 3-dimensional heteronuclear experiment: Heteronuclear Multiple-Bond Correlation Spectroscopy [HMBC]. Some samples were analyzed also by Mass Spectrometry [MS] (Fast Atom Bombardment [FAB+]).

Results

The quantity of residue obtained through the extraction process varied from 0.7mg to 25.1mg; especially the adobe blocks, samples no. 4 and 5, contain large amount of organic component. The FTIR spectra reveal the presence of variable quantity of esters in a range between 1718 and 1740cm^{-1}. The ^{1}H NMR spectra recorded with deuterated chloroform ($CDCl_3$)provide a pattern similar to a fatty acid ester, and with deuterated methanol (CD_3OD)the spectra reveal the presence of a sugar whose characteristics correspond to methyl pentoses, such as rhamnose or fucose. Besides this we detected signals of aromatic compounds at δ 7.22 and 7.5 with coupling, and signals at δ 5.2 and 5.3 which seem to correspond respectively to a triglyceride and to a double bond.

The organic components show a complex but very similar composition. Because the quantities are very small to run ^{13}C NMR spectra, we decided to combine all extracts in order to be able to separate components by column chromatography. The spectra of ^{1}HNMR, ^{13}CNMR, and their correlations such as COSY, HMQC and HMBC of the separated components by chromatography do not only support the interpretation of the spectra obtained for the individual samples, confirming the presence of hydrocarbons, a triglyceride and a sugar, but also indicate two methyl esters, one of them probably butyl phthalate whose signals appear at δ 3.6 and 3.8 (Figure 2 - 6). The hydrocarbons and the aromatic ester do not look like impurities, since they are abundant in all samples and the impurities of solvents are few.

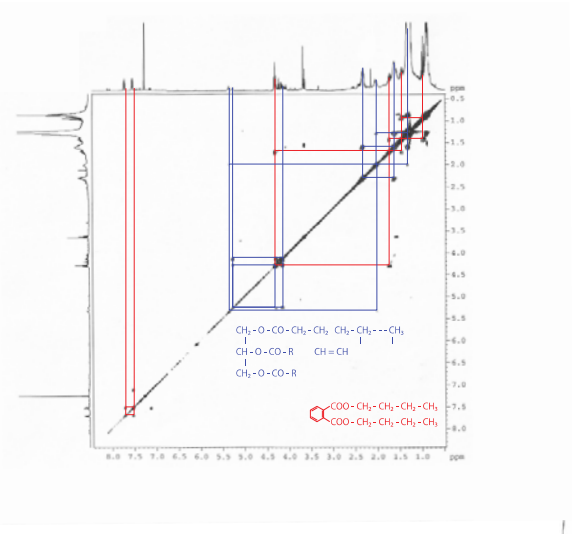
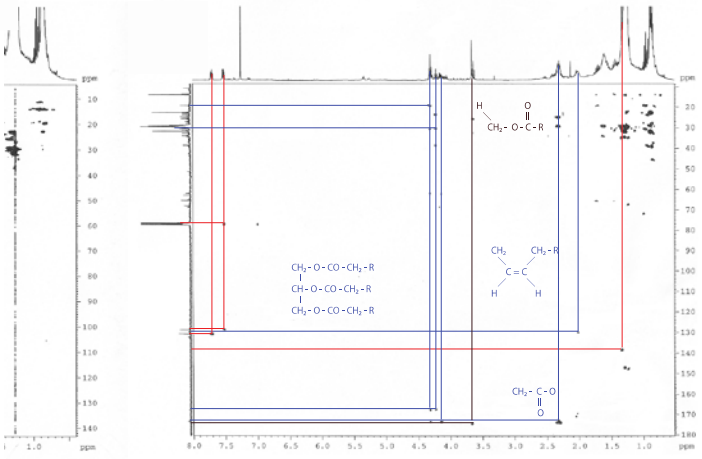


Figure 2 (left): The COSY spectrum which indicates the presence of hydrocarbons, a triglyceride and two methyl esters, one of them probably butyl phthalate.

Figure 3 (left below): The HSQC spectrum which indicates the presence of hydrocarbons, a triglyceride and two methyl esters, one of them probably butyl phthalate.

Figure 4 (right below): The HMBC spectrum which indicates the presence of hydrocarbons, a triglyceride and two methyl esters, one of them probably butyl phthalate.



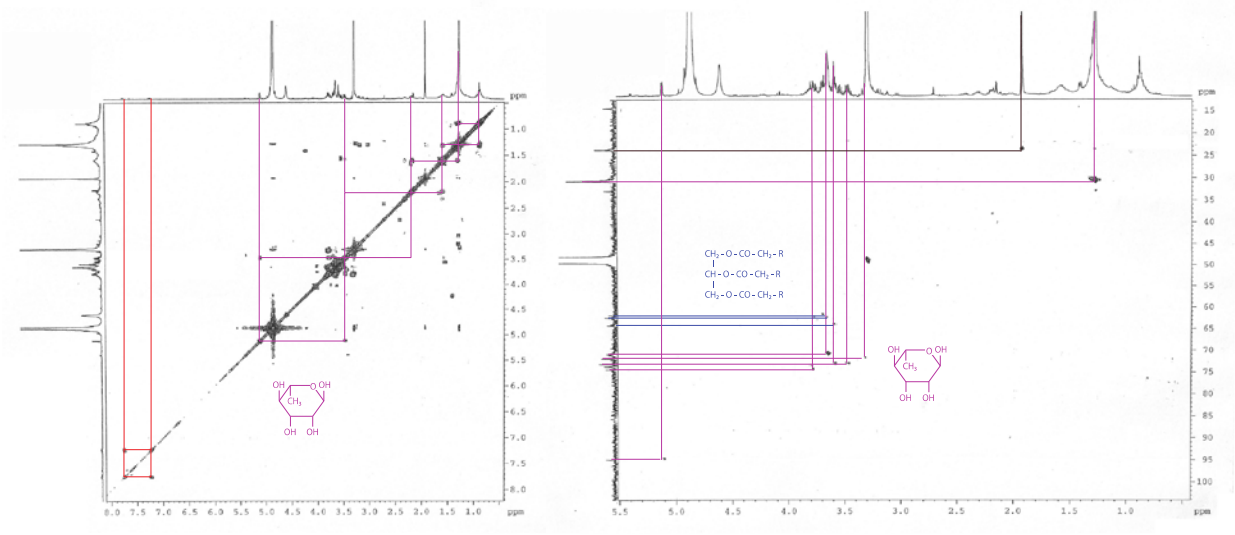


Figure 5 (left): The COSY spectrum which indicates the presence of a sugar.
Figure 6 (right): The HSQC spectrum which indicates the presence of a sugar and a small quantity of a triglyceride.

Discussion

Considering local practices in vernacular architecture in Mexico and other countries of Latin America, such as El Salvador and Peru, we expected the presence of some polysaccharide from plants, which brought us to think that the hydrocarbons could be impurities. However, hydrocarbons were observed in all samples extracting and rinsing with high quality of solvents, therefore they should come from the original samples. We must report that the local inhabitants of the La Joya site are currently exploiting the archaeological mounds to extract earth to make brick, and between the 1980's and 90's used a byproduct of petroleum processing as a fuel for the brick kilns. Therefore, some modern contamination could be possible, especially for the samples 7-14of the altar annexed to the main Pyramid, as they come from relatively shallow archaeological strata in an area close to where brick-kilns were in use in the 1990's. But, as the hydrocarbon signature shows up in all the samples, we are quite confident there is no modern contamination.

We do not have references on the pre-Columbian use of bitumen as a stabilizer of adobe blocks, but there is information on the use of bitumen to waterproof earthen structures and bind adobe blocks in ancient Mesopotamia (Barton, 1926; Taylor 1855),the Near East (Hollander, 2000), the Indus Valley and Egypt (Forbes, 1936). Besides, the use of water-in-bitumen emulsion is recommended as a good additive for adobe blocks for modern day construction in North America (O'Connor, 1973). The raw material was available and known by the ancient Gulf coast cultures since the Preclassic period (as early as 1600 B.C.), as there are natural seeps of bitumen along the coastal plains of Veracruz, and bitumen was traditionally used on ceramic and wooden objects, as well as building floors, as decoration and waterproofing (Belt, 1971;Daneels, 2006;Wendt&Cyphers, 2008).At the site of La Joya itself, there are instances of bitumen used as decorative paint on ceramic figurines and vessels dating to the same period as the architectural samples studied.

Regarding the sugar components found in the samples, these could stem from possible original organic additives. To identify them, we are using as an initial comparative base the organic compounds obtained from water extracts of leaves and stems of the mallow shrub (*Sida rhombifolia*) and bark of the guacima tree (*Guazuma ulmifolia*) which as we indicated above are used as additives for adobe blocks in humid tropical regions of Central America. We're currently applying the same analytical procedure to these extracts, and are also producing experimental adobe samples using local earth mixed with those organic extract to study their utility and polymerizing effects. Thus we will obtain results comparable to those obtained from the pre-Columbian samples.

Conclusions

It's been possible to identify hydrocarbons, a triglyceride, methyl pentoses and an aromatic ester in the organic extracts of the construction material of the pre-Columbian earthen architecture of La Joya, a Classic period site located in a humid tropical environment on the coastal plain of the Gulf of Mexico. At this moment we cannot identify the specific source of the original organic additives, but hydrocarbons might come from locally available bitumen, as its use is attested in even the earliest Gulf Coast cultures, albeit for different purposes. The other components may be from shrubs and trees abundantly available in the region. In both cases, we still have to develop a comparative corpus of local resources in order to identify the specific sources, a study that is currently under way.

The major contribution of our research up to now is to have proven that there is a consistent organic compound mix present in the building material of the monumental earthen architecture, as part of a systematic pre-Columbian building technique. This sustains our initial hypothesis that earthen construction based on an expansive clay building material would not have been viable in the adverse tropical environment without the use of an effective additive. The discovery of a hydrocarbon as a binder, though common knowledge in the Old World and still recommended today for adobe constructions, had up to now not been reported for Ancient Mexico. This opens up a completely new set of perspectives for the research on Pre-Columbian architecture.

Acknowledgements

We appreciate the great help offered by the Laboratory of Natural Products of the Institute of Chemistry of the National Autonomous University of Mexico, and the unfailing enthusiasm of distinguished Dr. Emeritus Alfonso Romo de Vivar in guiding and assisting the research. This study is part of the National Autonomous University of Mexico project *Patrimonio arquitectónico en tierra: estudio y gestión*, directed by archaeologist Dr. Annick J. E. Daneels V., receiving PAPIIT IN300812 funding (2012-2014) from the University's DGAPA. Dr. Y. Kita, architect and specialist in restoration of built heritage, is currently a grantee from the postdoctoral scholarship program at the National Autonomous University of Mexico, period 2011-II. The Archaeology Council of Mexico's National Institute for Anthropology and History granted Dr. Annick J. E. Daneels V. the permissions to excavate at the La Joya site and to analyze pre-Columbian construction samples from the site.

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Chemical study of two natural substances extracted from *Medicago sativa* grown on different soils and analysis of their effects on the growth of some pathogenic bacteria

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Abstract: To identify new phytotherapeutic molecules economically accessible and with an effective biological activity we are interested to *Medicago sativa* leaves extracts. Our first objective is to analysis the edaphic factor effect on the chemical characters of flavonoids and saponins. This could make easier a better control of the aspects of these extract with a view to a pharmaceutical preparation. The second objective is to determinate their antibacterial effect on some bacterial strains known for their pathogenicity in humans. The results show that the soil has an impact on the chemical composition of plant extracts.The microbial tests translate significant effects. Among the sensitivity degrees vary bacterial strains and plant extracts. These results have been encouraged to promote *Medicago sativa* on an appropriate soil and it is necessary to conduct additional tests to confirm the use of these substances to treat the bacterial infection.These preliminary tests allow us to justify the use of this species in traditional pharmacopoeia suggesting that their leaves possess an interesting antibacterial compounds.

Keywords : *Medicago sativa*, actives substances, flavonoïds, saponins, antibacterienne activity impact du facteur édaphique.

Introduction

To cope with the appearance of the microorganisms, that show a resistance to antibiotics, due to an excessive and uncontrolled use of those molecules, the scientists are confronted to seek for new effective antibacterial substances and broad-spectrum. One strategy for this research is to explore the plants used in traditional medicine. Medicinal plants inexhaustible source of active compounds, are nowadays the main source and basis of numerous pharmaceutical specialties. However, large number of other plant species occurring in nature, in enormous quantities and with interesting therapeutic properties, remains untapped and the man has not yet been able to take advantage of them. In order to enhance and streamline their use and to identify more natural substances with effective and potential therapeutic properties, we are interested in *Medicago sativa* study, one fabaceae more known for his interest in animal feed for its use in public health care although its use in traditional medicine dates back hundreds of years it was used by herbalists to treat various infectious diseases (Bouvyer, 2007). The literature study revealed that exempt for studies on the chemistry of organs, this species has been no investigation on its biological activity. The goals this study is to:

-Achieve a chemical-screening of the plant for determining the principal compounds with a therapeutic interest.
- Determine the chemical profiles of flavonoids and saponins extracted from leaves of Medicago sativa from different native soils. The interest is to assess the impact of edaphic factor on their variability. This could facilitate a better control of the qualitative and quantitative aspects of these active substances in order of pharmaceutical preparations. -
-Conduct an analysis of the antibacterial activity in order to identify molecules with potential antibacterial properties.

Materials and Methods

1- Plant material

It consists of leaves of *Medicago sativa*. This plant family Fabaceae species is very rich in protein, vitamins and trace elements (Bouvyer, 2007). This plant is healthy and ecological, with specific bacteria living in symbiosis on its root system; it fixes atmospheric nitrogen necessary for its growth and requires no chemical fertilizer.

The leaves of this plant were harvested before the flowering stage in the Annaba region (North-eastern Algeria) in four culture stations with different soil characteristics. After drying in the dark at ambient temperature, the leaves are detached and powdered to be used to obtain different extract.

2- Microbial strains

The microbial support used is composed of:

- 3 Strains of Reference: *Escherichia coli (ATCC); Staphylococcus aureus* (ATCC); *Pseudomonas aeruginosa* (ATCC).

-9 Bacterial strains frequently isolated in hospital and often implicated in many diseases in humans.

3 - Screening Chemical

It consists in detecting the different families of compounds existing in the leaves by precipitation reactions or coloring using reagents specific to each class of compounds. The results are noted positive (+) or negative (-).

4- Solutions used

-The decoction is obtained from an aqueous decoction of powdered leaves (20g) mixed with distilled water (1 L) and brought to boiling for 15 minutes. The decoction of 2% obtained was filtered and concentrated on a rotary evaporator.

-Crude extracts flavonoids and saponins: After highlighting the different families of compounds in the leaves of *Medicago sativa*, we targeted these two families. Their preponderance in the leaves and their possible antimicrobial activities presumed encouraged us to submit them to our investigation. Their extraction was conducted using the method described by Lee *& al.,* (1995) for flavonoids and method of Applebaum & *al.,* (1969) for the saponins. For microbiological testing and chromatographic study, the crude extracts were recovered respectively with DMSO (Dimethylsulfoxide) and acetone.

5 - Determination of chemical profiles

The identification of chemical profiles of flavonoids and saponins was conducted on leaves coming from the four stations. The objective is to evaluate the impact of soil type on the variability of their chemical components. Separation and identification of substances was performed by TLC (thin layer chromatography) on silica gel G60 plates (Merck). Spots 2µl of each sample is deposited at point's pins on the edge of the plate and immersed in an appropriate eluent. After development of the chromatogram, the plate is dried at ambient temperature and then examined in the UV (λ= 254nm and 365nm). The results contain information on the number of chemical constituents their RF (retention factors of chemical constituents) and their behavior under UV light.

5-Microbiological tests

The antibacterial activity of the tested solutions was performed on filter paper discs by diffusion method on solid medium (Bauer *& al*., 1966). Muller Hinton agar is the medium used for tests of bacterial strains (Nostro *& al*., 2000). The media are inoculated with a few ml of the inoculums (10 CFU / ml) for bacterial species (Cavallo, 2006) in order to cover the whole agar surface. Filter paper discs loaded with test solution are

deposited on the surface dry of medium. After 24 h of incubation at 37 ° C, the antibacterial activity is manifested by the appearance of a halo of inhibition of bacterial growth around the discs (Bauer, 1966; Duvar 1980; Carbonelle *& al*., 1987): is considered respectively as resistant strain sensitive, highly sensitive or extremely sensitive that having a diameter D<8mm; 9mm ≥ D ≤14mm; 15mm≥ D≤ 19mm; D > 20mm. (Duraffourd *& al*., 1990; Ponce *& al.*, 2003).

Results and discussion:

Chemical Screening:

Table 1: Chemical screening of Medicago leaves

Saponins	Flavonoids	Alkaloids	Essential oils	Anthocyanes	Stérols and thriterpenes
+	+	-	-	+	+

In this work it appears that the phytochemical screening based on specific tests allowed to characterize at the Medicago leaves some families of chemical compounds (Tab.1). These tests are in agreement with the results of the literature.

Localization and characteristics of harvesting stations

Table 2: Geographical situation of the harvest stations

Stations	Latitude	Longitude	Altitude	Bioclimatic floor
Fetzara	36°48N	7°45E	0-50m	Subhumid
Aeroport	36°50N	7°48E	0-50m	Subhumid
Besbes	36°46N	7°54E	0-50m	Subhumid
Ben mhidi	36°41N	7°51E	0-50m	Subhumid

Table 3: Physico-chemical characters of soils

Stations	pH H2O	pH KCl	Texture	Organic matter %	Electrical conductivity	Total limestone %
Fetzara	7,66	6,90	sandy- slimy	3,70	2,07	14
Aeroport	7,52	6,80	slimy-clay	2,11	0,14	12,52
Besbes	7,61	6,92	slimy-clay	2,64	0,17	22,37
Ben mhidi	7,12	7,04	slimy-clay	2,26	0,12	23,47

Chemical profiles of Flavonoids and Saponins:

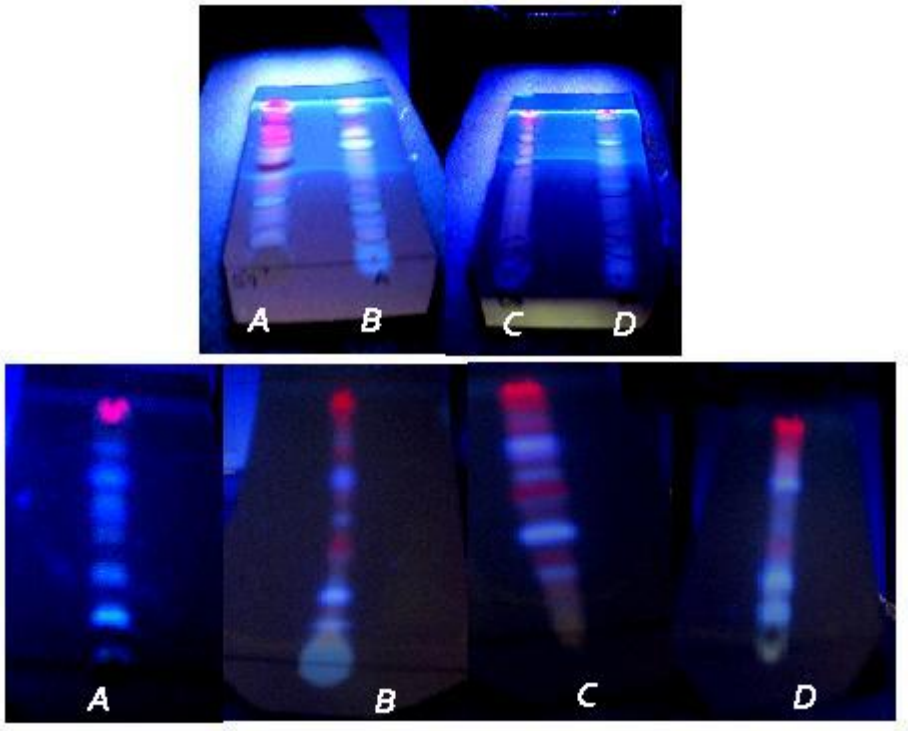

Figure1: Chromatograms observed under UV light at 366 nm (A:Benmhidi;B:Aeroport;C:Besbes;D:Fetzara)

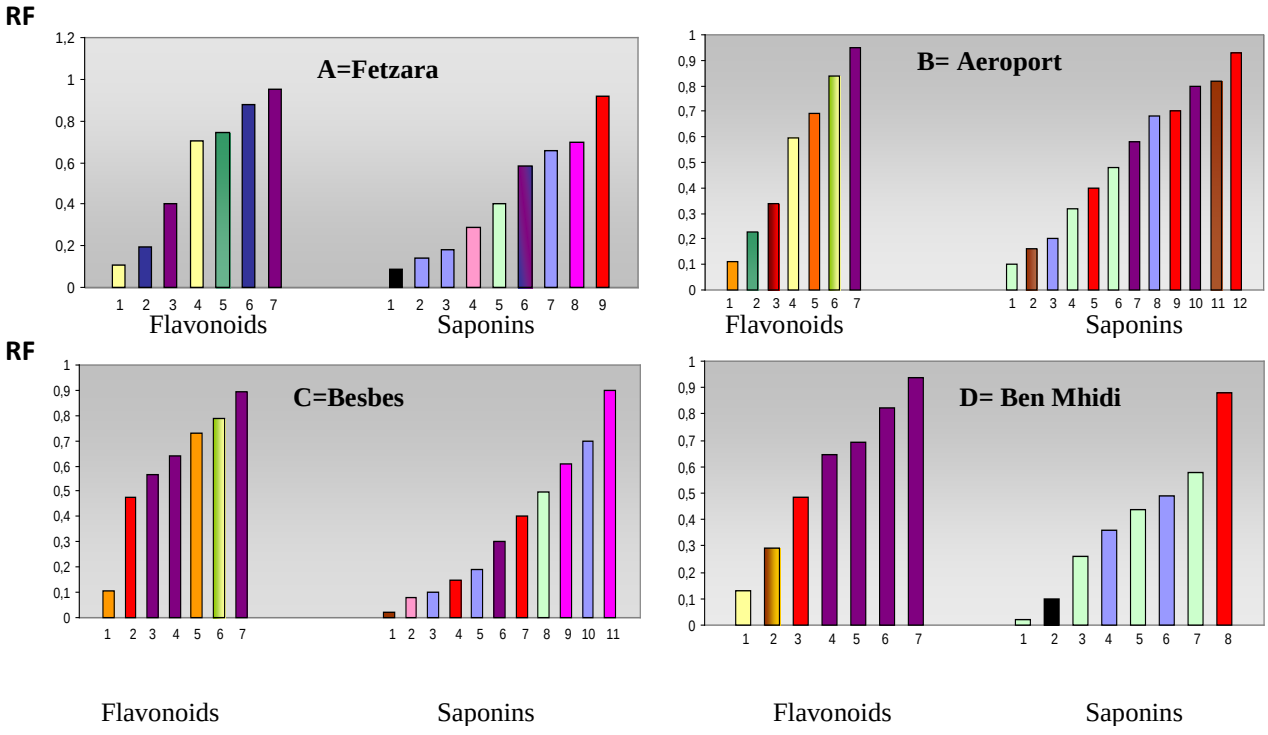

Figure 2: Chromatogram profiles of Medicago leaves crud extracts of different studied stations (Chemical component and its RF and color respective).

The results of chromatography visualized under UV light (fig.1) shows, for each soil type a wealth in chemical compounds flavonoids and saponins. However, the comparison of figures 2 (a, b,c,d.) representing their respective numbers, their colors and their RF indicate that these compounds vary qualitatively and quantitatively from soil to soil. These results indicate that although there is a geographic unit of the source of plant material (Tab. 2) the chemical composition of flavonoids and saponins is still dependent on soil physicochemical characteristics (Tab.3).

Microbiological tests:

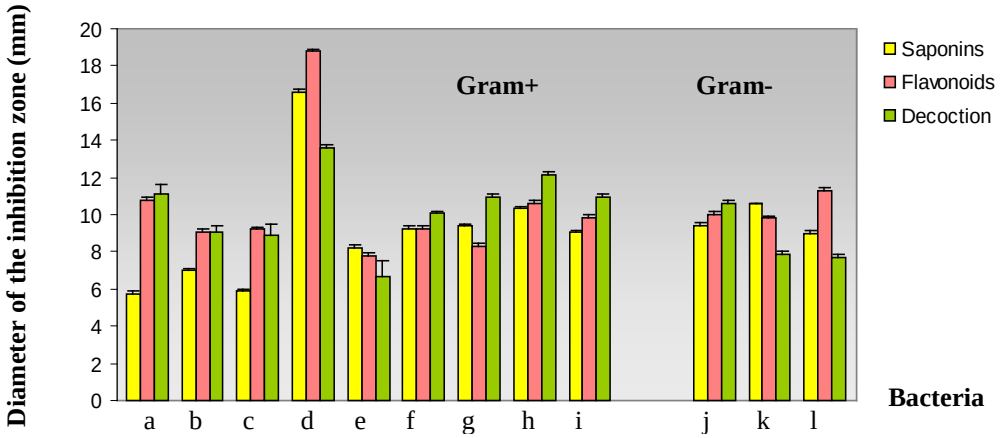

Figure 3 :Compared activity of three extracts on Gram (-)and gram (+) bacterial growth. **a**: E. Coli; **b**: E. Coli(BLSE); **c**: E. Coli (ATCC) **d**: Klebsiella oxytoca; **e**: K.pneumoniae; **f**: Serratia,sp; **g**: Pseudomonas,sp; **h**: P,aeruginosa(ATCC) ; **i** : Acinetobacter; **j**: Staphylococus aureus; **k**: S. epidermidis; **l**: S.aureus(ATCC)

Microbial tests reveal for each of three solutions studied an antibacterial activity well defined on most of the Gram+ and Gram- . The importance of this activity is variable depending on the strain (fig.3).

Klebsiela oxytoca was very sensitive towards the three solutions proved very active. Their diameters of zones of inhibition are of the order of 13,4mm, 18,7mm and 16,4mm respectively for the decoction, flavonoids and saponins. While *Klebsiela pneumonia* has proved resistant. Apart its effect on *Klebsiella oxytoca* whose sensibility towards the 3 solutions are quite similar the decoction is the average more active. With a concentration of 2% only its activity appears superior to that of flavonoids and saponins. This marked activity could be explained by the combined action of flavonoids and saponins in the decoction or by a synergy effect between the different constituents soluble in water because in the absence of complete chemical screening, we can not exclude the possibility of existence in the decoction of other molecules known for this type of activities such as: terpenoids (Ceccherell, *& al.*, 1985; Grade *&t al*., 1992;) and phenolic compounds (Slavienaka & *al*., 2005).

These sensitivity tests allowed us to determine the presence of an antibacterial activity in *Medicago sativa*. This plant is traditionally used to treat rum, digestive disorders, abscesses and other infectious diseases (Bouvyer, 2007). Therefore inhibiting the growth of bacteria tested partly responsible for these pathologies (Fauchère & April, 2002) would explain at least parts the plant using in traditional medicine.

Conclusion

It appears from this study that the phytochemical screening based on specific tests allowed to characterize some families of chemicals in relation to literature results.

The study of chemical profiles of crude extracts of flavonoids and saponins isolated from the leaves of *Medicago sativa* native soils of different shows for each substance rich in chemical compounds, however, varies

qualitatively and quantitatively from one soil to another. This shows that although there is a geographic unit of the source of plant material, homogenization chemical characteristics is all the same dependent edaphic factor.

The results of microbiological tests showed that the leaves of *Medicago sativa* possess chemical molecules with antibacterial power defined on the majority of strains tested. On Klebsiella oxytoca the effect is very potential.

Those results have been encouraged to promote *Medicago sativa* on an appropriate soil. It is necessary to conduct additional tests to confirm the specific use of the studied solutions to treat the bacterial infections caused by bacteria found to be sensitive to our extracts because the preliminary tests of bacterial activity allow us to justify the use of *Medicago sativa* in traditional pharmacopoeia suggesting that their leaves possess an interesting antibacterial compounds.

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Distribution of salinity and nutrients in soils under recently environment change

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Abstract: Many countries are facing environment change. This study aims to study the distribution of salinity and some nutrient (*i.e.* N, P, Fe, Mn, Zn and Cu) under recently environment change "climate factors, soil factors and human factors" in soils adjacent to North Delta, Idku region, Behra Governorate, Egypt between year 1986 and year 2011, whereas about 900 000 ha suffer from salinization problems, 6 % of Northern Delta region are salt-affected. Fourteen profiles (thirty nine samples), these representative profiles were transects vertical to Idko Lake. The study area is located between 31^{o} 10' and 31^{0} 40' N, and longitudes 30^{o} 25' and 31^{0} 20' E. The Idko Lake found on distance 1km the Mediterranean Sea.

The obtained results could be summarized as follows: Weight means to Electric conductivity (EC) in year 1986 were different the values in profiles. EC values of the studies soil were decrease with increase of soil depths. The highest values of EC were found in most profiles. The EC was between 1.30 to 51.70 dSm^{-1}, in comparison with year 2011 in all profiles were between 0.70 to 3.10 dSm^{-1} very slightly saline to non saline. In year 2011 available N in all profiles was medium whereas values were between 52.88 to 74.32 mg kg^{-1}. In comparison, in year 1986 available N was very lowest whereas values were between 1.20 to 10.6 mg kg^{-1}. In year 2011 was lowest available P in all profiles. In comparison with, year 1986 was between high and medium, whereas values were between 3.20 to 44.80 mg kg^{-1}. Available Fe in year 2011 increase in mostly profiles, whereas range was between 2.00 to 32.6 mg kg^{-1}. In comparison with, year 1986 was range was between 2.00 to 14.2 mg kg^{-1}. Available Mn in year 2011 increases in profiles, whereas range was between 2.10 to 5.50 mg kg^{-1}. In comparison with, year 1986 was range between 8.00 to 30.0 mg kg^{-1}. Data in year 2011 show that range available Zn was 0.45 to 5.60 mg kg^{-1}. In comparison with, year 1986 found profiles between 1.00 to 10.6 mg kg^{-1}. Available Cu is given in year 2011 show that highest value was all profiles. Available Cu of the studied profiles was range between 1.00 to 19.6 mg kg^{-1}. In comparison with, year 1986 all profiles were high, whereas range was between 3.20 to 11.8 mg kg^{-1}.

Keywords: Salinity, nitrogen, phosphorus, iron, manganese, zinc, copper and environment change.

Introduction

The world's population is estimated to increase from six billion about ten billion by 2050. To meet the food demand of the growing world population, a large increase in food production is required. Meanwhile, the increases in world population will result in a serious pressure on the existing agricultural land through urbanization and intensive cultivation (Ismail, 2002). FAO (2003) showed that the majority of salt-affected soils in Egypt are located in the Northern centralpart of the Nile Delta and on its Eastern and Western sides. About 900 000 ha suffer from salinization problems in cultivated irrigated areas, 6 % of Northern Delta region are salt-affected, 20 % of the Southern Delta and Middle Egyptian region and 25 % of the Upper Egypt region. Million hectares of arable land too saline for agriculture and hundreds of thousands hectares of agriculture productive land are land are lost annually for food production due to salinization (FAO, 2008). The factor affecting land are (climatic factors, soil factors and human factors). The three factors called natural or physical factors are affect natural vulnerability or potential degradation. The three factors affect the actual degradation (FAO, 1978). Dregne *et al*. (1995) reported that the land degradation processes occurring in the arid region of the world are vegetation, wind and water erosion, salinization and soil compaction. This mentioned that the geochemical land degradation processes especially salinization, alkalinization and sodification are broadly occurring in the areas like arid and semi-arid climatic zone. Gaddes (1997) found that the following human activities have main impacts; poor range management, which leads to over-grazing through overstocking. Cultivation practices on unsuitable land area as a result of constant population

growth, there is an extension of cultivation to soils less and suitable for this purpose (saline). An increase in temperature coupled with reduced rainfall will lead to predominantly up word water movement in soils, as currently seen in the more arid parts of the world and this will result in the accumulation of salts in the upper soil layers. Such effects will be intensified if poor quality irrigation water is used on agriculture soils. Climate change will increase inundation and salinity along coastal regions worldwide, through the influence of sea level rise (Pezeshki *et al.*, 1990). The impact of climate change on soil nutrients other than nitrogen, such as phosphorus and micronutrients, has largely been neglected (Legros *et al.*, 1994).

Increasing atmospheric CO_2 alone will increase soil organic matter (Loiseau *et al.*, 1994 and USDA, 2009). Abou El-Eneni *et al*. (2008) found that available nitrogen in soil after wheat plant cultivated in clay and calcareous soil were presented. The values of available nitrogen in soil after wheat in clay soil increased. Borhamy (2001) found that the distribution pattern of available P was almost similar to the obtained for the total amounts. *i.e*., the highest value was obtained from the Nile alluvium, while the lowest one was obtained from the old lacustrine sediment, probably due to the relatively high content of bound P-$CaCO_3$ in the old locustrine sediment. Mortvedt (2008) showed that iron deficiencies are found mainly on calcareous (high pH) soils. Cool, weather enhances Fe deficiencies, especially on soils marginal levels of available Fe. El-Maghraby *et al.* (2010) found that on study in the Northern West of Nile Delta available Fe varied from 1.8 and 22 mg kg^{-1}. He found negative correlations occurr available Fe and soil pH. Available Mn varied from 3.0 to 35.4 mg kg^{-1}. Aavailable Zn varied from 0.2 to 4.6 mg kg^{-1}. Available Cu varied from 1.0 to 32.2 mg kg^{-1}. This study aims to study the distribution of salinity and some nutrient (*i.e.* nitrogen, phosphorus, iron, manganese, zinc and copper) under recently environment change in some soils adjacent to Idko lake, Behra Governorate, Egypt between year (1986) and year (2011).

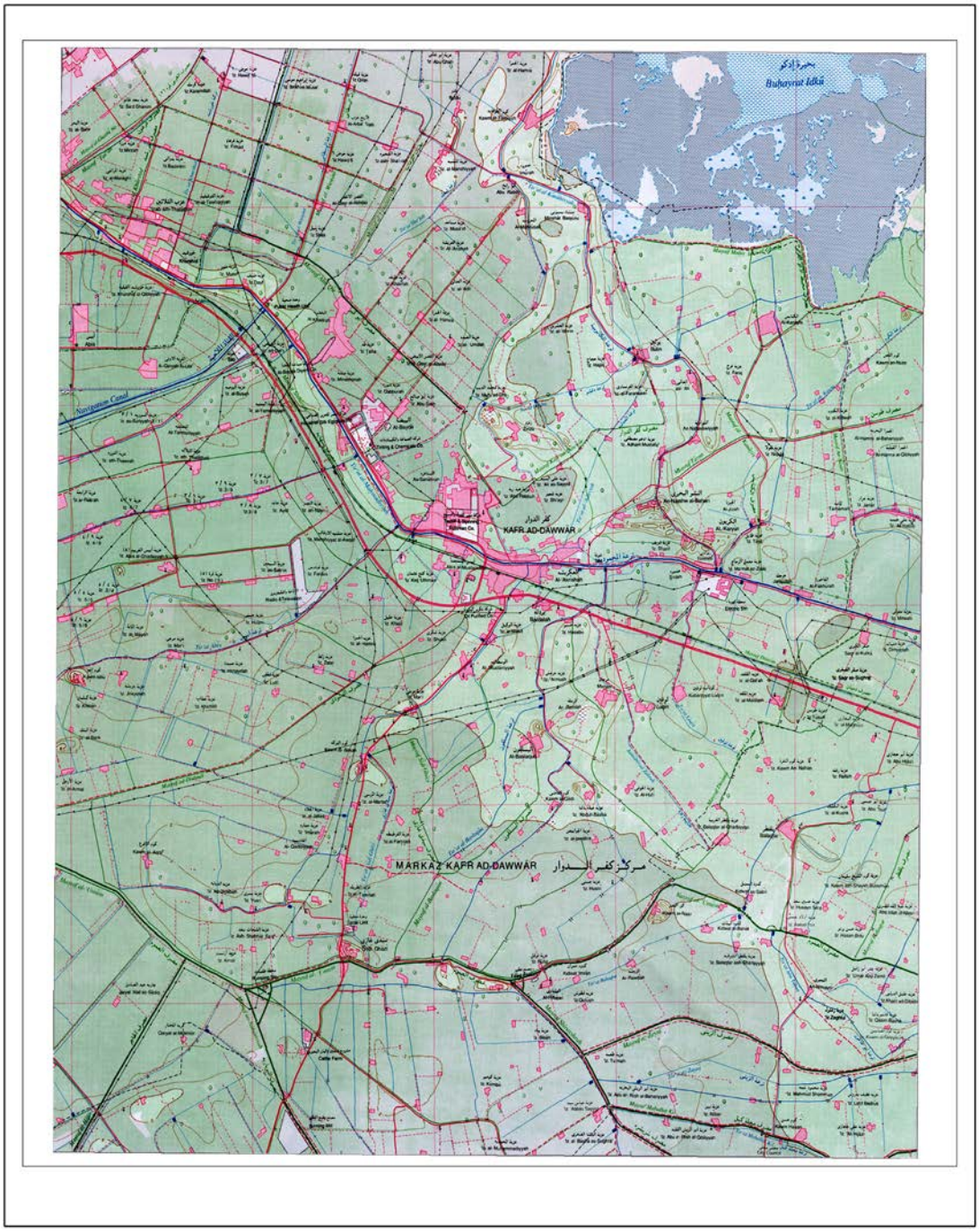
Materials and method

The current study was carried out to investigate the distribution of salinity and some nutrient (*i.e.* nitrogen, phosphorus, iron, manganese, zinc and copper) under recently environment change in some soils adjacent to Idko Lake, Behra Governorate, Egypt between year (1986) and year (2011)**.** To fulfill this purpose, fourteen profiles (thirty-nine samples, according to different layers "Table 3") were dug at different locations to represent physiographic units in the area according on a previous study in 1986 (Map 1). The collected soil samples were air dried, crushed, sieved to pass a 2mm sieve and preserved for further analyses. The sites of these deposits situated between 31^{o} 10' and 31^{0} 40' N, and longitudes 30^{o} 25' and 31^{0} 20' E. The Idko drain on the east, Abou Keir drain on the west, in the north found the Idko Lake, the Lake found on distance 1km the Mediterranean Sea and in the south El-Mahmodia canal. Meteorological data for the 1986 and 2011in study period are given in Table 1. Electrical conductivity in soil paste extract and soluble cations and anions according to Page *et al*. (1982). Available micronutrients Fe, Mn, Zn and Cu were extracted with "NH_4HCO_3-DTPA" according to Soltanpour(1985) and determined by using Atomic Absorption Spectrophotometer apparatus, Perkin Elemer, Model 969AA. Nitrogen was determined by micerokjeldahl method as described by Chapman and Pratt (1978). Available phosphor was eastimated colorimetrically according to Olsen *et al.* (1954). Particle size distribution (Table 2) was carried out by pipette method by Gee and Bauder (1986). Statistical analysis for soil properties according to Snedecor and Cochran (1980). Oertal and Gille (1963) suggested three measures for parameter, namely the weighed mean (W). The weighed mean was calculated as parameter of each layer of the solum multiplied by the thickness of the layer and dividing the sum of these products by the total thickness of all analyzed layers. According to those authors the weighed mean is the most satisfactory measure of the parameter status of a soil profile. The weighed mean concentration of a parameter is probably determined by pedogenic processes (except where the parent material is markedly heterogeneous in element content).

Table 1: Mean monthly temperature, rainfall, relative humidity, evaporation in the studied area to year (1986 and 2011)

Months	Temperature (C^0)						Rainfall (mm/month)		Relative humidity (%)		Evaporation (mm/day)		Wind Speed (Km)	
	1986			2011										
	Max	Min	Mean	Max	Min	Mean	1986	2011	1986	2011	1986	2011	1986	2011
Jan.	22.00	11.30	16.65	19.60	6.10	12.80	20.25	14.20	47.69	83.00	7.16	2.20	0.772	1.30
Feb.	22.60	11.96	17.28	20.40	6.30	13.40	18.60	12.90	47.76	83.00	7.32	2.70	0.772	1.40
Mar.	24.95	13.60	19.28	23.00	7.90	15.40	12.73	6.70	49.17	79.00	8.13	3.50	0.772	1.70
Apr.	26.10	15.20	20.65	30.10	10.40	20.25	8.66	2.60	53.63	71.00	9.80	5.00	0.824	1.50
May.	32.70	20.42	26.56	35.20	14.20	24.70	3.64	2.90	57.98	66.00	7.83	6.50	0.824	1.50
Jun.	33.00	19.93	26.47	38.00	17.00	27.50	0.00	0.00	59.02	69.00	6.97	6.70	0.721	1.50
July.	31.88	19.12	25.50	43.00	19.00	31.00	0.00	0.00	60.66	75.00	5.50	5.70	0.721	1.30
Aug.	32.55	18.36	25.46	45.60	18.40	32.00	0.00	0.00	61.38	77.00	4.44	5.00	0.721	1.30
Sep.	30.61	17.09	23.85	44.90	17.71	31.31	0.17	0.15	55.85	77.00	4.30	4.80	0.824	1.10
Oct.	31.00	14.96	22.98	33.70	15.60	24.65	0.30	0.21	60.38	78.00	4.23	3.80	0.830	1.00
Nov.	24.65	13.90	22.00	25.90	12.60	19.25	12.33	6.90	54.33	83.00	3.30	2.80	0.856	1.10
Dec.	21.11	12.00	16.56	21.70	8.30	15.00	23.60	13.60	54.56	86.00	3.18	2.10	0.877	1.10

Source: Meteorological survey department, Egypt.



Map 1: Location of soil profiles in the studied soil

Table 2: The weight mean to partical size distribution and saturation precent of the studied soils between year (1986 & 2011)

Location. No.	C. Sand%		F. Sand%		Silt %		Clay %		SP	
	1986	2011	1986	2011	1986	2011	1986	2011	1986	2011
1. Shebl.Iz	3.99	1.23	26.46	12.11	25.69	22.37	43.11	64.50	84.00	79.70
2.AlkaserAlh	9.62	2.89	46.72	17.04	17.53	37.58	26.16	42.48	51.00	81.80
3.Hawad 6	6.20	1.17	43.02	3.79	21.56	18.21	29.22	76.83	61.00	97.60
4. Zoqalih.Iz	11.83	4.00	41.48	16.60	15.57	46.80	30.86	32.60	61.00	80.00
5.Mini.Ba(1)	8.46	1.70	36.12	6.00	23.29	36.80	31.55	55.50	58.00	76.70
6.Mini.Ba(2)	6.90	1.90	25.66	10.90	22.13	21.20	45.31	66.00	86.00	77.50
7. Alashrin.Iz	1.31	1.70	28.72	11.90	29.62	26.30	40.36	60.10	62.00	87.90
8.Alno. Alba	1.26	2.72	42.64	21.58	14.95	36.54	41.50	41.07	80.00	77.92
9. Sherf.Iz	1.74	1.17	42.13	10.97	23.36	29.00	32.24	59.05	53.00	77.48
10.Bawadi	0.96	2.40	20.15	9.10	32.14	34.20	46.40	54.30	78.00	79.90
11. farag.Iz	1.38	0.70	21.39	2.70	33.97	19.30	43.26	77.30	64.00	85.90
12.Alkanayes	0.92	2.10	16.62	16.10	31.36	32.20	48.77	49.60	74.00	81.80
13.Idku(1)	3.67	1.60	17.99	9.90	33.32	30.40	45.06	58.10	93.00	83.70
14.Idku(2)	7.88	1.20	21.97	5.70	20.83	22.20	47.30	70.90	82.00	91.00

Table 3: Location, depth of grand water and cultivated plants of the studied soil profiles

Location. Name	Profile No.	Depths cm	Cultivated plant	Depth of grand water (cm)	
				1986	2011
Shebl.Iz	1	0-30, 30-120, 120-150	Wheat	120	150
Alqasr Alkhdr	2	0-30, 30-120, 120-150	Wheat	120	150
Hawd.6	3	0-30, 30-120, 120-150	Wheat	120	150
Zoqalih.Iz	4	0-30, 30-80	Wheat	120	80
Minishit Basuone 1	5	0-30, 30-70	Wheat	150	70
Minishit Basuone 2	6	0-30, 30-60	Wheat	150	60
Al ashrin.Iz	7	0-30, 30-100, 100-150	Wheat	100	150
ALnoshio Albahri	8	0-30, 30-120, 120-150	Wheat	110	160
Sherf.Iz	9	0-30, 30-120, 120-160	Wheat	150	160
Bawadi	10	0-30, 30-120, 120-160	Wheat	150	160
Farag.Iz	11	0-30, 30-120, 120-160	Wheat	150	160
Alkanays	12	0-30, 30-120, 120-150	Wheat	85	150
Idku 1	13	0-30, 30-80, 80-150	Wheat	150	150
Idku 2	14	0-30, 30-70, 70-150	Wheat	150	150

Results and discussions

1. Weight mean of electric conductivity (EC) of the studied soils 1986 and 2011.

The presented data in Table (4) showed that the weight means to EC dSm^{-1} values of the studies soil samples in year 1986 were different the values in profiles. The highest values of EC were found in profile Idku 2, Idku 1 very saline whereas the values were 51.70 and 47.80 dSm^{-1} respectivly, profile Minishit Basuni 2 was EC vales saline whereas values 9.00 dSm^{-1}, in profiles Alnoshio Albahri, Shebl Izba, Hawad 6 were EC moderately saline whereas values 7.80, 6.70, 4.50dSm^{-1} respectivly, and profiles Bawadi, Minishit Basuni 1, Alashrin Izba, Alkanayes and Zoqalih Izba were EC slightly saline whereas values 3.20, 3.10, 3.10, 2.70 and 2.40 dSm^{-1}, respectively, according to Richards (1954).

The profiles "Idku 1 and Idku 2" in year 1986 not cultivation, these profiles cultivated in year 1993 and increase human activity along time. The environmental conditions (temperature, evaporation, humidity, groundwater table (its depth and salinity) and activity human affect the salt balance of the soil and this is refelected directly on the exchangeable sites in soil complex. The range EC due to the long cultivation periods and increasing agriculture activity of Idku area, rainfall the rate of in year 1986 was 100.28mm/year, temperature the mean range to in year 1986 was 24.0C^{o} and evaporation mean found range in year 1986 was 6.97mm/day.

In comparison with, data in Table (5) were the weight means to EC dSm^{-1} values of the studies soil samples in year 2011 were different the values in profiles. The highest values of EC were found in

profile "Idku 1, Sherf Izba, Alnoshio Albahri, Shebl Izba" 2.60, 2.40, 2.30 and 3.10 dSm^{-1} respectively, this data direction to profiles is very slightly saline. Other profiles values EC 0.70, 1.90, 0.70, 0.90, 1.50, 0.70, 1.30, 1.40, 1.80 and 1.60 dSm^{-1} "Alkaser Alakhdar, Hawad 6, Zoqalih Izba, Minishit Basuni 1, Minishit Basuni 2, Alashrin Izba, Bawadi, Farag Izba, Alkanays and Idku 2" respectively, this profiles is non saline. The range EC was due to the long cultivation periods and increasing agriculture activity of Idku area, rainfall the rate of in year (2011) 62.40 mm/year, Temperature the mean range to in year (2011) 26.56 C^o and evaporation mean found range in year (2011) 4.85 mm/day. Areas were classified as non-to slightly-saline. This is probably due to it's relatively clay textured grade and well drainage conditions that enhanced the removal of the excess salts. Soil salinity is more associated with the inherited accumulations due to the intensive weathering, shallow water table, continuous lateral seepage from the relatively high areas and absence of adequate soil drainage system. **Nadi *et al.*, (2010)** showed that EC_e values in the Nile alluvial soils were ranged from 0.80 to 12.26 dSm^{-1} indicate that the soils are non saline to moderately saline.

Table 4: The weight mean to electric conductivity and soluble ions of the studied soils (1986)

Location. No.	ECe dSm^{-1}	Soluble cations (mmolc L^{-1})				Soluble anions(mmolc L^{-1})		
		Ca^{2+}	Mg^{2+}	Na^{+}	K^{+}	HCO_3^{-}	Cl^{-}	SO_4^{2-}
1.Shebl.Iz	6.70	28.2	23.9	30.3	0.80	2.20	24.8	56.2
2.Alqasr Alkhdar	2.10	7.40	7.40	8.30	0.50	3.50	6.00	14.2
3.Hawad 6	4.50	7.20	10.9	26.7	0.60	3.30	25.3	16.9
4.Zoqalih. Iz	2.40	6.50	8.70	13.0	0.60	4.90	7.50	16.4
5.MinishitBasuni(1)	3.10	19.7	13.2	6.90	0.40	2.30	3.80	40.2
6.MinishitBasuni(2)	9.00	24.1	20.0	71.0	1.50	2.40	14.4	99.9
7.Alashrin.Iz	3.10	8.60	6.70	18.7	0.40	3.80	12.6	18.0
8.Alnoshio AlBahri	7.80	5.90	9.40	63.4	0.90	4.00	45.1	30.6
9.Sherf.Iz	1.60	5.30	4.30	6.20	1.00	2.30	4.00	9.60
10.Bawadi	3.20	4.30	4.60	18.7	0.20	4.30	8.80	21.6
11.Farag.Iz	1.30	5.80	3.50	6.50	0.20	3.90	4.20	7.90
12.Alkanays	2.70	4.10	4.50	21.7	0.20	3.40	7.30	19.9
13.Idku(1)	47.8	34.8	111	432.9	9.20	2.30	478.4	87.2
14.Idku(2)	51.7	49.5	76.8	480.6	8.20	1.00	493.6	120.5

*No detected CO_3^{2-}

Table 5: The weight mean to electric conductivity and soluble ions of the studied soils (2011)

Location. No.	EC_e dSm^{-1}	Soluble cations(mmolc L^{-1})				Soluble anion(mmolc L^{-1})		
		Ca^{2+}	Mg^{2+}	Na^{+}	K^{+}	HCO_3^{-}	Cl^{-}	SO_4^{2-}
1.Shebl.Iz	3.10	7.23	8.15	13.3	0.69	3.92	15.78	9.69
2.Alqasr Alkhdar	0.70	1.72	1.45	2.90	0.20	1.33	3.28	1.66
3.Hawad 6	1.90	4.92	3.89	6.91	0.46	2.22	9.67	4.29
4.Zoqalih.Iz	0.70	1.44	1.07	3.70	0.31	1.13	3.10	2.29
5.MinishitBasuni(1)	0.90	2.11	2.01	4.58	0.50	1.77	5.19	2.28
6.MinishitBasuni(2)	1.50	3.52	3.60	5.44	0.22	2.15	6.92	3.70
7.Alashrin.Iz	0.70	1.40	1.30	3.33	0.34	1.09	3.38	1.91
8.Alnoshio AlBahri	2.30	4.75	3.58	9.12	0.20	2.30	14.0	4.35
9.Sherf.Iz	2.40	6.90	6.02	8.60	0.23	3.08	12.8	5.91
10.Bawadi	1.30	3.44	2.23	5.21	0.43	2.69	5.08	3.54
11.Farag.Iz	1.40	3.63	3.64	5.75	0.18	2.06	7.41	3.73
12.Alkanays	1.80	4.84	3.27	8.19	0.16	2.45	10.2	3.86
13.Idku(1)	2.60	5.71	6.46	9.19	1.90	4.05	13.8	7.35
14.Idku(2)	1.60	3.01	3.81	4.63	0.52	1.40	6.87	3.69

*No detected CO_3^{2-}

2. Statistical analysis the weight mean of soil electric conductivity.

The presented data in Table (6) show that some statistical parameters of electric conductivity of weight mean of the some location in studied soils. Electric conductivity (EC) in mean year (1986) 10.57 increase from year (2011) 1.64.

Also, stander deviation (stDev) to electric conductivity EC in year (1986) 16.77 increase from year (2011) 0.76. Stander deviation (SE) to electric conductivity (EC) in year (1986) 4.48 increase from year (2011) 0.20.

Table 6: Statistical analysis the weight mean of soil electric conductivity

Variable	Mean		Minumim		Maximum		
	1986	2011	1986	2011	1986		2011
EC dSm^{-1}	10.57	1.64	1.30	0.70	51.70		3.10
	StDev		SE		SE	T	
	1986	2011	1986	2011	Different	Test	Tabulated
	16.77	0.76	4.48	0.20	4.43	2.02	2.16

3. Distribution availability of macronutrients (N and P) in surface layer of the studied soils 1986 comparison with 2011

Data presented in Table (7) show that of studied soils available macronutrients in years (1986 and 2011), in year (2011) available nitrogen was improved on all profiles, the results indicated that the available nitrogen in all profiles were medium. In comparison with, year (1986) available nitrogen was very lowest, because the farmers changed the fertilization strategies whereas now farmers added NH_4NO_3 (N 33%) and Urea (N 46.5%) fertilizers throw through year in soil and cultivation crops which help on catch nitrogen on roots for example, clover and bean, these results agreement with Abou El-Eneni *et al*. (2008).

Also, to satisfy and meet the objectives of the present study, Table (7) showed that of the studied area in year (2011) was lowest available phosphor in all profiles except profile "Alnoshio Albahri" was medium available phosphor. In comparison with, year (1986) was between high and medium, because carelessness in phosphor fertilizer, poor range management to agriculture the cycle, misuses of irrigation, high temperature help on fast analysis to organic matter and cultivation practices were unsuitable land so a cause of consumed of available phosphor (Gaddes, 1997), according to be critical level of the studied available plant nutrient (Lindsay and Norvell, 1978). Shalabbi (1977) studying the effect of soluble divalent cations Ca^{2+} and Mg^{2+} individually on available phosphorus in Egyptian soils (Idku region).

Table 7: Available of nitrogen and phosphor (mg kg^{-1}) in surface layer of the studied soils (1986 & 2011)

Location No.	N				P			
	1986		2011		1986		2011	
	AV.*	Clas.*	AV.*	Clas.*	AV.*	Clas.*	AV.*	Clas.*
1.Shebl.Iz	3.80	Low	52.88	Medium	5.00	Low	4.00	Low
2.Alqasr Alkhdar	10.3	Low	65.61	Medium	21.5	High	3.50	Low
3.Hawad 6	9.60	Low	63.64	Medium	16.0	High	2.80	Low
4.Zoqalih.Iz	10.6	Low	64.11	Medium	12.2	High	4.30	Low
5.MinishitBasuni(1)	6.10	Low	61.12	Medium	12.7	High	2.10	Low
6.MinishitBasuni(2)	5.50	Low	64.06	Medium	3.20	Low	2.70	Low
7.Alashrin.Iz	8.30	Low	72.15	Medium	18.4	High	3.10	Low
8.Alnoshio AlBahri	8.30	Low	59.01	Medium	8.40	Medium	7.00	Medium
9.Sherf.Iz	4.20	Low	64.16	Medium	12.4	High	2.70	Low
10.Bawadi	7.60	Low	65.11	Medium	10.4	High	3.00	Low
11.Farag.Iz	7.40	Low	73.00	Medium	8.00	Medium	2.80	Low
12.Alkanays	8.30	Low	74.32	Medium	44.8	High	2.80	Low
13.Idku(1)	1.30	Low	61.66	Medium	4.90	Low	2.00	Low
14.Idku(2)	1.20	Low	67.13	Medium	6.10	Medium	1.90	Low

Note: AV.=available, Clas.*=classification. Critical level of the studied available plant nutrients (mg/kg), after Lindsay and Norvell (1978),[N <40.0 Low, 40.0-80.0 Medium, >80.0 High; P <5.0 Low, 5.0-10.0 Medium, >10.0 High.

4. Distribution of micronutrient availability in surface layer of the studied soils 1986 comparison with 2011

Data in Table (8a&b) showed the AB-DTBA extractable of some micronutrient in surface layers of the studied soils in year (2011) and year (1986), the amount of available Fe extracted with DTPA in the studied soils year (2011) increase in mostly profiles, whereas range was between 2.00 to 32.6 mg kg^{-1}. In comparison with, year (1986) was range between 2.00 to 14.2 mg kg^{-1} it could be attributed that the most soil was farms tree guava, it greedy iron fertilizer so farmers add iron

compounds to collect increase mass production. Also, other layers were range between 1.80 to 4.60 mg kg^{-1} amounts of available Fe increased by increasing clay (Nadi *et al*., 2010).

The presented data in year (2011) show that standard available Mn in surface layers of studies soils. All surface layers in the studies soils were high between range 2.10 to 5.50 mg kg^{-1}. In comparison with, year (1986) was range between 8.00 to 30.0 mg kg^{-1}. Data showed that ratio of Mn in year (2011) were decrease in comparison year (1986). It could be attributed that the because carelessness in organic matter, poor range management to agriculture the cycle, misuses of irrigation, high temperature help on fast analysis to organic matter and cultivation practices were unsuitable land. The obtained resultes are in agreement with Nadi, *et al.* (2010) as she found that Mn values in the sand, silt and clay fraction in the Nile alluvial soils highest values are detected in the surface layer, while the lowest values are associated with the deepest layers.

Data in year (2011) show that standard available Zn in surface layers of studies soils. Found standard Zn is low in some profiles "Hawad 6, Alnoshio Albahri, Sherf Izba and Bawadi" whereas range between 0.45 to 0.71 mg kg^{-1}. Also found profiles standard Zn was medium in profiles "Farag Izba and Idku 1" whereas range 0.98 and 2.20 mg kg^{-1} respectively, ever lasting the profiles is high content whereas range between 1.83 to 5.60 mg kg^{-1}. In comparison with, year (1986) found profiles between medium and high, whereas range between 1.00 to 10.6 mg kg^{-1}. It could be attributed that the lowest amount of silt and organic matter.

Data of available copper are given in year (2011) show that highest value was all profiles. Available copper of the studied profiles were range from 1.00 to 19.6 mg kg^{-1}. In comparison with, year (1986) all profiles were high, whereas range between 3.2 to 11.8 mg kg^{-1}. These values are relatively higher than those of El Sayed (1983) and Rashad (1986) may be due to seepage from Idko lake. Too the availability of soil copper may be due to the presence of hydroxyl acid produced by microorganisms from the organic material present in the soils (El Damaty *et al*., 1973). According to the deficiency limits of available Fe, Mn, Zn and Cu given by Soltanpour (1985) all the studied soils contained adequate to high levels of Fe, Mn, Zn and Cu to support normal plant growth.

Table 8a: Available of some micronutrients ($mgkg^{-1}$) in surface layers of the studied soils (2011)

Location. No.	Fe		Mn		Zn		Cu	
	Av.	Clas.	Av.	Clas.	Av.	Clas.	Av.	Clas.
1. Shebl.Iz	15.6	High	4.30	High	2.32	High	6.20	High
2.Alkaser AlKdar	32.6	High	3.20	High	1.83	High	9.00	High
3.Hawad 6	23.6	High	3.50	High	0.46	Low	3.20	High
4. Zoqalih.Iz	27.4	High	4.40	High	5.60	High	19.6	High
5.Minishit Basuni (1)	7.40	High	2.10	High	1.83	High	4.60	High
6.Minishit Basuni (2)	20.8	High	5.50	High	2.61	High	3.80	High
7. Alashrin.Iz	5.20	High	3.90	High	1.83	High	1.80	High
8.Alnoshio Albaahri	12.8	High	4.50	High	0.45	Low	2.20	High
9. Sherf.Iz	14.4	High	3.80	High	0.63	Low	2.20	High
10.Bawadi	6.20	High	3.90	High	0.71	Low	1.00	High
11.farag.Iz	2.00	Low	3.90	High	0.98	Medium	1.20	High
12.Alkanayes	10.6	High	3.90	High	1.83	High	1.00	High
13.Idku(1)	2.40	Low	3.80	High	1.41	Medium	2.20	High
14.Idku(2)	4.20	Medium	4.20	High	2.16	High	4.20	High

Note: *Av.=Available /Clas.=Classification " mg kg-1" (Fe 0-3.0 Low, 3.1-5.0 Medium and > 5.0 High; Mn 0-0.5 Low, 0.6-1.0 Medium and > 1.0 High; Zn 0-0.9 Low, 1.0-1.5 Medium and > 1.5 High; cu0-0.2 Low,0.3-0.5 Medium and >0.5 High)According to Soltanpour(1985).

Table (8b): Available of some micronutrients (mg kg^{-1}) in surface layers of the studied soils (1986)

Location. No.	**Fe**		**Mn**		**Zn**		**Cu**	
	Av.	**Clas.**	**Av.**	**Clas.**	**Av.**	**Clas.**	**Av.**	**Clas.**
1. Shebl.Iz	4.80	Medium	12.0	High	1.40	Medium	5.00	High
2.Alkaser AlKdar	4.60	Medium	16.0	High	6.40	High	11.8	High
3.Hawad 6	8.60	High	30.0	High	10.6	High	11.2	High
4. Zoqalih.Iz	13.4	High	18.3	High	5.40	High	10.3	High
5.Minishit Basuni (1)	8.80	High	10.0	High	1.60	High	6.50	High
6.Minishit Basuni (2)	10.8	High	14.5	High	1.00	Medium	6.70	High
7. Alashrin.Iz	5.00	Medium	13.8	High	1.20	Medium	4.60	High
8.Alnoshio Albaahri	9.20	High	18.1	High	1.80	High	5.80	High

9. Sherf.Iz	3.00	Low	10.3	High	1.60	High	4.50	High
10.Bawadi	10.5	High	16.0	High	1.40	Medium	5.80	High
11. farag.Iz	2.00	Low	14.0	High	1.60	High	4.40	High
12.Alkanayes	14.2	High	8.00	High	1.00	Medium	7.80	High
13.Idku(1)	5.00	Medium	12.0	High	1.20	Medium	3.20	High
14.Idku(2)	11.2	High	24.0	High	2.40	High	7.80	High

Conclusion

The results obtained in the study showed that:
1-The electric conductivity in year 2011 decreased in compares with 1986
2-Available nitrogen in year 2011 increased in compares with year 1986. However available phosphors in year 2011 decreased in compares with 1986.
3-Available iron in year 2011 increased in compares with year 1986. However available manganese, zinc and copper in year 1986 increased in compares with 2011.

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Factors Affecting Leisure Time Activities According to Vocational High School Students

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Abstract: The main problem of this study is to prove the reasons why vocational high school students cannot spend their leisure time. In the direction of this main problem, sub-problems of the study is to prove the reasons why vocational high school students cannot spend their leisure time with an activity "according to the variables such as class level, gender, region that parents live, economic conditions of the parents, educational background of mother and father. In this research, descriptive research method has been used in general screening model. The population of the study comprises of 50.539 Vocational High School students who are still attending. The sample of the study comprises of 1380 students. The reasons why they cannot spend their leisure time with an activity according to Vocational High School students are put in order from high to low: I do not have enough time, my achievement is decreasing, we are not instructed by the school, activities are not organized in my school, we are not instructed by our teachers, my parents do not allow me and my parents do not have enough income.

Key words: Leisure Time, Out-of-School Time, Free Time, Vocational High School, Education, Student.

Introduction

It may be said that since the early ages one the most important affairs of human life is spending their leisure time with useful activities. In contrast to past, controlling of children by both parents and schools is getting harder. Factors such as social environment and internet, written-visual media have started to be much more dominant than parents and the schools. In this context, the foundations of making a habit of spending their leisure time with useful activities and turning into attitudes as from person's school age must be one of the basic functions of formal education. It is explicit that students' spending their leisure time with useful activities will make a great contribution to students' canalizing individual and academic success by improving themselves. It is apparent that this kind of activities has contribution intended for the students' assuming responsibility, having positive interpersonal relations, creativities, academic successes and self-actualizations. On the other side, in the education of youths who are taking a step towards adulthood, evaluating their out-of-school time with activities for their not heading for bad habits to be formed their personalities, in their heaths' being protected and their preparing a better future is quite important (Demir & Demir, 2006; Terzioğlu & Yazıcı, 2003; Tezcan, 1976).

** This study has been generated from one part of post graduate thesis supervised by second author.

Spending free time has become an important subject in many counties of the world. Free time has some advantages such as; creativity, pleasure, satisfactory, enhancing personal satisfaction, developing physical-mental-psychological capacity and leading entertainment (Demirel & Harmandar, 2009; Sağlam Saföz, 2008; Demir & Demir, 2006). The main aim of education is to train good people, good citizens. In this context, the primary function of educational institutions is to train youths as competent adults of the future, to provide their compatibility to the social life and to gain them democratic and moral (Özer, Gelen & Öcal, 2009; Yetiş, 2008).

The most important factors for programing the students' out-of-school time are schools and parents. Parents should know that social activities are useful for their children and school works cannot supersede these activities alone. If the child has been given enough time to study, habit of preparing their weekly program should be gained by giving permission to his/her sparing enough time to play (have a good time). Schools, however, should be the place where the students can spend their out-of-school time. At the end of the school hours, with social events and recreational activities, students should be encouraged to spend their free time efficiently and the students should be in the habit of these activities and should reflect their youths and adulthoods period (Kırkpınar, 2004; Tezcan, 1976). For these reasons, in the future in order to be the students' being individuals who have completed their personalities, be able to take social responsibilities, spend time efficiently, are away from harmful habits, they should learn to use their out-of-school time accurately (Ministry of National Education, 2012). In this framework, it is thought that this study will provide contributions in terms of knowledge as a source to the school administrators, teachers, parents, civil society institutions, local administratiors and other relevants.

The main problem of the study "According to Vocational High School students, the determination of the reasons of their out-of-school time." Sub-problems of the research, however, are these; how are the reasons of the Vocational High School students' not being able to spend their out-of-school time according to "class level, gender, the place where the parents live, economic situation of the parents, educational level of father and mother variables?"

Methodology

In this research, descriptive research method in general screening model has been used. Target population of the study has consisted of 50.539 students, attending the Vocational High Schools. Sample of the study, %99 confidence %1 margin of error accuracy, has consisted of 1800 students determined by ratio sampling from these schools. But, data analysis have been made through (over) the rest 1380 surveys after the ones which were filled inappropriately.

In research, the 5th section of the survey "Forms of the students' spending their out-of-school time and the factors affecting these forms" has been used in order to determine the forms of the Vocational High School students' out-of-school time and the factors affecting these forms as data collection tools. The 1st section of the survey comprises personal information. In 2nd section, 7 cases have been given the reasons why the

students cannot take part in the activities in their out of school time. As this section (5th section) has the classification property, reliability work has not been studied.

Findings

3.1.What are the reasons of the Vocational High School students' not being able to spend their out-of-school time with any activities? findings relating to this basic problem

Table 1. The reasons of the Vocational High School students' not being able to spend their out-of-school time

	n	%
have enough time	746	54,1
ievement is decreasing	383	27,8
not instructed by the school	298	21,6
ies are not organized in my school	273	19,8
not instructed by our teachers	214	15,5
ents don't allow	188	13,6
ents don't have enough money	176	12,8

According to Table 1, the reasons of not being able to spend their out-of-school time in regard to Vocational High School students are like these from top to least (maximum to minimum): "I don't have enough time (% 54,1), my achievement is decreasing (% 27,8), we are not instructed by the school (% 21,6), activities are not organized in my school (% 19,8), we are not instructed by our teachers (% 15,5), My parents don't allow (% 13,6) and My parents don't have enough money (% 12,8).

3.2. "How are the reasons of the Vocational High School students' not being able to spend their out-of-school time with any activities" according to gender?

Table 2. The reasons of not being able to spend time according to "gender" variable

asons of not taking part in activity	Gender	Yes		No	
		n	%	n	%
don't have enough time	Girl	251	% 33,6	205	% 32,3
	Boy	495	% 66,4	429	% 67,7
My parents don't allow	Girl	79	% 42,0	377	% 31,6
	Boy	109	% 58,0	815	% 68,4
parents don't have enough money	Girl	44	% 25,0	412	% 34,2
	Boy	132	% 75,0	792	% 65,8
ities are not organized in my school	Girl	80	% 29,3	376	% 34,0
	Boy	193	% 70,7	731	% 66,0
achievement is decreasing	Girl	133	% 34,7	823	% 32,4
	Boy	250	% 65,3	574	% 67,6
e are not instructed by our teachers	Girl	48	% 22,4	408	% 35,0
	Boy	166	% 77,6	758	% 65,0

e not instructed by the school	Girl	78	% 26,2	378	5 34,9
	Boy	220	% 73,8	704	5 65,1

According to the gender variable, the reasons of the Vocational High School students' not being able to take part in an activity are like these: at most school boys, I don't have enough time (66,4%), my parents don't allow (58,0%), my parents don't have enough money (75,0%), activities are not organized in my school (70,7%), my achievement is decreasing (65,3%), we are not instructed by our teachers (77,6%) and we are not instructed by the school (73,8%).

3.3. How are "The reasons of the Vocational High School students' not being able to spend their out-of-school time with any activities"according to class level?

Table 3. The reasons of not being able to spend time according to "class level" variable

ons of not taking part in activity	Class Level	Yes		No	
		n	%	n	%
on't have enough time	9	109	% 14,6	81	5 12,8
	10	394	% 52,8	298	5 47,0
	11	196	% 26,3	202	5 31,9
	12	47	% 6,3	53	% 8,4
y parents don't allow	9	19	% 10,1	71	5 14,3
	10	90	% 47,9	502	5 50,5
	11	68	% 36,2	330	5 27,7
	12	11	% 5,9	89	% 7,5
arents don't have enough money	9	21	% 11,9	69	5 14,0
	10	93	% 52,8	499	5 49,8
	11	50	% 28,4	348	5 28,9
	12	12	% 6,8	88	% 7,3
ities are not organized in my school	9	45	% 16,5	145	5 13,1
	10	141	% 51,6	551	5 49,8
	11	72	% 26,4	326	5 29,4
	12	15	% 5,5	85	% 7,7
chievement is decreasing	9	65	% 17,0	125	5 12,5
	10	191	% 49,9	501	5 50,3
	11	112	% 29,2	286	5 28,7
	12	15	% 3,9	85	% 8,5
are not instructed by our teachers	9	24	% 11,2	166	5 14,2
	10	76	% 35,5	516	5 52,8
	11	92	% 43,0	306	5 26,2
	12	22	% 10,3	78	% 6,7
are not instructed by the school	9	35	% 11,7	155	5 14,3
	10	142	% 47,7	550	5 50,8
	11	101	% 33,9	297	5 27,4
	12	20	% 6,7	80	% 7,4

According to the class level variable, the reasons of the Vocational High School students' not being able to take part in an activity are like these: at most 10th grade students, I don't have enough time (52,8%), my parents don't allow (47,9%), my parents don't have enough money (52,8%), activities are not organized in

my school (51,6%), my achievement is decreasing (49,9%), we are not instructed by the school (47,7%); 11th grade, we are not instructed by our teachers (43,0%).

3.4. "How are the reasons of the Vocational High School students' not being able to spend their out-of-school time with any activities" according to the place where parents live?

Table 4. The reasons of not being able to spend time according to "the place where parents live" variable

ısons of not taking part in activity	ıce where the parents live	Yes		No	
		n	%	n	%
don't have enough time	City	443	% 59,4	327	% 51,6
	County	234	% 31,4	231	% 36,4
	Town	8	% 1,1	19	% 3,0
	Village	61	% 8,2	57	% 9,0
My parents don't allow	City	80	% 42,6	390	% 57,9
	County	93	% 49,5	372	% 31,2
	Town	2	% 1,1	25	% 2,1
	Village	13	% 6,9	105	% 8,8
parents don't have enough money	City	91	% 51,7	379	% 56,4
	County	56	% 31,8	409	% 34,0
	Town	2	% 1,1	25	% 2,1
	Village	27	% 15,3	91	% 7,6
vities are not organized in my school	City	144	% 52,7	326	% 56,5
	County	99	% 36,3	366	% 33,1
	Town	4	% 1,5	23	% 2,1
	Village	26	% 9,5	92	% 8,3
achievement is decreasing	City	214	% 55,9	356	% 55,8
	County	136	% 35,5	329	% 33,0
	Town	4	% 1,0	23	% 2,3
	Village	29	% 7,6	89	% 8,9
are not instructed by our teachers	City	113	% 52,8	357	% 56,3
	County	76	% 35,5	389	% 33,4
	Town	5	% 2,3	22	% 1,9
	Village	20	% 9,3	98	% 8,4
are not instructed by the school	City	170	% 57,0	300	% 55,5
	County	94	% 31,5	371	% 34,3
	Town	7	% 2,3	20	% 1,8
	Village	27	% 9,1	91	% 8,4

According to the place where the parents live variable, the reasons of the Vocational High School students' not being able to take part in an activity are like these: at most students living in cities, I don't have enough time (59,4%), My parents don't have enough money (51,7%), activities are not organized in my school (52,7%), my achievement is decreasing (55,9%), we are not instructed by our teachers (52,8%) and we are not instructed by the school (57,0%); students living in counties, My parents don't allow (49,5%).

3.5. "How are the reasons of the Vocational High School students' not being able to spend their out-of-school time with any activities" according to the economic situation of the parents?

Table 5. The reasons of not being able to spend time according to "the economic situation of the parents" variable

ons of not taking part in activity	:onomic situation of the parents	Yes		No	
		n	%	n	%
ɔn't have enough time	Good	149	٪ 20,0	64	› 25,9
	Medium	544	٪ 72,9	:20	› 66,2
	Poor	53	٪ 7,1	50	٪ 7,9
y parents don't allow	Good	33	٪ 17,6	:80	› 23,5
	Medium	136	٪ 72,3	:28	› 69,5
	Poor	19	٪ 10,1	34	٪ 7,0
[y parents don't have enough money	Good	9	٪ 5,1	:04	› 25,2
	Medium	114	٪ 64,8	:50	› 70,6
	Poor	53	٪ 30,1	50	٪ 4,2
vities are not organized in my school	Good	57	٪ 20,9	:56	› 23,1
	Medium	198	٪ 72,5	'66	› 69,2
	Poor	18	٪ 6,6	35	٪ 7,7
My achievement is decreasing	Good	66	٪ 17,2	:47	› 24,8
	Medium	300	٪ 78,3	:64	› 66,6
	Poor	17	٪ 4,4	36	٪ 8,6
ıre not instructed by our teachers	Good	31	٪ 14,5	:82	› 24,2
	Medium	169	٪ 79,0	'95	› 68,2
	Poor	14	٪ 6,5	39	٪ 7,6
ıre not instructed by the school	Good	56	٪ 18,8	:57	› 23,8
	Medium	228	٪ 76,5	'36	› 68,0
	Poor	14	٪ 4,7	39	٪ 8,2

According to the economic situation of the parents variable, the reasons of the Vocational High School students' not being able to take part in an activity are like these: students who are perceived their parents' economic situations as medium, I don't have enough time (72,9%), My parents don't allow (72,3%), My parents don't have enough money (64,8%), activities are not organized in my school (72,5%), my achievement is decreasing (78,3%), we are not instructed by our teachers (79,0%) and we are not instructed by the school (76,5%).

3.6. "How are the reasons of the Vocational High School students' not being able to spend their out-of-school time with any activities" according to the educational level of mother?

Table 6. The reasons of not being able to spend time according to "the educational level of mother" variable

ıs of not taking part in activity	e educational level of mother	Yes		No	
		n	%	n	%
don't have enough time	Not educated	23	% 3,1	22	⁄ 3,5
	Primary school graduate	404	% 54,2	346	⁄ 54,6
	Secondary school graduate	135	% 18,1	116	⁄ 18,3
	High school graduate	155	% 20,8	132	⁄ 20,8
	University graduate	23	% 3,1	15	⁄ 2,4
	Other	6	% 0,8	3	⁄ 0,5
My parents don't allow	Not educated	8	% 4,3	37	⁄ 3,1
	Primary school graduate	112	% 59,6	638	⁄ 53,5
	Secondary school graduate	21	% 11,2	230	⁄ 19,3
	High school graduate	42	% 22,3	245	⁄ 20,6
	University graduate	4	% 2,1	34	⁄ 2,9
	Other	1	% 0,5	8	⁄ 0,7
parents don't have enough money	Not educated	7	% 4,0	38	⁄ 3,2
	Primary school graduate	118	% 67,0	632	⁄ 52,5
	Secondary school graduate	27	% 15,3	224	⁄ 18,6
	High school graduate	19	% 10,8	268	⁄ 22,3
	University graduate	4	% 2,3	34	⁄ 2,8
	Other	1	% 0,6	8	⁄ 0,7
ities are not organized in my school	Not educated	8	% 2,9	37	⁄ 3,3
	Primary school graduate	127	% 46,5	623	⁄ 56,3
	Secondary school graduate	55	% 20,1	196	⁄ 17,7
	High school graduate	68	% 24,9	219	⁄ 19,8
	University graduate	11	% 4,0	27	⁄ 2,4
	Other	4	% 1,5	5	⁄ 0,5
achievement is decreasing	Not educated	19	% 5,0	26	⁄ 2,6
	Primary school graduate	218	% 56,9	632	⁄ 53,4
	Secondary school graduate	63	% 16,4	188	⁄ 18,9
	High school graduate	67	% 17,5	220	⁄ 22,1
	University graduate	13	% 3,4	25	⁄ 2,5
	Other	3	% 0,8	6	⁄ 0,6
e are not instructed by our teachers	Not educated	7	% 3,3	38	⁄ 3,3
	Primary school graduate	111	% 51,9	639	⁄ 54,8
	Secondary school graduate	48	% 22,4	203	⁄ 17,4
	High school graduate	42	% 19,6	245	⁄ 21,0
	University graduate	5	% 2,3	33	⁄ 2,8
	Other	1	% 0,5	8	⁄ 0,7
e not instructed by the school	Not educated	4	% 1,3	41	⁄ 3,8
	Primary school graduate	152	% 51,0	598	⁄ 55,3
	Secondary school graduate	66	% 22,1	185	⁄ 17,1
	High school graduate	65	% 21,8	222	⁄ 20,5
	University graduate	7	% 2,3	31	⁄ 2,9
	Other	4	% 1,3	5	⁄ 0,5

According to the educational level of mother variable, the reasons of the Vocational High School students' not being able to take part in an activity are like these: students whose mothers are primary school graduate, I don't have enough time (54,2%), My parents don't allow (59,6%), My parents don't have enough money (67,0%), activities are not organized in my school (46,5%), my achievement is decreasing (59,9%), we are not instructed by our teachers (51,9%) and we are not instructed by the school (51,05%).

3.7. “How are the reasons of the Vocational High School students’ not being able to spend their out-of-school time with any activities” according to the educational level of father?

According to the educational level of father variable, the reasons of the Vocational High School students’ not being able to take part in an activity are like these: students whose fathers are primary school graduate, I don’t have enough time (44,92%), My parents don’t allow (52,7%), My parents don’t have enough money (56,80%), activities are not organized in my school (35,9%), my achievement is decreasing (45,4%), we are not instructed by our teachers (39,3%) and we are not instructed by the school (35,2%).

Table 7. The reasons of not being able to spend time according to “the educational level of father” variable

		Yes		No	
ıs of not taking part in activity	he educational level of father	n	%	n	%
don’t have enough time	Not educated	5	% 0,7	10	% 1,6
	Primary school graduate	335	% 44,9	249	% 39,3
	Secondary school graduate	159	% 21,3	143	% 22,6
	High school graduate	189	% 25,3	195	% 30,8
	University graduate	55	% 7,4	37	% 5,8
	Other	3	% 0,4	0	% 0,0
My parents don’t allow	Not educated	0	% 0,0	15	% 1,3
	Primary school graduate	99	% 52,7	485	% 40,7
	Secondary school graduate	46	% 24,5	256	% 21,5
	High school graduate	29	% 15,4	355	% 29,8
	University graduate	14	% 7,4	78	% 6,5
	Other	0	% 0,0	3	% 0,3
parents don’t have enough money	Not educated	3	% 1,7	12	% 1,0
	Primary school graduate	100	% 56,8	484	% 40,2
	Secondary school graduate	24	% 13,6	278	% 23,1
	High school graduate	39	% 22,2	345	% 28,7
	University graduate	10	% 5,7	82	% 6,8
	Other	0	% 0,0	3	% 0,2
ities are not organized in my school	Not educated	0	% 0,0	15	% 1,4
	Primary school graduate	98	% 35,9	486	% 43,9
	Secondary school graduate	53	% 19,4	249	% 22,5
	High school graduate	97	% 35,5	287	% 25,9
	University graduate	25	% 9,2	67	% 6,1
	Other	0	% 0,0	3	% 0,3
achievement is decreasing	Not educated	6	% 1,6	9	% 0,9
	Primary school graduate	174	% 45,4	410	% 41,1
	Secondary school graduate	81	% 21,1	221	% 22,2
	High school graduate	91	% 23,8	293	% 29,4
	University graduate	28	% 7,3	64	% 6,4
	Other	3	% 0,8	0	% 0,0
e are not instructed by our teachers	Not educated	2	% 0,9	13	% 1,1
	Primary school graduate	84	% 39,3	500	% 42,9
	Secondary school graduate	49	% 22,9	253	% 21,7
	High school graduate	66	% 30,8	318	% 27,3
	University graduate	12	% 5,6	80	% 6,9
	Other	1	% 0,5	2	% 0,2

e not instructed by the school	Not educated	0	% 0,0	15	٪ 1,4
	Primary school graduate	105	% 35,2	١79	٪ 44,3
	Secondary school graduate	67	% 22,5	٢35	٪ 21,7
	High school graduate	100	% 33,6	٢84	٪ 26,2
	University graduate	25	% 8,4	67	٪ 6,2
	Other	1	% 0,3	2	٪ 0,2

Conclusion, Discussion and Suggestions

In this research, it has been aimed to reveal the reasons of the Vocational High School students' not being able to spend their out-of-school time. "I don't have enough time and my achievement is decreasing" are the basic reasons of the Vocational High School students' not being able to spend their out-of-school time with any activities. This outcome proves that students take the best part of their free time to study because of testing system in Turkey and academic success.

In terms of research outcomes, these are the suggestions: 1- Activities should be included in curriculum (instructional program) in order for the students to spend their out-of-school time efficiently. 2- Parents administrators and teachers should be raised awareness of this subject. 3- Testing system should be restructured.

The suggestions that are for the future research depending on the research outcomes might be these: 1- This research can be applied to other high schools and youths out of school. 2- Researches should be done in order to provide awareness for the term "out-of-school time" being perceived.

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Heavy Metal Scavenging Evaluation of *in Vitro* Grown *Brassica Campestris* Var. Sarsoon from the Tanneries Contaminated Soil Using Atomic Absorption Spectroscopy

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Abstract: The study was conducted to evaluate and compare the scavenging efficiency of *in-vivo* and *in-vitro* grown *Brassica campestris* var. Sarsoon, for the uptake of Lead and Chromium(two major components of inorganic contaminants in the tanneries contaminated soils) using Atomic Absorption Spectroscopy. *In vitro* plants were grown on MS basal medium containing 2,4-D (2.5 mg/l).Both *in-vivo* and hardened *in-vitro* grown plants were shifted to contaminated soil near Kasur Tanneries. After 6o days of growth in this contaminated soil, the plants bioassays were subjected to Atomic Absorption Spectroscopy for the estimation of lead and Chromium uptake. The *in-vivo* grown *Brassica* plants absorbed much lesser amount of both the metals(2.69 &1.62ppm) as compared to *in-vitro* grown plants which showed higher ranges(4.61 &2.69 ppm) of Pb and Cr respectively. The results supported our idea that, in future, the *in-vitro* grown hyper accumulator plants specially weeds can be used as an effective and better tool of phytoremediation (compared to field grown ones) for the removal of heavy metals through their rhizosphere scavenging action, from the contaminated lands on a wider scale.

Keywords: Phytoremediation, *In- vitro* grown plants, Lead , Chromium, Inorganic, contaminants, Scavanging evaluation.

Introduction

Tanning industry always gives rise to serious environmental problems in countries lacking implementation of environmental regulations. Currently, the contamination of the environment by by–products of rural and mining industries is the most threatening problem. District Kasur in Punjab Province of Pakistan represents such an area, which is being spoiled by tanning industry due to deposition of its lethal exudates in the local soils, damaging their biological life on a wider scale.

Hundreds of thousands of acres of country's lands area are disturbed and polluted by these contaminants.Some of these lands are in remote locations making cleanup very difficult. Others have minimal funds for cleanup or are so large that cleanup becomes economically impractical.There is a need for low energy green technologies that can be applied at these sites.

Phytoremediation is considered as the most emerging field of environmental biotechnology. Most of the soil contaminants can be removed by many other physical methods but the heavy metal pollution of vast cultivated land is a serious threat to the agricultural biology because of their prolonged stay in the soil.The plants roots have

natural ability to absorb the heavy metals of the soil thus behaving as phytoremediates. Metals uptake using plants provides an environmental friendly solution of the soil pollution, which is a low cost, *in-situ* process, energized by solar energy (McCutcheon and Schnoor, 2003).

Many plants species behave as hyper accumulators of the metals, depending upon their scavenging efficiency, and ability to accumulate these metals in the different cellular compartments of their cells.The metals pass through the root cell membrane to the symplast, inside the cell, then metals could be passed to the vacuoles, (where they are degraded enzymatically) by membrane metal transporters, and are deposited there with the help of metallothioneins i:e metal-binding proteins.

Heavy metals replace other essential metals in pigments inside the cellular structure, destroying the natural balance of these molecules (Manios *et al*., 2003). They may cause oxidative stress too, especially transition metals like $Fe^{2+/3+}$ and $Cu^{+/2+}$ (Rivetta *et al.*, 1997).

Plant tissue culture provides a selected environment for the evaluation of many limiting factors. It is in extensive use nowadays, to obtain variants with variable tolerance to different biotic stresses (Ben-Hayyim, 1987; Santos-Díaz and Ochoa-Alejo, 1994). This technique is also found to be useful for cultured plant organs to know the metal accumulation properties by each separate plant part e:g the removal of Sr^{2+} using shoots of *Solanum laciniatum* (Kartosentono *et al*., 2001), and Cd hyper-accumulation by roots of *Thlaspi caerulescens* (Nedelkoska and Doran, 2000).

Atomic Absorption Spectroscopy is an alternative, simple and rapid technique for quantitative isolation of the group of eight elements (Al, Ca, Cd, Cu, Fe, Mg, Pb and Zn) from vegetable material (Wieteska *et al*.,1998). The proposed method allows to obviate the organic matrix destruction stage, shortens the analyte dissolution time, reduce cost, and minimize hazards of loss and contamination. Therefore main objective of the present study is to evaluate and compare the Lead and chromium uptake by *in vivo* and *in vitro* grown *B.compestris* var Sarson with the help of Atomic Absorption Spectroscopy (AAS).

The present research was aimed to study the accumulation of heavy metals (Pb & Cr) in the plant body of *B.Campestris*. It can help identify the comparative efficiency potential of plants to remediate the metals from the contaminated soil in which they were cultivated.This study also examined the growth performance and physiological responses of these plants under contamination stress.

So by employing this method, one may be able to find the effect of heavy metal contamination to the plant body as well as to give practical implementation of phytoremediative use of tissue cultured plants and their future prospects on a wider scale in future.

Materials and Methods

This piece of work was divided into two steps:

1. The *in-vivo* and *in -vitro* growth of *B.campestris* var Sarson and the hardening of the *in-vitro B.compestris* and its transfer, along wit *in-vivo* grown *B.campestris*, to the Pb and Cr polluted soils of Kasur tanneries for a period of 60 days.

2. Estimation of Lead and Chromium uptake by these plant(grown in contaminated soil) using Atomic Absorption Spectroscopy.

1. The *in-vivo* and *in -vitro* growth of *B.campestris*.

For *in-vivo* growth the certified seeds of *B.campestris* were sown in the normal soil of Lcw university and were grown for 60 days. For the *in -vivo* growth, the explants were taken from the wild *B.campestris*, were cultured and then subcultured in the PGRs optimium media for 60 days.
For the *in-vitro* growth, following protocol was followed.

a. Medium and Phyto Growth Regulators (PGRs):

MS (Mrashaige and Skoog, 1962) basal medium was used. Different PGRs were used separately and in combinations in MS basal medium as follows to select the best one.
i. 2, 4-D,2.5mg/l
ii. BAP, 0.5mg/l
iii. NAA,1.0mg/l
iv. 2, 4-D,2.5mg/l+BAP,0.5mg/l

b. Physical Factors:

Sucrose was added to medium at 3% concentration (30g/l).The optimum temperature required for culture environment was maintained at 25±2°C. The cultures were incubated at 16 hours light period (under cool light fluorescent tubes,with light intensity of 2000-3000 lux) and the pH of the medium was adjusted between 5.6-5.7.

c. Hardening and shifting of the plants to the Kasur Tanneries contamoinated soil

In vitro grown plants were shifted to the sterilized soil of different grades and and gradually to the normal regular soil in order to harden the plants.These plants and other set of field grown plants were shifted to the contaminated soil near Tanneries located in vicinity of Kasur city .

d. Plan of experiment and data recording: Three sets of each experiment were designed with three replica of each experiment**.** The cultured explants were observed after inoculation and the contamination percentage, percentage of callus formation and number of frequency of micro-propagated plants per explants after given culture period was worked out.Mean deviation was calculated after using SPSS software(Levesque,2007) following Steel *et al* (1997).

2. Estimation of Lead and Chromium uptake by *in-vivo* and *in-vitro B.campestris* using Atomic Absorption Spectroscopy (AAS) after their shifting to Pb and Cr contaminated soils:

Atomic Absorption Spectroscopy (AAS) provides accurate quantitative analysis for metals in water, sediments, soils or rocks.Samples are analyzed in solution form, so solid samples must be leached or dissolved prior to analysis.The second step of the study was to estimate the Lead and Chromium uptake by *B.campestris(* Phyto remediation) using AAS. All chemicals and reagents used in the study were of analytical grade and were used without further purification. Solutions were prepared in double distilled water.

a. Preparation of Biomass: Elements in plants parts cannot be detected directly by atomic absorption spectroscopy, so solutions for plants were prepared by wet digestion method and then samples were analyzed to determine the concentration of metal ions. After collecting leaves of plant they were washed with double distilled water to remove dust from plant. These leaves were then dried in an oven. The dried plants were then digested. The same procedure was done with *in vitro* grown plants except that regenerated plants were not sterilized.

b. Methods for digestion: The dried plant leaves were weighed separately and 5.0g of then was taken in a round bottom flask. The dried material was ashed in crucible muffle furnace at 500C for 1 hour . The residue was then wet digested by Hcl/HNo_3 5ml (1:3) and heated till dryness. After drying 5ml of HNO_3 was added in the same beaker and heated for 5-10 minutes. The volume was adjusted up to 50 ml with double distilled water and then was filtered . The sample solutions were ready to be aspirated in AAS. These sample solutions of *in vivo* and *in vitro* grown leaves were kept at 4°C with UV protection in amber bottles.

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Results and Discussion

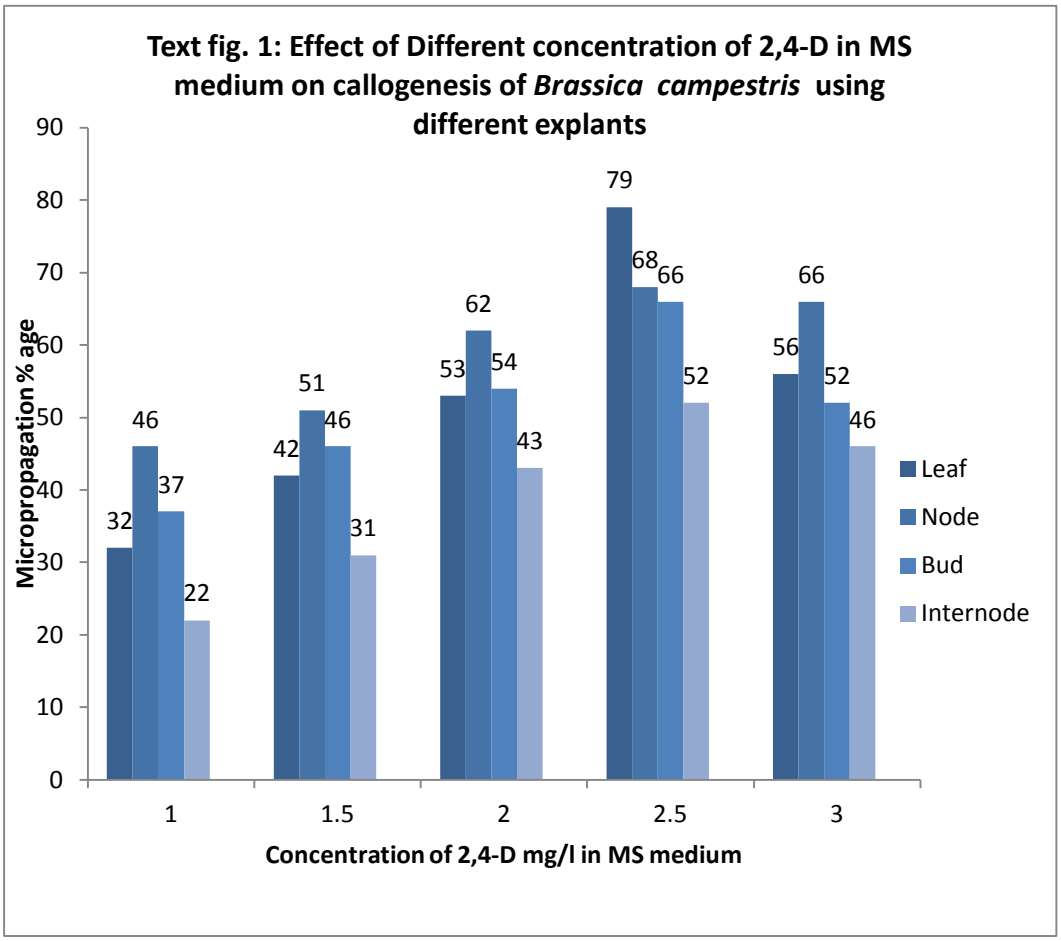
It was found that among all the PGRs and their combinations 2, 4-D was the best PGR for the *invitro* growth of *Brassica campestris.* The effect of different concentration of the 2, 4-D (mg/l) on *in vitro* growth of *Brassica campestris* in MS medium using different explants is given in table 1 and text figure 1. Twenty-five cultures were inoculated for each explant and the best response was observed in leaf explants and gave maximum percentage of *invitro* growth i.e. 79% in the medium containing 2, 4-D (2.5 mg/l), whereas the minimum percentage i.e. 46% was found in 2, 4-D (1.0mg/l).Nodal explants gave highest percentage of growth i.e. 68% in 2, 4-D (2.5 mg/l), while in medium containing 2, 4-D (1.0mg/l) showed a lowest percentage of growth i.e. 33%. The bud explants showed the maximum percentage of growth i.e. 66% in 2, 4-D (2.5mg/l), whereas the minimum percentage of growth i.e. 37% was found in 2, 4-D (1.0mg/l). Internode explants gave the maximum percentage of growth i.e. 52% in the medium containing 2, 4-D (2.5mg/l), while the minimum growth i.e. 22% was found in 2, 4-D (1.0mg/l).

Table.1: Effect of different concentration of 2,4-D (mg/l) on *in vitro* growth of *Brassica campestris* using different explants.

Sr. no.	Expalnts Used	2,4-D(mg/l) used	Number of cultures inoculated	Callogenesis and micropropagation mean (%)	LSD value
I.	Leaf	1.0	25	33±0.51^{cd}	1.46
		1.5	25	42±0.58^{c}	
		2.0	25	53±0.57^{b}	
		2.5	**25**	**79±0.34^{a}**	
		3.0	25	56±0.22^{b}	
ii.	Node	1.0	25	46±0.11^{cd}	1.23
		1.5	25	51±0.39^{c}	
		2.0	25	62±0.41^{b}	
		2.5	**25**	**68±0.21^{a}**	
		3.0	25	66±11^{b}	
iii.	Bud	1.0	25	37±57^{cd}	1.67
		1.5	25	46±0.58^{c}	
		2.0	25	54±0.31^{b}	
		2.5	**25**	**66±0.47^{a}**	
		3.0	25	52±0.37^{b}	
iv.	Internodes	1.0	25	22±0.99^{cd}	1.83
		1.5	25	31±0.52^{c}	
		2.0	25	43±0.41^{b}	
		2.5	**25**	**52±0.32^{a}**	
		3.0	25	46±1.32^{b}	

± =Standard error of the mean

The mean with different letter in each column are significantly different according to Duncan's multiple range test (0.005p value)



As far as, physical factors were concerned, it was noted that maximum and minimum *in vitro* growth, i.e 79% and 20% were seen at 25±2°C and 18±2°C respectively (Table 2). It was also observed that *Brassica campestris* in liquid medium gave only 5% *in vitro* growth. Whereas, solidified medium (using Difco-Bacto agar as solidifying agent) gave 79% *in -vitro* growth for the plant (Table 3). The effect of different photoperiods was also observed and it was concluded that 16hrs photoperiod (3000 lux) showed 80% *in vitro* growth and zero hour photoperiod (complete dark) gave minimum, i.e.10% *in vitro* growth rate of the plant (Table 3). Most suitable pH value for *in vitro* growth was found to be 5.7 with 79% i. e maximum percentage. Where as for pH 5.9 minimum, i.e. 25% *in vitro* growth was noted for *Brassica campestris.*

Table 2: Effect of temperatures & pH on *in vitro* growth of leaf explants of *Brassica campestris* in MS medium using 2, 4-D,2.5mg/l.

S. No	Physical factors	Ranges	Maximum %*In vitro* growth (% mean)
1.	Temeprature (°C)	25±2	**79 ±1.93**
2.	pH	5.7	**79±2.08a**

Table 3: Effect of Agar Solidified medium & Photoperiod on *in vitro* growth of leaf explants of *Brassica campestris* in MS medium using 2,4-D,2.5mg/l

S. No	Physical factors	Maximum% *In vitro* growth (% mean)
1.	16 hrs Photoperiod (3000 lux)	**79±2.60**
3.	Agar Solidified Medium	**79±1.78**

On the basis of observations made for physical factors and nature of media it was concluded that maximum *in vitro* growth i.e 79% was seen at 25±2°C and minimum *in vitro* growth of *Brassica campestris,* i. e 20% was observed at 18±2°C. The agar solidified MS medium supplemented with 2,4-D (2.5mg/l) gave 79% *in vitro* growth. Ebrahim, *et al.* (2000) reported influence of medium, solidification and pH value on *in-vitro* micropropagtion of shoot tip explants. The effect of different pH ranges on *in -vitro* growth of *B.campestris* were also studied during the present piece of work. It was observed that the most suitable pH range was 5.7 for *in vitro* growth (Table 2). At this pH, callus formation was 80% where as 5.9 pH gave minimum growth (25%). Ebrahim, *et al.* (2000) studied the effect of pH on the *in -vitro* growth of *Maranta leuconeura.* A medium with pH of 5.7 resulted in the maximum multiplication rate, shoot strength and leaves differentiation. *Maranta leuconeura* can be successfully micropropagated at pH

5.7 irrespective of nature of media, either it is liquid or solid .

The effect of different photoperiods on micropropagation of *Brassica campestris* was also recorded. It was observed that the most suitable photoperiod was 16 hours.. At this photoperiod 79% *in -vitro* growth was observed and the minimum photoperiod result was 10% at 0hours photoperiod. In 2004, Morini, *et.al.* (1991) studied the effect of different photoperiods on *in-vitro* growth of plum rootstock.Three photoperiods i:e16h (control), 12h and 8h were applied,with a PAR of 39 mol m^{-2} sec^{-1}. Tips collected from *in- vitro* established shoots were used. Growth medium was MS. Shoot proliferation after 45 days of growth was not statistically different between 12 h and 16 h of light, while the 8-h photoperiod gave a much lower rate of shoot formation.

The second step of this research work was to determine concentration of two mineral elements i.e; Lead (Pb) and Chromium (Cr) in *in vivo* and *in vitro* grown plant tissues of *B.campestris* after their shifting to the Kasur tanneries contaminated fields so that their comparison may be carried out.

In *in vivo* grown *Brassica campestris* gave Lead and Chromium uptake up to 1.21 and 1.62 ppm. Where as in *in vitro* grown *Brassica campestris* uptake for Lead (Pb) Chromium (Cr) uptake was found to be 2.69& 4.61ppm respectively.

The concentration of Chromium (Cr) and Lead (Pb) was determined by Yuwai *et al;* (1991) in *in vivo* grown plant tissues of *Brassicaeae*. According to them was Chromium (Cr) 3.54ppm and Lead (Pb) was 5.97ppm. One of the major factors influencing trace mineral uptake in plants is the composition of the soil.

This study also leads to the conclusion that *in vitro* grown plants can behave as natural scavengers if planted to the chemically polluted soils on large scale in future.

Table. 4: Concentration of Cr and Pb in *In-vivo* plant material of *B.campestris* determined by Atomic Absorption Spectrometry (AAS)

Plant used	**Plant tissue**	**Heavy metal**	**Concentration(ppm)**	**Mean%**
Field grown *Brassica campestris*	Leaf Explants	Pb	2.21 2.21 2.21	2.21±0.000
		Cr	1.62 1.62 1.62	1.62±0.000

Table. 5: Concentration of Cr and Pb in *In-vitro* plant material of *B.campestris* determined by Atomic Absorption Spectrometry (AAS)

Plant used	**Plant tissue**	**Heavy metal**	**Concentration(ppm)**	**Mean%**
In vitro grown *Brassica campestris*	Leaf Explants	Pb	4.61 4.61 4.61	4.61±0.000
		Cr	2.69 2.69 2.69	2.69±0.000

Table 4 and 5 show that Lead (Pb) and Chromium (Cr) both are in high quantity in *in vitro* grown plant tissues as compared to *in vivo* grown plant tissues which indicate that the composition of the media and soil plays an important role in mineral uptake of plants.This study also leads to the conclusion that *in vitro* grown plants can behave as natural scavengers if planted to the chemically polluted soils.In future, the purified in-*vitro* grown hyper accumulator plants can be used as the natural phytoremediates and heavy metal scavangers of the toxic elements e:g Pb and Cr, for the treatment of contaminated and polluted agricultural lands on commercial scale.

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Impact of air pollution on the lichen flora in the region of Annaba (East of Algeria)

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Abstract: The objective of our work is summarized on the study of the impact of air pollution on the lichen flora in the region of Annaba and more precisely at two areas isopollution whose purity index ranges from atmospheric 0.6 to 3, 8 to zone I and 3.9 to 8.3 for zone II. For this we used the technique of transplantation advocated by Deruelle and Semadi in1993. The results we obtained following the assay of chlorophyll and protein in two species *Parmelia caperata* and Parmelia perlata transplant at six sites, as well as at the el Kala (taken like a witness), reflect the presence of nitrogen type of pollution in our region, which acts as a fertilizer on chlorophyll levels at the sites most frequented by traffic (S5 and S6) compared to the control and the other sites (S1 and S2) to low values, and appearance of a stress in relation with this pollution, which results in an increase in protein at the same sites.

Observations in binocular and histological sections of the thallus of these transplants confirm our results also reflect the deterioration of our lichen flora under the influence of a cocktail of pollutants at the Annaba region

Key words: Air pollution, lichen biomonitoring, impact, chlorophylls, proteins dosage

Introduction

The term pollution refers to all discharges of toxic compounds that man releases into the ecosphere, but also substances which, without being really dangerous to living organisms, have a disruptive influence on the environment. In other words, pollution is an adverse change in the natural environment, which can affect humans and plants. It can also affect by altering the physical environment, its recreational possibilities or disfiguring nature. (A. Semadi, 1989)

Since 2002 the Ministry of Spatial Planning and Environment installed at the city of Annaba (North-eastern Algeria) a system for monitoring the quality of air in urban areas. This control is called SAMA SAFIA generally provided by sensor networks physicochemical characteristics that measure concentrations of various pollutants. (Tlili N. et al, 2009)

The city of Annaba is one of the most polluted cities in Algeria due to the existence of large industrial complexes such as iron and steel complex of El Hajar and phosphate fertilizer complex. In addition, it is known for its dense road traffic and the overcrowding that has led researchers to study air quality and the effects of pollution in the region. (A. Semadi, 1986).

Several technics have been implemented for the detection and evaluation of air pollution. Among these technics, we note the physico-chemical technics that continuously measure the concentrations of various pollutants the case of "SAMA SAFIA" and biological techniques that use the plant or plant part as a bio-indicator: eg lichens. (A. Semadi, 1989)

The high cost of measuring devices will never cover the whole territory. The use of living organisms and in particular for the assessment of air quality, the lichen biomonitoring should be a tool of choice. Lichens are found everywhere and their differences in sensitivity to pollutants we can use to assess the qualitative and quantitative development of many circles. (Gaveriaux J. P, 2005)

In the same context summarizes the purpose of our work is to study the impact of pollution on the lichen flora and thus the environment.

Materials and Methods

1 - Presentation of the study area:

Annaba is a coastal town in northeastern of Algeria; it is bounded to the south, east and west respectively by the provinces of: Guelma, Skikda and El Tarf. . it covers a

Area of 1411.98 km (fig11)

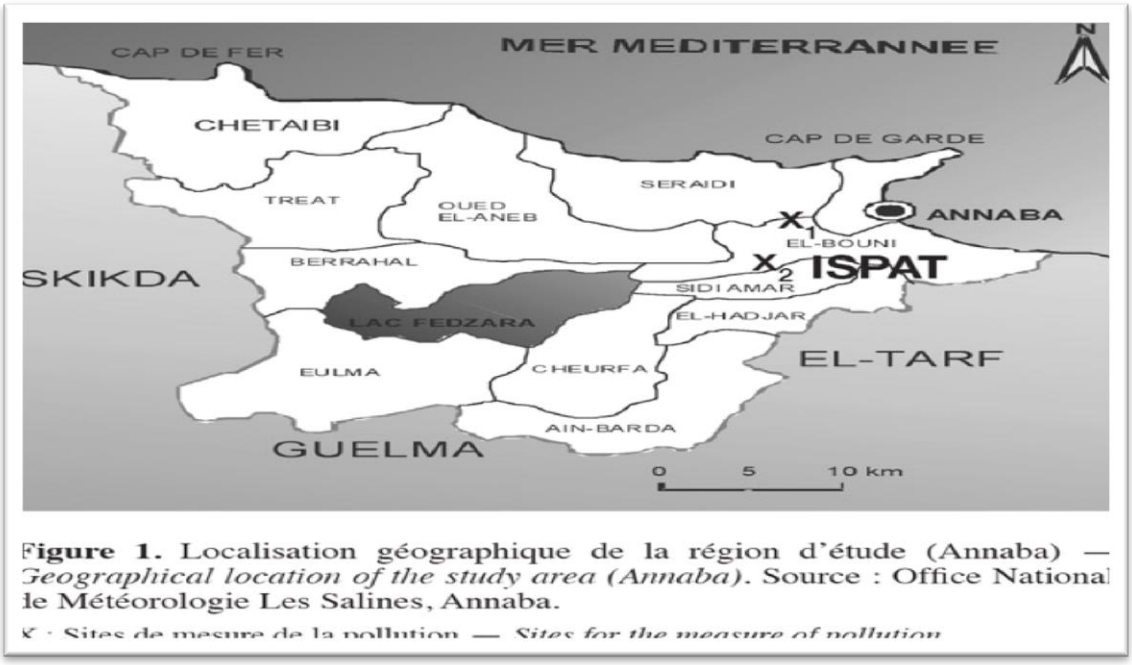


Figure 1. Localisation géographique de la région d'étude (Annaba) — *Geographical location of the study area (Annaba)*. Source : Office National le Météorologie Les Salines, Annaba.

X : Sites de mesure de la pollution — *Sites for the measure of pollution*

Figure 1: localization of wilaya of Annaba (Annaba State)

Its industrial and its status as capital of steel, make it one of the most polluted areas of the country. (Chaffai and Mourdi, 2011)

2. Climatic data of Annaba:

Like other coastal areas of Algeria, Annaba this whole traits Mediterranean types with bioclimatic zones: sub humid and humid wich means a wet soft and moist dry season.

Some climatic parameters are considered in our study because they have a particularly important role in the diffusion and dilution of impurities (Table 3)

2-1 Temperature:

Annaba is characterized by mild temperatures in winter and hot in summer, with a maximum temperature average of 23.66 ° C and a minimum temperature average of 12.66 ° C during the period 2009-2012

2-2 Rainfall:

Rain, snow and other forms of precipitation realize washing, absorption and drive to the floor of impurities from the air, the average annual rainfall during the period 2009-2012 is 28.083%

The month of December is the wettest with a value of 46% while the minimum value was recorded in July with 5% (2009/2012)

2-3 Humidity:

In Annaba region the humidity is very high throughout the year, it is 74.083% during the period (2009-2012). (Website 9)

3 - Industry Sectors:

By its strategic position Annaba has a basic industrial processing of local raw materials such as iron ore, this is mainly based on the steel complex "metal steal" the largest steel complex in Africa largest phosphate fertilizer "ASMIDAL" and old metal processing workshops "ferrovial" then comes the comercial activity area, industrial areas, these bases are at the origin of several liquid effluents and atmospheric (Blida and Tiaibia, 2011)

3-1 Releases complex "metal steel"

This complex discharges to particulates which are mainly iron oxides and silica compounds along with various rare metals such as thallium due to very high emissions deposited to Tunisia

The effluent gaseous products are comprised mainly of sulfur, oxides of carbon, nitrogen and trace fluorine (Table 1)

Table 1: Emissions complex "metal steel"

Rejected products	Quantities tonne / year
Organic materials	35
ammonia	1220
Phenol	3000
Sulfur oxide	6000
Suspended solids	4100
Dust	6000

3-2 Releases of phosphate fertilizer complex "ASMIDAL"

The complex phosphate fertilizer "Asmidal" rejects quantities of pollutants in the atmosphere; the nature of these pollutants is very varied according to each unit. These quantities estimated above pre-project of the World Bank (Table 2)

Table 2: Discharge of Asmidal before the draft World Bank

Units	Pollutants	Quantities tonne / year
Nitric unity	No_2 NH_3	1188 2291
Acid sulfirique unity	SO_2	90000
Phosphoric acid unity	**Phosphogypsum**	280000
NPK unity	Fluorine	88
Ammonium nitrate unity	Dust Nitrates (NO_3)	43000 133000

Table 3: Rejections (discharges) of Asmidal «after the project of the World Bank (Serradj, 2007)

Units	Pollutants	Quantities tonne / year
Nitrate unity	No_2 NH_3	275 45.6
Acide sulfurique unity	SO_2	0
Acide phosphorique unity	**Phosphogypsum**	0
NPK unity	Fluorine	10.5
Nitrate –ammonium unity	Dust nitrates (NO_3)	50 250

4-Current of road traffic:

The wilaya of Annaba by its geographic position (a crossroads) and development was observed to this day a highly polarized traffic especially at the city and especially in the last years (see Annex) this we will confirm through recent statistics we have gathered at the direction of transport, these data represent a total of vehicles of any category increase from one year to another, was recorded in 2008 (110.897 vehicles), 124.510 in 2009, 139.409 in 2010 and a total of 149.843 vehicles in 2011.

5 -Epidemiology:

According to a survey made by L. Belfarhi in 2011 in Annaba, the risk of asthma are largely due to: Air Pollution with 58% humidity (18%) and factors, tobacco (19%), Heredity (15%) and medical drugs (3%).
In our side, we could get this year very interesting statistics:
- Of cancer in our region that are listed in the Schedule in effect at the CHU of Annaba lung cancers affect individuals of different ages (2 years and 60 years) with a percentage of 100%.
- Of the estimated asthma attacks at the pediatric clinic Saint Thérèse see Annex during 2009 There are crises of 1235 and increased in 2010 to reach a value of 2029. (see appendix)

6 - Method of sampling:

6-1 Rootstock:

Bio-indicator species of low pollution, low resistance

Parmelia caperata ***Parmelia perlata* (Site web 1)**

Table 4: Systematic position of *Parmelia caperanta* and *Parmelia perlata*

systematic position	
Parmelia caperata	***Parmelia perlata***
Phylum: Lichens **Class: Ascolichens** **Order: lecanorales / Cyclocarpales** **Family: Parméliacées** **Genre: *Parmelia*** **Species: *caperata***	**Phylum: Lichens** **Class: Ascolichens** **Order: lecanorales / Cyclocarpales** **Family: Parméliacées** **Genre: *Parmelia*** **Species: *perlata***

6-2 Transplantation Technics:

The first transplantation of epiphytic lichens were made several years ago in the city of Munich Arnold (1991-1901), since both technics were used

- The first was developed by Brodo 1961.elle involves grafting a disc supporting a lichen on bark of the same species phorophyte
- The second is to present in polluted thallus branches covered with epiphytes (Semadi and Deruelle.1993)

In our study we followed the second approach is to say we collected branches covered thallus of two species: *Parmelia perlata Parmelia caperata* and in their communities of origin ie drill bougous level of El Kala considered an unpolluted area and we transferred at different sites already mentioned. These branches with a length of 10 cm A50 are set using a string to a height of 1.5 to 2 m above the ground for 4 months.
The observation of transplanted epiphytes used to study the damage caused during the period of exposure to the polluted environment.

6-3 Selection of sites:

Following a study made by the IPA (Bengrait Lemboub S & N, 2011) which allowed us to have 2 iso pollution areas covering the North East Annaba (Fig 2), our sites studies are placed in these two areas as follows:
Transplants of our 2 lichen species (*Parmelia caperata* and *Parmelia perlata*) were placed at stations 1 and 2 are part of the area isopollution II by cons stations 3, 4, 5 and 6 are part of the isopollution zone I. without forgetting our control area or El Kala grow naturally our two lichen species

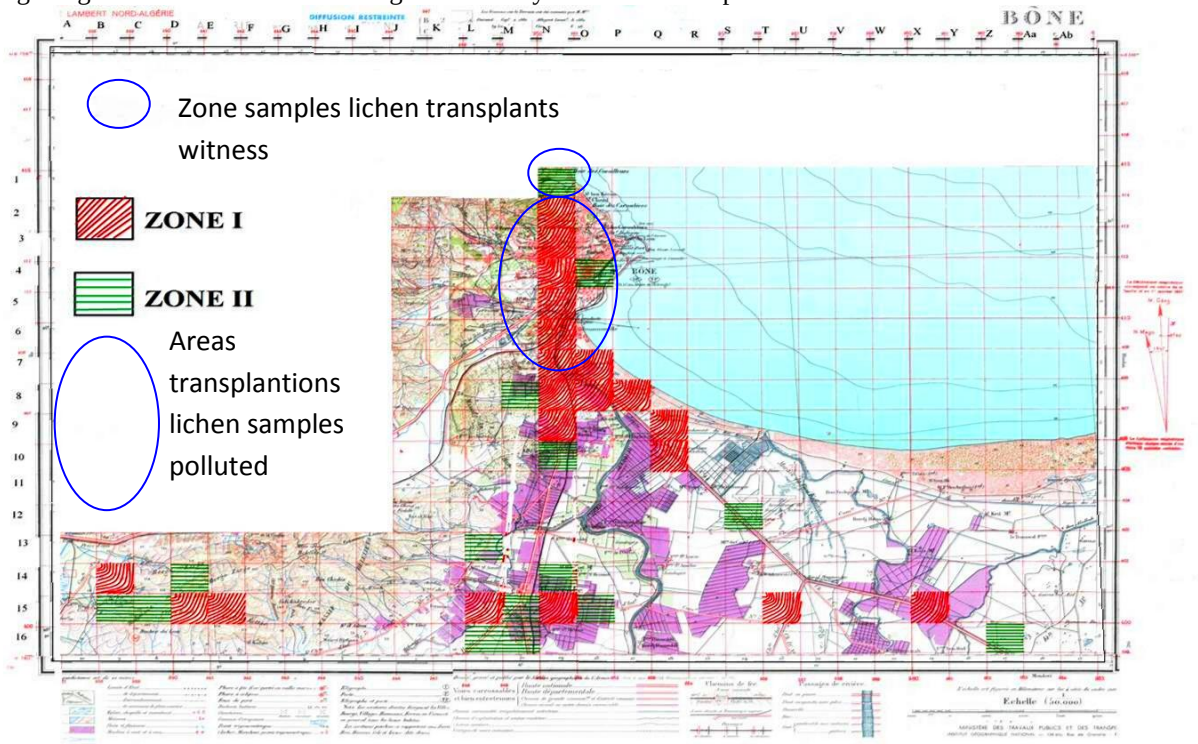


Figure 2: Location of the study area (Bengrait Lemboub S & N, 2011)

- **Zone I:**

IPA which varies from 0.6 to 3.8; This is the most polluted area occupies 18 stations (part of the city of Annaba and the town of El Bouni)

- **Zone II:**

IPA which ranges from 3.9 to 8.3 occupe17 stations (Hdjarediss western sector, and region of the common Mhidi Ben D'El Tarf)

We made so to have sites with a degree of traffic ranging from strong to weak and we selected six sites (Sidi Aissa, Road coral-Bay Bridge White City Are safsaf, Oued Forcha, City belaid belgacem in Oued Forcha) and Table (6) below shows the location of these sites

Table 5: Different sites of transplantation

Sites	Location
Witness	El-kalla
Site1 (Sidi Aissa)	Tree 1: In a garden of a small house and away from the road

	Tree 2: located near a small yard Tree 3: Same as the one tree on private property from the road
Site2 (Road of Baie of Corailleurs)	Tree 1: the tree at the edge of a small road little frequented by vehicles Tree 2: found at a nearby construction site Tree 3: Trees along a small road little frequented by vehicles
Site 3 (Pont blanc)	Tree 1: located near the roundabout which is highly frequented by different vehicles) Tree 2 are within the campus of the roundabout, but it does not exclude the large attendance of all types of vehicles in the Tree 3: located in the University Hospital of the orangery, near the end of the establishment is facing a highly frequented road.
Site 4 (Es safsaf)	All transplants are placed on roadside trees are at the edge of a highway that crosses the station studied
Site 5 (Oued forcha)	All transplants are placed along the roads that cross the study area
Site 6 (City belaid belgacem in Oued forcha)	Transplants are placed on roadside trees are at the edge of a road that crosses the village studied, one tree is near a taxi rank

3 - Analytical methods:

3-1 Determination of chlorophyll:

Extraction of chlorophyll in lichen thalli was performed according to the traditional method of Mackiney (1941), then improved by Holden (1975)

3-2 Determination of protein:

We analyzed proteins in lichen thalli of the species according to the method of Bradford (1976).

3-3 Observation in binocular species and transplanted according Clausade Ozanda, 1970

3-4 Cups histological thalli transplanted according Clausade and Ozanda, 1970

Results

1-Variations of the chlorophyll at the level of the transplants various:

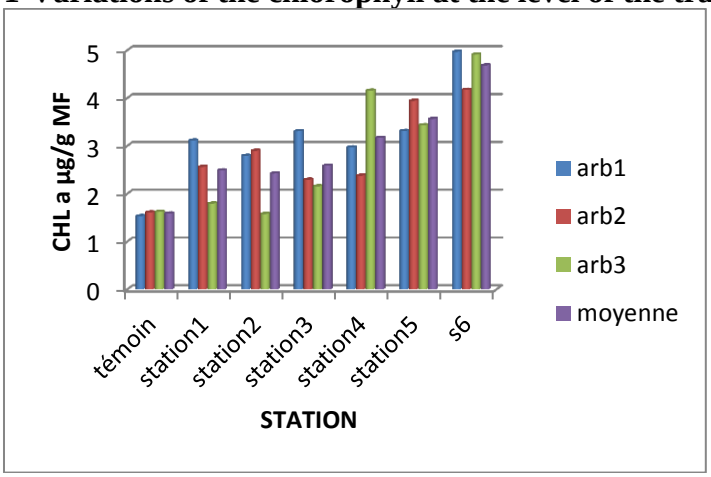


Figure3: Spatial Variations of the rate of the chlorophyll (a) µg / g MF at *Parmelia caperata*

We find that the average Chl a increases from one site to another in relation to this witness confirmed the following values: 1,589< 2,491< 2,586< 3, 17 <3,565< 4, 68.

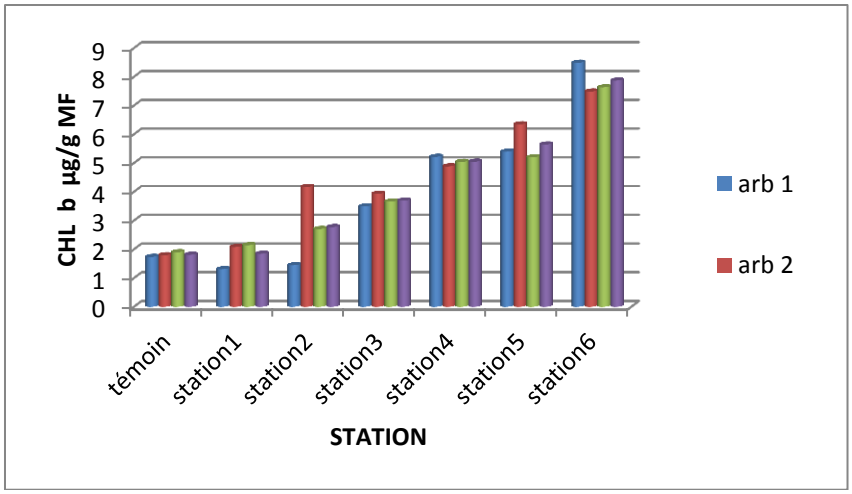


Figure 4: Spatial Variations of the rate of the chlorophyll (b) µg / g MF at *Parmelia caperata*

Also, we observe that the shape of the histograms of the Chl b presents the same tendencies as those of the Chl has in other words the values increase by a site to the other one this with regard to the witness.

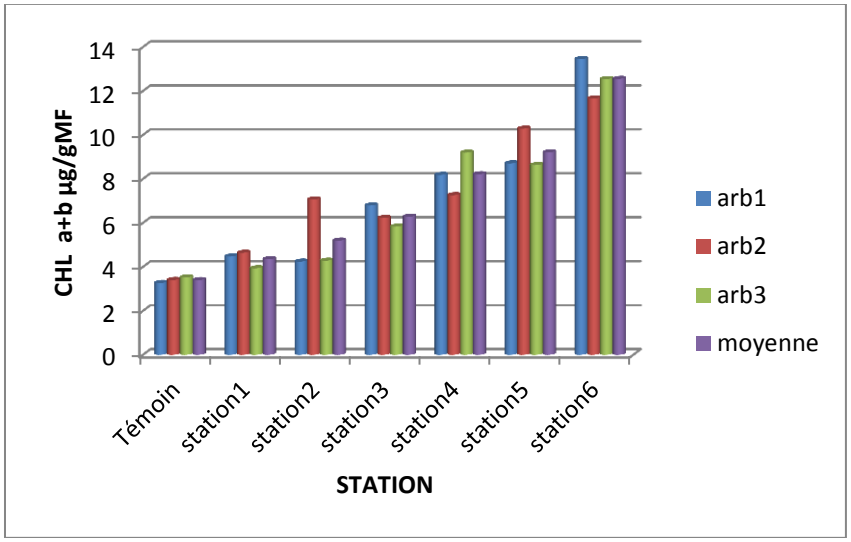


Figure 5: Variation of rate of the chlorophyll a+b µg / g MF at *Parmelia caperata*

Also, the total Chl (a+b) is very high at the level of the site 6 with regard to the witness (12,54 ug / gMF / 3,397ug / GM), on the other hand site1 register very low values (4, 350ug / gMF).

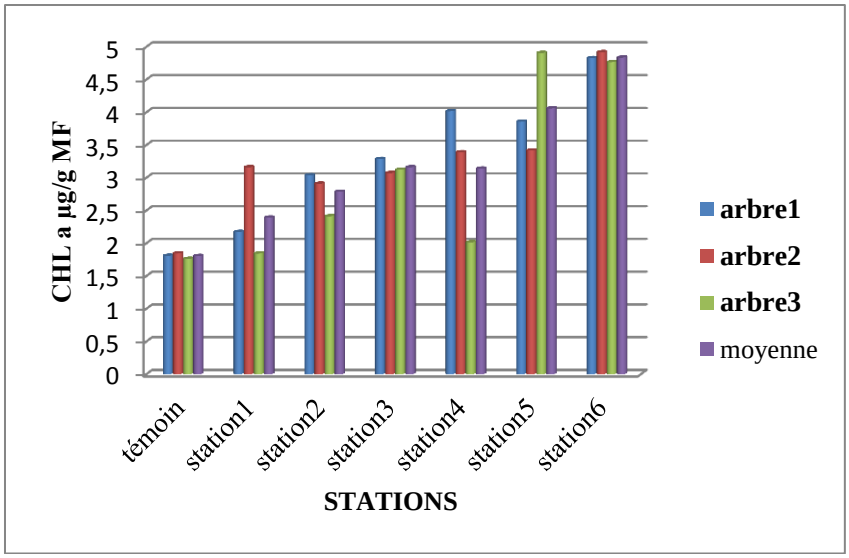


Figure 6: Spatial Variations of the rate of the chlorophyll (a) µg / g MF to *Parmelia perlata*

We register according to her it fig6 a low weak increase of the rates of Chl has in the first two stations with an average value between (2.392et 2.786 µg / g MF) this with compared with the witness (1.805 µg / g MF); on the other hand this increase seems very clear at the level of sites 3, 4, 5 and especially at the level of site 6 with an average value of 4,836 µg / g MF.

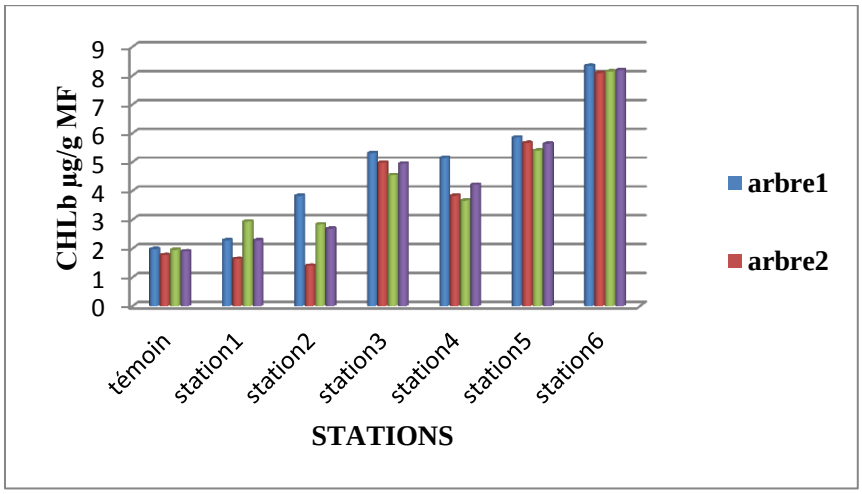


Figure 7: Spatial Variations of the rate of chlorophyll (b) µg / g MF to *Parmelia perlata*

According to the fig 7, it seems that the values of the Chl b follow the same tendency as the Chl has, only with values more raised with compared with the witness (1.905 µg / g MF), the values of the site 3 are close to the site 4, on the other hand we notice a clear increase at the level of site6 with compared with all the sites (8.100 ug / gMF)

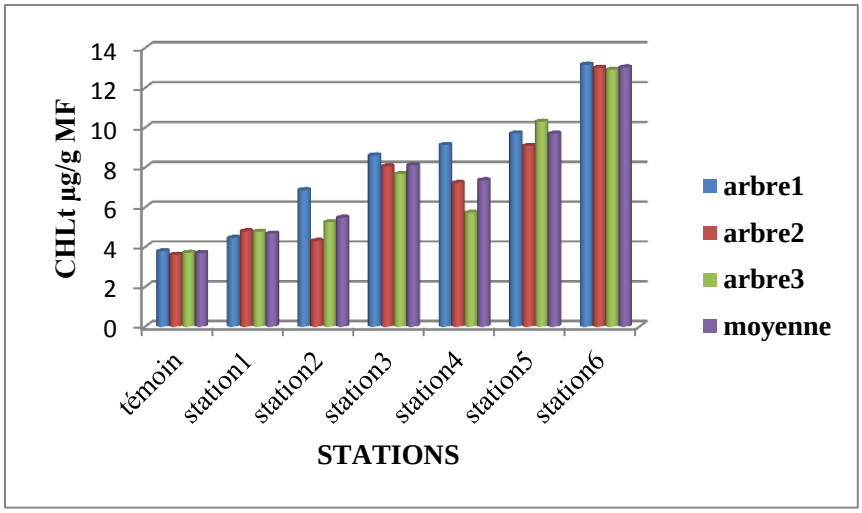


Figure 8: Spatial Variations of the rate of chlorophyll (a+b) µg / g MF to *Parmelia perlata*

The fig 8 shows that the Chl (a+b) follows the same trend as that of the Chl has and the Chl b, the content always varies with an increase contrary to the witness (3.709µg / g MF) the site 5 registers a value raised of (9,694 ug / gMF) as well as the even more raised site 6 (13,025ug / g MF).

2 - Variations of proteins at the level of the transplants various

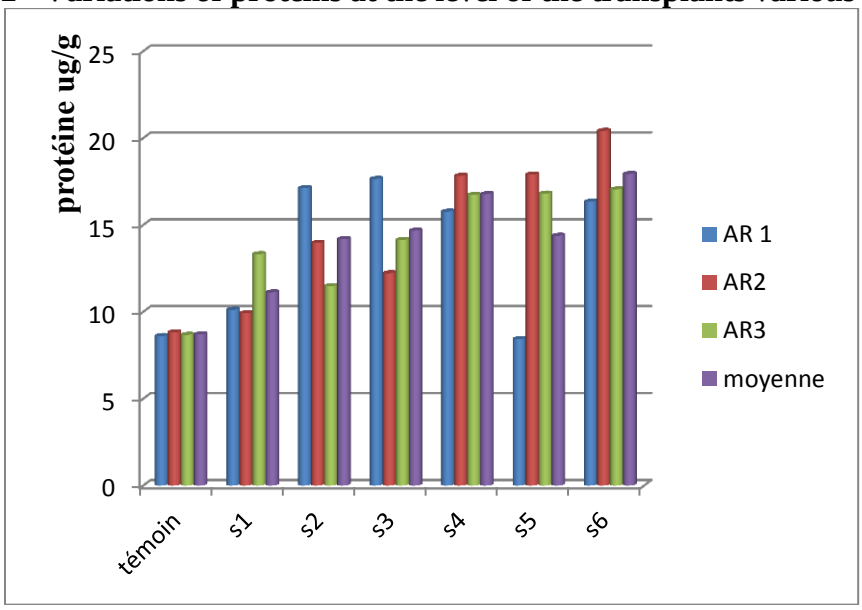


Figure 9: Spatial variations of proteins at the level of the transplants of *Parmelia caperata*

According to the results profits illustrated in the fig 9 we let us register record an increase of the rate of protein at the level of all the sites with compared with the witness, we notice that the rate of protein is more raised in the station 6 with compared with the witness, with an average value of 17.93ug / g, contrary to the station 1 we notice a light increase with an average value de11.11ug / g. The rate of protein is less raised in the station 1 because three trees are taken away from the influence of the road and more raised at the level of the station6 because trees carrying our transplants are situated at the edge of a road which crosses the studied station

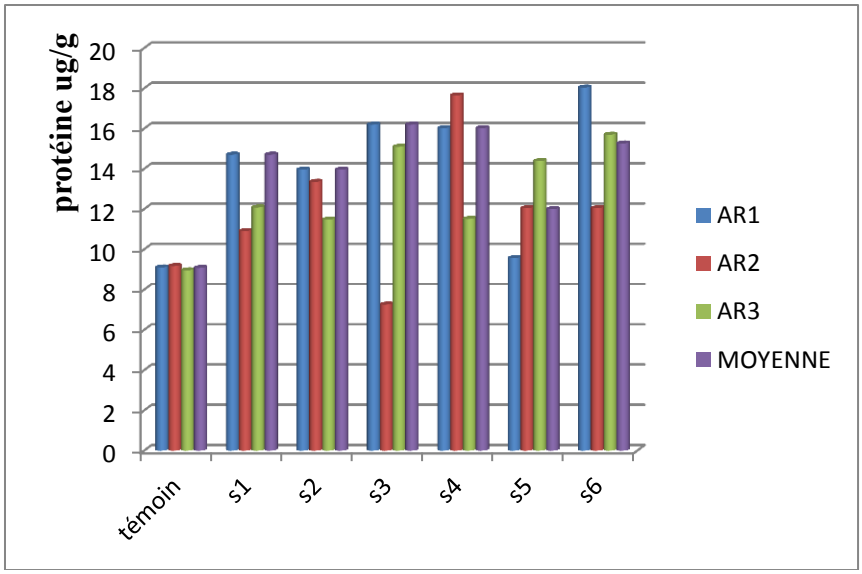


Figure10: Spatial variations of proteins at the level of the transplants of *Parmeilia perlata*

According to the results illustrated in her fig10 we observe that the rate of protein is very high in all the stations is reach his maximum in the 3éme station (16,19ug / g), this with compared with the witness (9, 7 ug / g).
The rate of protein is very high in the 3éme station because she presents a big attendance of vehicles of every types.

Variations of the various physiological parameters according to the test of ANOVA

Table 6: Variations of the physiological parameters in the transplant of *Parmelia cape*rata according to the test of ANOVA
***caperata* selon le test d'ANOVA**

Variable	DDL	SCE	CM	F observed	P
Chlorophylle a	6	17,7127	2,9521	8,25	0,001**
Chlorophylle b	6	89,283	29,128	36,91	0,000***
Chlorophylle a+b	6	174,766	14,881	35,99	0,000 ***
Protéine	6	184,802	30,800	4,46	0,010*

Table 7: variations of the physiological parameters in the transplant of *Parmelia perlata* according to the test of ANOVA

Variable	DDL	SC E	CM	F observed	P
Chlorophylle a	6	18,558	3,0931	9,69	0,000***
Chlorophylle b	6	89,216	31,070	37,23	0,000***
Chlorophylle a+b	6	186,421	12,903	41,53	0,000***
Protéine	6	77,420	14,869	1,76	0,181

►Also the test of ANNOVA table shows that the variation of the **Chl a** at the level of the species ***Parmelia caperata*** is highly significant **(p = 0,001 **)** and that the variations of the **Ch b** and **Chl (a+b)** at the level of the same species is very highly significant **(p = 0,000 ***).**
Also the test of ANNOVA **table** shows that the variations of the **Chl a, Chl b and Chla+b** at the level of the species ***Parmelia perlata***, are very highly significant **(p = 0,000 ***).**

► **Proteins** measured at the level of the transplants of ***Parmelia caperata*** show a not significant variation **table**; on the other hand the variation of the contents of proteins of ***Parmelia perlata*** is only significant **(p = 0,01 *)**

Spatial Comparisons of the various physiological parameters according to the test of Dunnett

► **Chlorophyll**

Table 8: Tests of simultaneity of Dunnett for the Chlorophyll has at *Parmelia caperata*

Station	Average	Difference of the averages with the witness	T observed	Value adjusted of P
1	2,491	0,902	1,846	0,308
2	2,424	0,835	1,709	0,376
3	2,586	0,997	2,041	0,228
4	3,170	1,580	3,235	0,027
5	3,565	1,975	4,044	0,005
6	4,685	3,095	6,336	0,001**

The test of Dunnett **tab 8** shows that only the difference of average of the **Chl a** in the transplants of *Parmelia caperata* at the level of the site 6 with compared with the witnessis highly significant **(p = 0,001 **)**

Table 9: tests of simultaneity of Dunnett for the Chlorophyll b at *Parmelia caperata*

Station	Average	Difference of the averages with the witness	T observed	Value adjusted of P
1	1,844	0,034	0,066	1,000
2	2,772	0,963	1,858	0,303
3	3,692	1,883	3,632	0,012
4	5,046	3,237	6,244	0,000***
5	5,646	3,836	7,400	0,000***
6	7,869	6,060	11,690	0,000***

The same test **tab 9** indicates that the difference of average of the **Ch b** in the transplants of *Parmelia caperata* at the level of the site 4, 5 and 6 with compared with the witnessis very highly significant **(p = 0,000 ***).**

Table 10: tests of simultaneity of Dunnett for the Chlorophyll a+b at *Parmelia caperata*

Station	Average	Difference of the averages with the witness	T observed	Value adjusted of P
1	4,349	0,952	1,296	0,628
2	6,123	2,725	3,710	0,011*
3	6,283	2,886	3,929	0,007
4	8,213	4,816	6,556	0,000***
5	9,208	5,810	7,910	0,000***
6	12,550	9,152	12,460	0,000***

At the level of the **tab10** the test of Dunnett shows that the difference of average of the **Chl (a+b)** in the transplants of *Parmelia caperata* at the level of the site 2 with compared with the witness is only significant **(p = 0,01 *),** on the other hand she is very highly significant at the level of sites 4, 5et 6 **(p = 0,000 ***)**

Table 11: tests of simultaneity of Dunnett for the Chlorophyll has at *Parmelia perlata*

Station	Average	Difference of the averages with the witness	T observed	Value adjusted of P
1	2,392	0,587	1,273	0,643
2	2,786	0,981	2,127	0,199
3	3,160	1,355	2,939	0,047
4	3,140	1,335	2,894	0,051
5	4,059	2,254	4,888	0,001**
6	4,836	3,031	6,573	0,000***

The same test indicates that the difference of average of the **Chl a** in the transplants of *Parmelia perlata* is highly significant at the level of the site 5 and very highly significant at the level of the site 6 **(p = 0,000 ***).**

Table 12: tests of simultaneity of Dunnett for the Chlorophyll b at *Parmelia perlata*

Station	Average	Difference of the averages with the witness	T observed	Value adjusted of P
1	2,287	0,382	0,741	0,938
2	2,690	0,785	1,521	0,483
3	4,946	3,041	5,893	0,000***
4	4,214	2,309	4,475	0,002
5	5,638	3,733	7,235	0,000***
6	8,192	6,287	12,184	0,000***

Also this test shows **tab12** that the difference of average of the chl b to *Parmelia perlata* is very highly significant at the level of sites 3, 5 and 6 with **(p = 0,000 ***).**

Table 13: tests of simultaneity of Dunnett for the Chlorophyll a+b at *Parmelia perlata*

Station	Average	Difference of the averages with the witness	T observed	Value adjusted of P
1	4,678	0,969	1,372	0,578
2	5,474	1,765	2,500	0,105
3	8,105	4,396	6,225	0,000***
4	7,357	3,648	5,165	0,000***
5	9,694	5,985	8,475	0,000***
6	13,025	9,316	13,191	0,000***

this test shows **tab13** that the difference of average of the chl a+b to *Parmelia perlata* is very highly significant at the level of sites 3, 4,5 and 6 with **(p = 0,000 ***).**

► **Proteines**

Table 14: Tests of simultaneity of Dunnett for proteins at *Parmelia caperata*

Station	Average	Difference of the averages with the witness	T observed	Value adjusted of P
1	10,913	2,213	1,032	0,798
2	14,140	5,440	2,536	0,099
3	14,700	6,000	2,798	0,061
4	16,844	8,144	3,797	0,009
5	14,476	5,776	2,693	0,074
6	17,896	9,195	4,288	0,003

.

Table 15: tests of simultaneity of Dunnett for proteins at *Parmelia perlata*

Station	Average	Difference of the averages with the witness	T observed	Value adjusted of P
1	12,556	3,478	1,571	0,453
2	12,826	3,478	1,693	0,384
3	12,952	3,874	1,750	0,355
4	15,165	2,892	2,750	0,067
5	11,970	6,086	1,307	0,621
6	15,164	6,087	2,750	0,067

According to the test of Dunnett, **tab 14-15** there's not in any significant difference of proteins in the transplants of *Parmelia caperata* and *Parmelia perlata* at the level of all the sites with compared with the witness.

Discussions

During development of the lichen thallus, both partners undergo a complex series of morphological, biochemical and physiological changes, resulting in a new organism with novel features (Chapman and Margullis, 1998; Barreno, 2004).

Lichen absorbs water and nutrient passively from their environment. Because of this lichens are particularly sensitive to environmental factors such as temperature, water availability, and air pollutants and/or Lichens are also suitable biomonitors due to their sensitivity to pollution. Several factors contribute to this sensitivity. Water and gas are exchanged over the entire lichen thallus. Because they lack roots, lichens do not have access to soil nutrient pools and must depend on deposition, water seeping over substrate surfaces, atmospheric and other comparatively dilute sources of nutrients. Thus, their tissue content largely reflects atmospheric sources of nutrients and contaminants. Lichens also lack the protective tissues or cell types necessary to maintain constant internal water content.

Many lichens pass through multiple wetting and drying cycles during a day. When hydrated, nutrients and contaminants are absorbed over the entire surface of the lichen
(Jenifer et al., 1996).

The substances accumulate in lichen from the environment through variety of mechanisms including particulate trapping, ion exchange, extracellular electrolyte adsorption, and hydrolysis and intra cellular uptake. (Nieboer et al., 1978).

Currently Lichen transplants are used to assess air quality in areas where lichens are absent or sparse. (Richardson,1992; Pearson ,1993).

According to, Arora and al ., on 2002, pollutants such as: the ozone (O3), the nitrogen oxide (NOx) and the sulphuric dioxide (SO2) participate actively in the formation of the free radicals, in other words favor the oxidizing stress. The Biomarkers of oxidizing stress are the chlorophyll, the proteins and the enzymes.

In the optimal conditions of growth of vegetables, numerous processes metabolic produce reactive species of the oxygen (ERO) but with a rate of low production. This formation of ERO is a normal consequence of the

metabolism to the photosynthetic cells which produce and consume permanently of the dioxygene. The system of transport of electrons in the membrane of thylakoïdes is a major source of ERO (Lagadic and al ., on 1997).
The oxidizing stress appears in a cell when the balance between the ERO and the antioxidant defense systems is broken in favor of the oxidizing state. (Goudable and Favier, on 1997). An imbalance between the production of ERO and the mechanisms of antioxidizing defense Leads to an oxidizing stress which can pull molecular and cellular changes (Goudable and Favier, on 1997; Blokhina and al., on 2003).
In our study we used as biomarkers the chlorophyll and the proteins and resultats registered at the level of tables 6-15 indicates a high concentration of chlorophyll a, b and a+b, mainly at the level of sites situated at the level of the zone of isopollution I and this zone of which the IPA varies from 0.3 to 3.8 is subject in fact to diverse sources of pollution such as: the urbanization, the industrialization presented by the discharges of the complex of phosphated fertilizers ASMIDAL as well as u n road traffic intense at the level of the urban area of Annaba, while the degradation of the chlorophyll is generally correlated in the intensity of the pollution (Garty and al ., on 2001) and concentrations raised by sulfate (Garty and al ., 1997)

Similar results were observed at the level of the other species of Parmelia, it is an etude which was made by Von Arb and Brunold in 1990 the content in chlorophyll of Parmelia sulcata near Bienne, Switzerland and in the North of Switzerland was more raised in samples being in the polluted urban zones that in the remote zones. The same year in 1990 Søchting surveyed the tissue nitrogen content of reindeer lichens in Denmark. In unpolluted areas, tissue levels were 0.26-0.49 % while in areas of wet deposited acidity, values were 0.70- 0.73 % and visible injury could be found. The nitrogenous component of acid rain can produce a fertilizer effect on lichens and cause floristic changes.

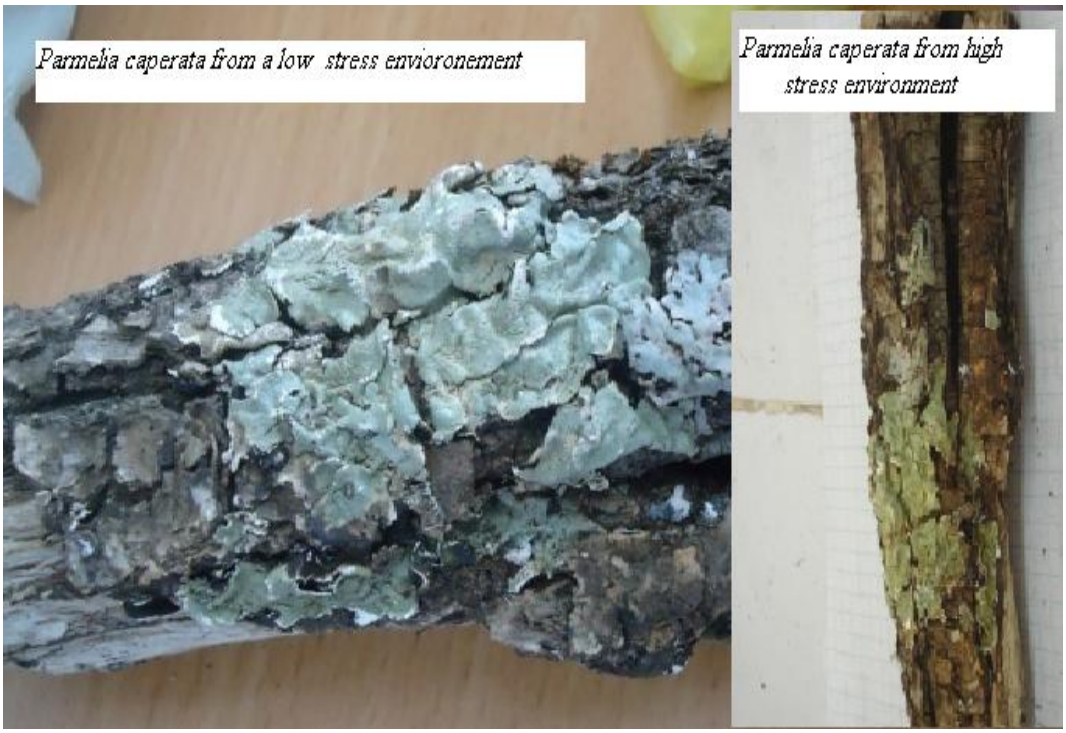
Another more recent study made in the United States indicates that the absence of lichens sensitive to the pollution in the polluted sites is in clear contrast with the visible improvement of the physiological state of the tolerant lichens for the pollution, but compatible with the high load of tissues in nitrogen and in sulfur at the level of these polluted sites. (H.S.Y. Ra, L.H. Geiser, R.F.E. Crang, 2004).

Also proteins as bio markers register very high values at the level of all the sites with compared with the witness this reflects very well the existence of a general stress at the level of our transplants licheniques (Faburé, 2009).

Indeed, the study which was made in 2007 by Serradj Ali Ahmed on the estimation of the acid pollution at the level of the region of Annaba by using several parameters such as; measures of the SO2 and NOx in the atmosphere, the pH of rains, pH of the barks of *Fraxinus angustifolia* and *Xanthoria parietina* as bio indicators, indicates that our region is indeed subject to an acid pollution caused by sulfur dioxides and nitrogen oxides and that these last years the broadcasts of nitrogen oxides exceed from a great distance those of sulfur dioxides this is certainly of for the road traffic the intensity of which deteriorates in the daytime in day.

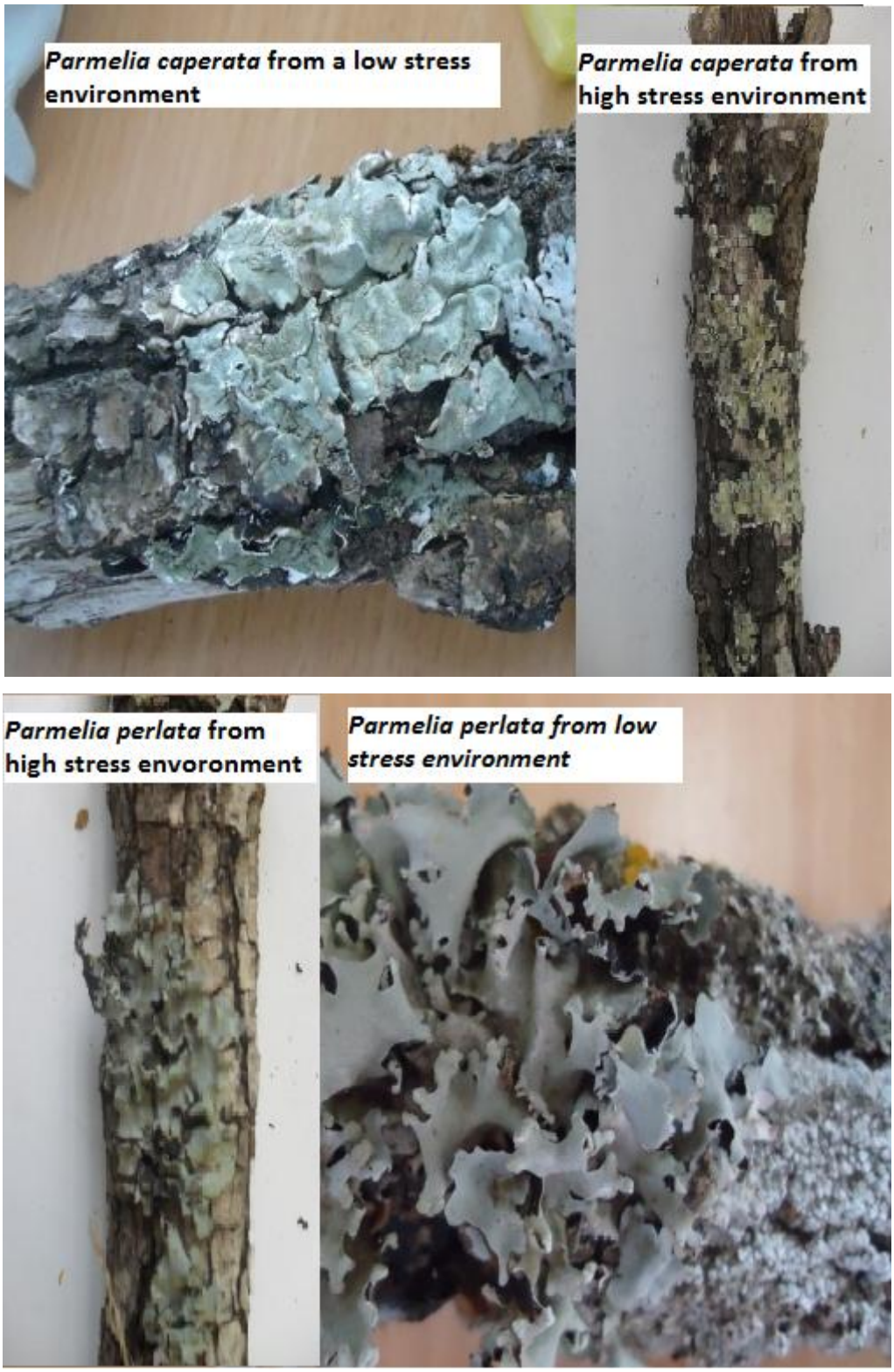
3-Morphological Descriptions of the various transplanted species

Air pollution effects on the transplants of *Parmelia caperata* and *Parmeelia perlata*



SITE 3 TREE 2

With regard to the witness the thallus of the transplants of these sites does not undergo a lot of modification except an absence of some parts and the presence of one or two dense spots, because they are situated far from roads or meadows but little frequented by let convey

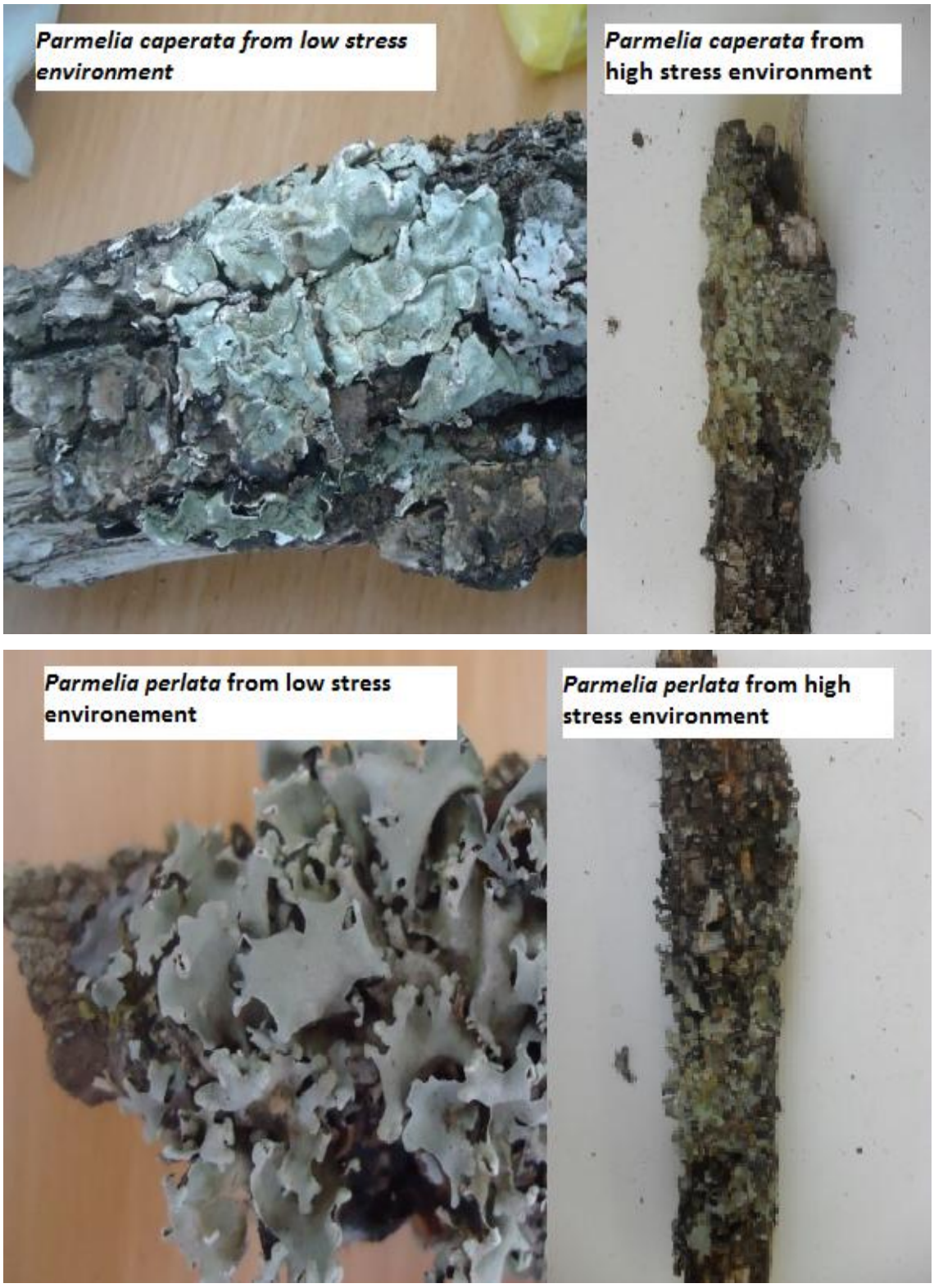


SITE 3 TREE 3

We observe an unsticking of the thallus of *Parmelia caperata*, presence of fine wrinkles; the thallus becomes so fragile and breakable, color darker with brown presence of spots, absence of soralie.
Parmelia perlata thallus color darker than the control, the almost total absence of reproductions bodies: the soralies.

SITE 4 TREE 1

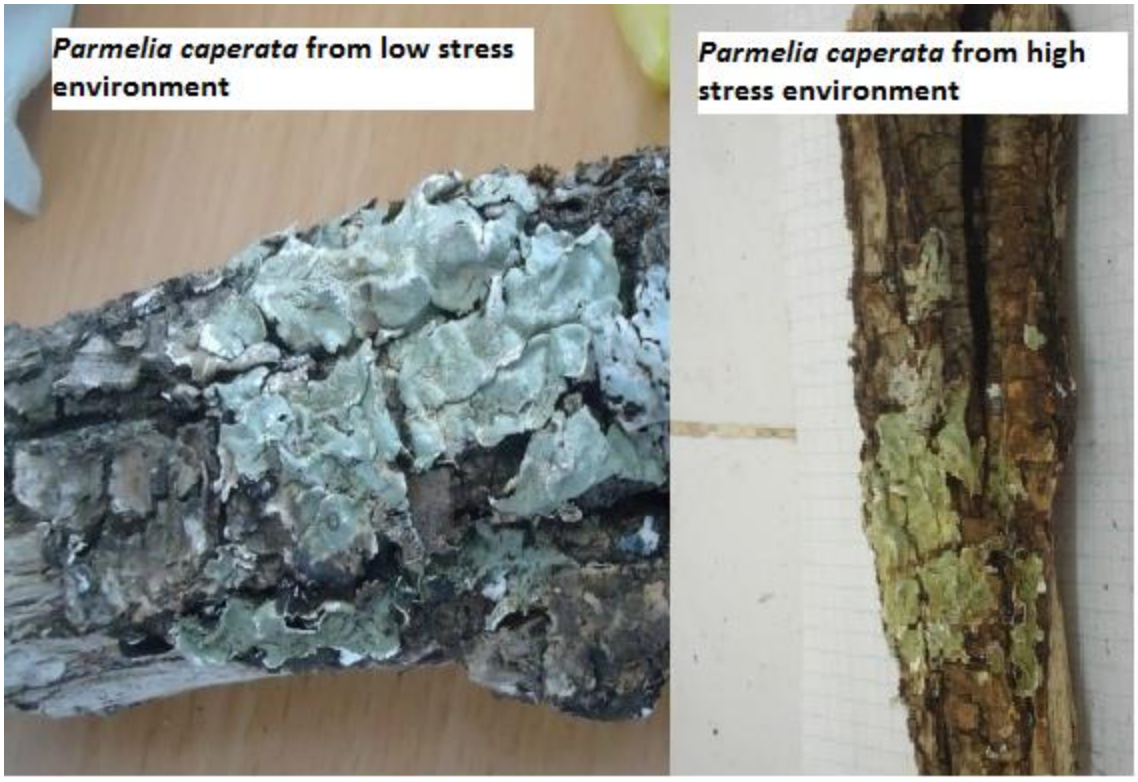
At the level of these sites 3 and 4 *Parmelia perlata* is very dark and the *caperata* becomes drier and unstuck from the support these sites are affected by a road high traffic.


Parmelia caperata from low stress environment
Parmelia caperata from high stress environment
Parmelia perlata from low stress environement
Parmelia perlata from high stress environment

SITE 4 TREE 2


Parmelia caperata from low stress environment
Parmelia caperata from high stress environment
Parmelia perlata from high stress environment
Pammelia perlata from low strees environment

SITE 5 TREE 2

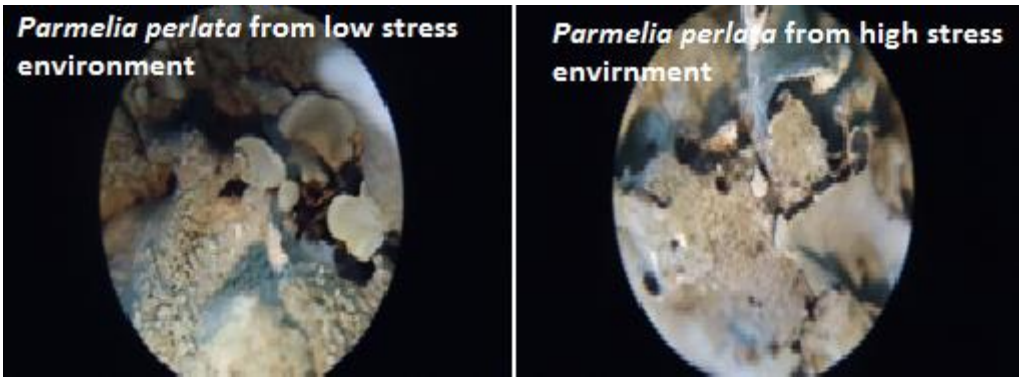


SITE 6 TREE 1

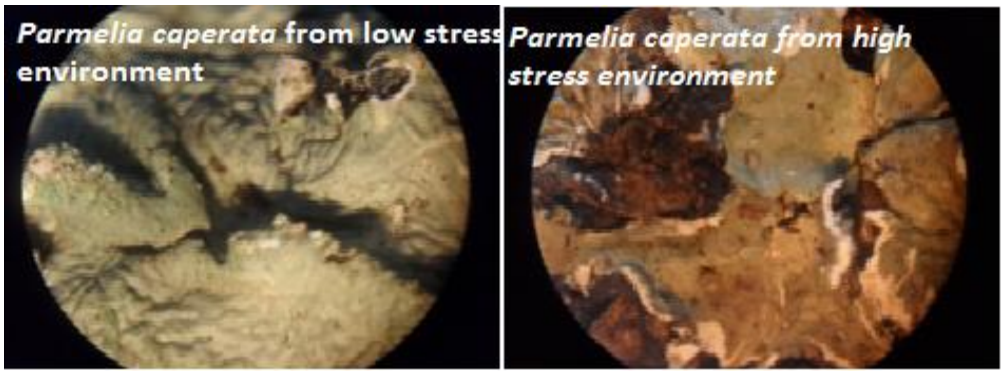
Stations 5 and 6 represent a site to very high road movement, discoloration of transplants
A myriad of pollution effects on lichens have been described. At the level of the whole plant, investigators have described decreases in thallus size and fertility (**DeWit 1983, Kauppi 1983, Sigal & Nash 1983**), bleaching and convolution of the thallus **(Sigal & Nash 1983),** restriction of lichen occurrence to the base of vegetation **(Sigal & Nash 1983, Neel 1988)**, and mortality of sensitive species **(DeWit 1983, Denison & Carpenter 1973).**

4-Observations under binocular microscope:

Marginal Presence of reproductive organs the soralies which are very developed training an edge rolled up in the shape of pearl reaches by the thallus of *Parmelia caperata* and *perlata* witness.

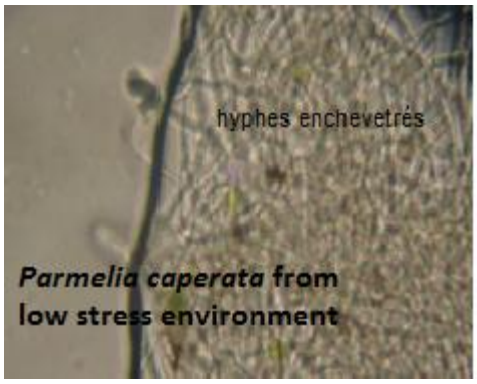


Almost total absence of soralies on the thalle of especes situated at the level of the Site 6



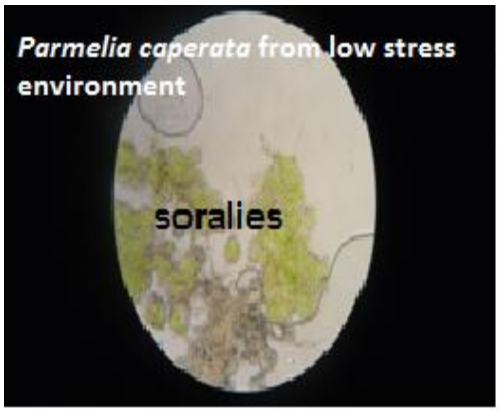
Suckers of *Parmelia caperata* and *Perlata* temoin fixed well to the trunk grace in rhizines
Sucker of necrosed *Parmelia caperata* and carrying deformations in the form of fine wrinkles Site 6

5- Histological Cups

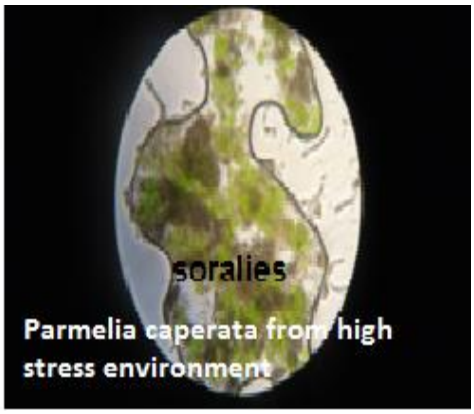


Crossde section of *Parmelia Caperata* control x10

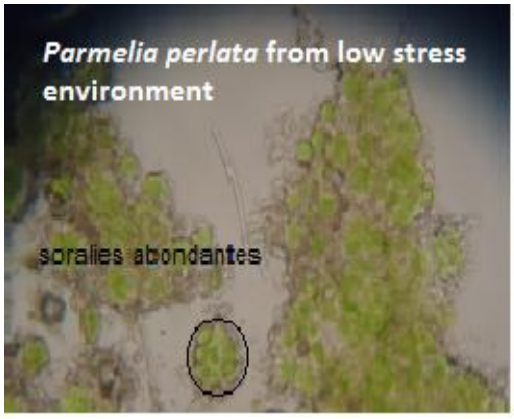
crossde section of *Parmelia caperata* polluted x10



Crossde section of soralies of *Parmelia caperata* control x40



Crossde section of soralies of *Parmelia caperata* polluted x40



Crossde section of *Parmelia perlata* control x40

Crossde section of *Parmelia perlata* polluted x40

According to these histological cups(cuttings) we notice that the structure of the thalle of 2 licheniques sorts(species) developing naturally at the level of el kala (temoin) constituent very developed hyphes a mycélium muddled, on the other hand the sorts(species) transplanted at the level of the site 6 for example presents a hétéromère structure with presence of gonidies and, presents a relaxation(slackening) of hyphes and a light decrease of length, otherwise said hyphes becomes very short and so the thalle loses its initial structure.

Also for organs of vegetative reproductions soralies is necrosed by the effect of the pollution.

Microscopic effects described include reduction in the number of algal cells in the thallus (Holopainen 1984), ultrastructural changes of the thallus (Hale 1983, Holopainen 1984, Pearson 1985).

Conclusion

The alteration of the air and the transformation of the environment related activities. Man is increasingly at the heart of the concerns of government agencies responsible for environmental protection

This study aims to characterize the impact of pollution amospherique lichen flora of regions d'Annaba, which resulted in a stress.

Generally, the content of chlorophyll in transplants of Parmelia Parmelia perlata caperata and tends to increase at the most polluted stations (S3, 4,5 and 6), the same increase in protein levels at the same transplants contaminated sites is due to the excessive presence of NOx and SO2 generated by different sources of pollution such as high urbanization, industrialization and even the intensity of traffic at the town of Annaba.

The effect of pollution on lichens results in a change in morphology and histology. These changes are due to pollution. There is a strong air pollution in the region of Annaba and especially at the city and Wadi fourcha by cons, at Sidi Aissa pollution is very low. We found it useful to suggest some measures to address this serious problem of air pollution in this case:

- Prioritize other cleaner energy
- Reduce the impacts due to road transport
- Improve the design of cars
- Treat exhaust
- Improve fuels and their use
- Accentuate the polluter pays principle
- Ensure proper functioning of continuously monitoring stations of the air quality and the right location .

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Impact of road traffic near the roads on the cypress in the region of Annaba Algeria

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Abstract : Air pollution especially of lead has steadily evolved over time, due to the increase in the number of vehicles on the market. Our research is based primarily on the use of a species phanérogamique "*Cupressus sempervirens*" as bioindicator of air pollution on the three major highways serving the city of Annaba. An appropriate sampling strategy, a spatio-temporal monitoring and measurement of physiological parameters by the combined determination of lead allowed us to assess not only the state of air quality but also the impact of this pollution generated by heavy traffic in this region.
Statistical analysis of results brings up correlations ranging from significant to very highly significant between the measured parameters and lead levels in the bio indicator by site and months of experimentation..

Key words: pollution, lead (shot), Cupressus sempervirens, bio indication, bio accumulation, road traffic, Annaba.

Introduction

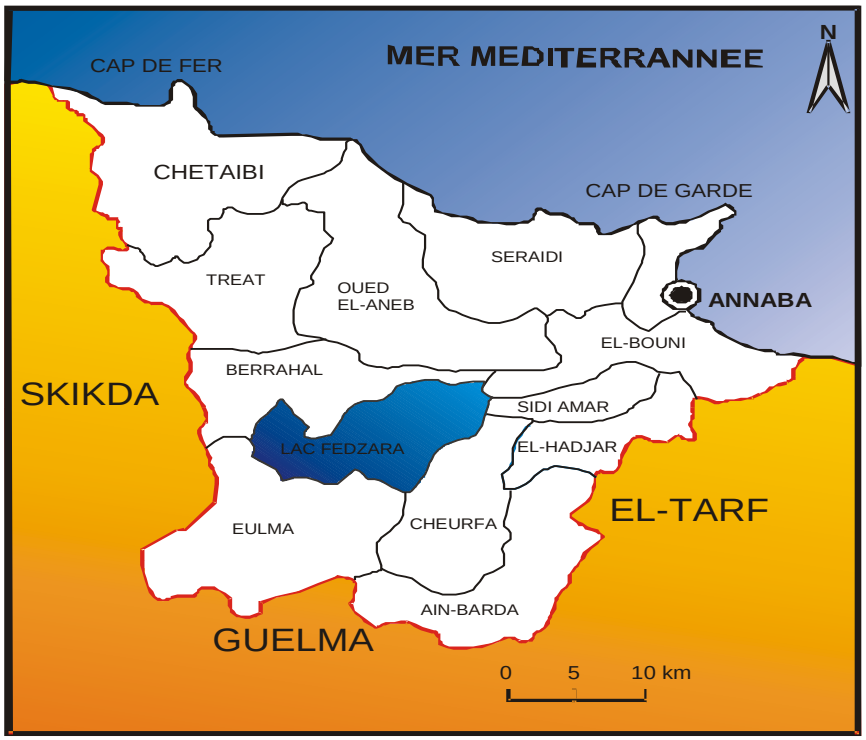
The air pollution arouses since a few years an interest growing as well among the leaders as within the population. The technological progress and the development of the branch of industry by way of the fast push of the urbanization are at the origin of a ceaselessly increasing infringement towards the air quality. Among the sources (springs) of pollution, we can quote the means of transportation, in particular the motor vehicles.
In Algeria and especially in the region is from the country, there is for several years a progressive problem of atmospheric pollution in particular plombique bound to important road networks (Semadi et Decormis, 1986 ; Maizi, 2006). In the region of Annaba, it is easy (well-to-do) to notice that we have a real problem of pollution on one hand because of the existence of a very important motor vehicle population (car fleet) with regard to the crossed distances, and on the other hand certain topographic and climatic characteristics which create a climate convenient to the development of the pollution (Alioua, 2001 ; Boureghda, 2004). Since the seventies of numerous searches (researches) were led on the use of the indicator and organic vegetables as the bio accumulators of the pollution in particular that some heavy metals (Semadi et Deruelle, 1993; Alioua et al., 2008). Our search on the study of the pollution plombique of automobile origin in the region of Annaba by using in a relevant way bio-indicators, in particular cypress in the objective to characterize the environmental state of the environment studied by bringing to light a plombique pollution bound to the road traffic, to study the impact of this last one on the morphology and the physiology of the used vegetable and to propose bio relevant indicators of this pollution.

Materials and methods

The city of Annaba is considered as being one of the cities the most polluted on the national territory and in the North of Africa, the main broadcasting(issuing) source(spring) of the lead(shot) is the road traffic which evolves in a disturbing rhythm.
The problem of the atmospheric pollution to Annaba bound(connected) to the presence of several industrial units and to the intense road traffic is deteriorated(aggravated) by its geographical position (in basin), factor(mailman) which favors the accumulation and the stagnation of atmospheric pollutants and exposes(explains) consequently the inhabitants to a sanitary risk.

The city is structured around a main center, the city center. This last one desired by the citizen, as well as by the planner is the space the most frequented by the city. The central space of the city does not take care only of the population of Annaba but also the populations of the bordering urban areas(conglomerations), all the activities are there present of businesses, presence of markets (walked(worked) El Hattab) presence of offices(desks), presence of stations(resorts) of taxis, presence of station(resort) of public transportation (Hacini-Chikh, 2008).
The population of the wilaya of Annaba did not stop increasing during these last years to reach(affect) 650 000 inhabitants where we register(record) moreover an annual average of growth closely 1,01 % and an irregular distribution of the population with a variation of the density from a municipality to the other one. The axis Annaba - Sidi Amar and El Bouni represents the sites where the majority of the population are concentrated (44, 65 % to Annaba, 20, 04 % to El Bouni and 12, 80 % to Sidi Amar).
The socioeconomic characteristics (commercial, industrial, university pole and the quality of the services are factors limiting some distribution of the population (P.D.A.U., 2008).
Nowadays we find an automobile city, the annual growth rate of car registration documents is only increasing year by year especially between year 2002 and 2003 or the rate increases considerably 0,92 it passes in 3,57 (Hacini-Chikh, 2008). In 2005, the vehicle of tourism is 68 % with regard to the other ways of transportation. Compared with the other Algerian wilayas Annaba is classified second after the capital with a park automobile reaching(affecting) 100 000 vehicles (P.D.A.U., 2008), With 94 passenger cars for 1000 inhabitants and exceed(overtake) widely Constantine and Oran which(who) are respectively 79 and 81 cars for 1000 inhabitants (Semaly – Transurb in Hacini-Chikh, 2008).
Since 2003 we would have an acceleration of motorization (+ 9 %), this acceleration rose during the last years when we registered respectively an increase (+ 14 %) in 2004 and (+ 42 %) between years (on 2004 and 2008).

1- Presentation of the zone of study:



The city of Annaba is situated east of Algeria between the latitudes (36 30) the North and (37 30) the North, and the longitudes (07 20) is and (08 40) is, with 12 municipalities of a total surface of 1411.98 Km2. She is limited by the Mediterranean Sea to the North, the wilaya of Skikda on the West, that of Guelma to the South and El Tarf in the East **(Figure 1).**

Figure 1: Geographical localization of the region of study (Annaba).

2- The climatic parameters::

Certain climatic parameters are considered in our study because they have a role particularly mattering in the distribution and the dilution of the impurities.

- The city of Annaba presents in general Mediterranean features of type with bioclimatic floors sub humid and wet.
- She(it) is characterized by soft temperatures in winter, warm in summer with an annual average temperature of 17.89°C, an annual average maximal temperature of 23.78°C and finally an annual minimal temperature of 12.76°C and plentiful precipitation, the annual pluviometry is of 654,64mm.
- The wind rose allowed us to bring to light a dominant direction of the Southwest North-East wind **(Figure 2).**

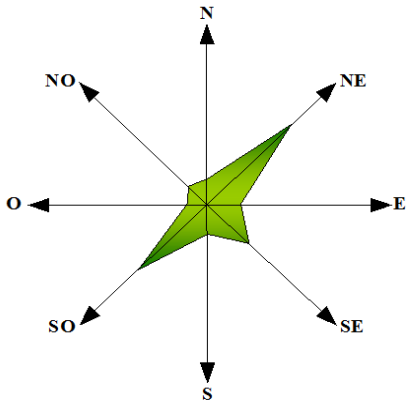


Figure 2: The wind rose of Annaba established on an average of 10 years (on 1999 - 2008).

3- Choice of the sites of surveillance and the bio accumulators of the pollution:

3.1- Choice of sites

Generally, for better connaitre the levels of pollution, it is important to set up networks of taking, by trying to choose well exposed sites, in number sufficient(self-important). The analysis of the built-up area of Annaba allows to distinguish in the global scale three expanding main trunk roads of growths and development and which converge on the city center of Annaba:
- The axis RN 16 which connects the big and former(ancient) two poles Annaba and El Hadjar,
- The axis RN 44 - is connecting Annaba with El Tarf,
- The axis RN 44 - the West connecting Annaba to Constantine.

The road stitch of the urban area is marked by three radial roads, the RN44 is which goes on the scale of the city center by penetrating the West and the RN 16 which goes on by the North-south axis and The RN 44 - is.

The evaluation of the levels of pollution near the axes of traffic is a complex exercise, considering the numerous factors to be considered in this scale. The concentrations in pollutants registered in border of way indeed depend on local emissions generated by the car traffic (depending themselves on conditions of traffic and on the composition of the motor vehicle population parameters influencing the dispersal of pollutants (local meteorology and configuration of public road network(garbage dump)) and levels of thorough concentration of the surrounding zones.

We chose three sites localized on three main highways harming the urban area of Annaba **(Figure 3):**
- Site 1: (R.N. 44): Annaba-El Tarf, he is approximately 4 km in the Southeast of Annaba.
- Site 2: (R.N. 16): Annaba-EL Hadjar. He was chosen in 5 km in the South of Annaba.
- Site 3: (R.N. 44): Annaba-Constantine: he was realized in 3 km in the Southwest of Annaba.

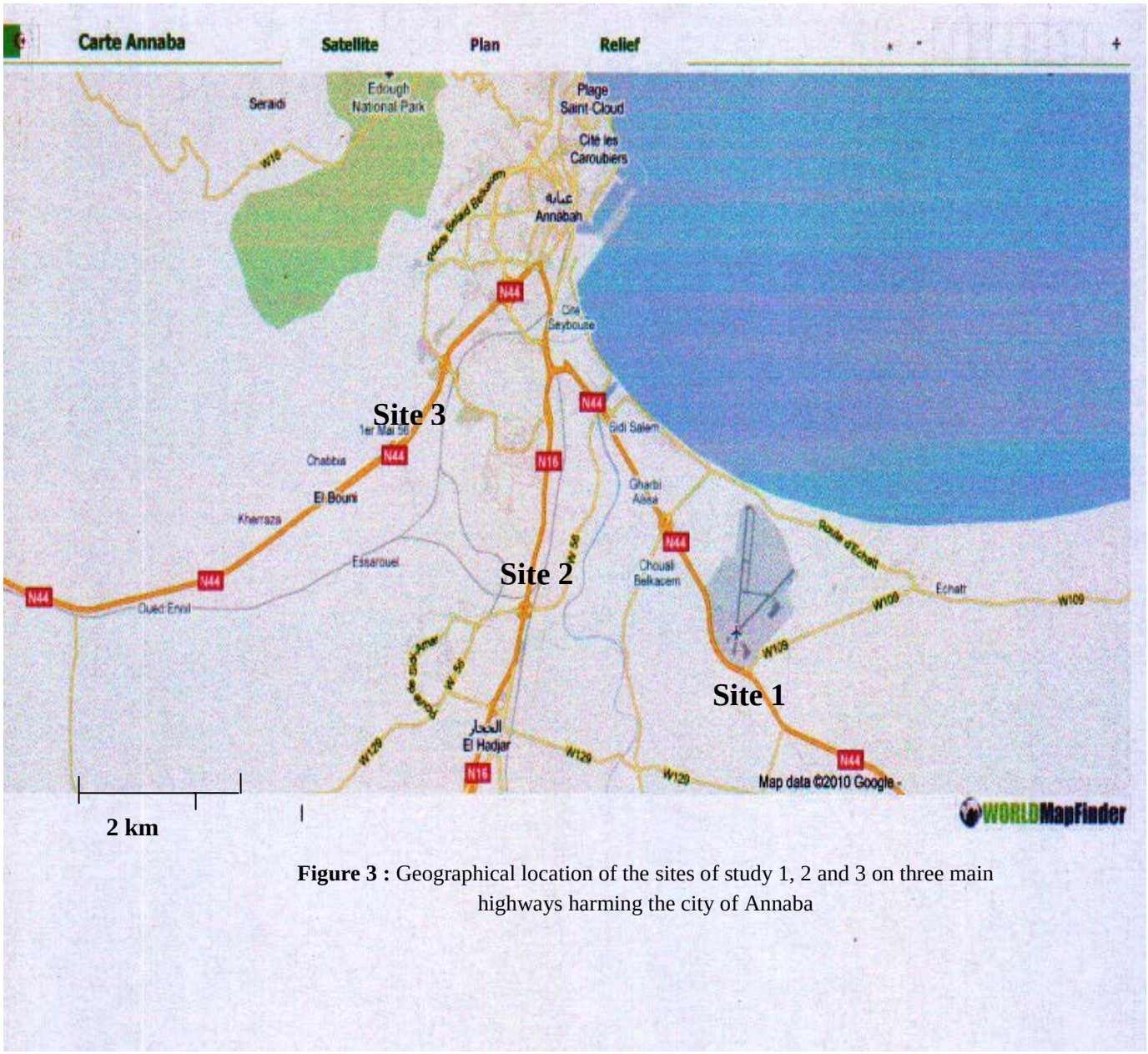


Figure 3 : Geographical location of the sites of study 1, 2 and 3 on three main highways harming the city of Annaba

3.2- Choice of the botanical species:

Our choice concerned a phanérogamique sort "in situ ", it is about the cypress (Cupressus sempervirens), it is the most representative vegetable of the region.
This vegetable is homéohydre, that is the moisture content of the vegetable remains relatively constant during all its existence, whatever are the variations of the hygrometric state of the air(sight) and the moisture content of the ground **(Gorenflot, 1998).**

4- Appreciation of the road traffic:

The counting of vehicles was made at the level of our three sites of study in the region of Annaba. We chose a site of just counting of vehicles next to the phanérogamique sort chosen, object of our study. This counting was thus made at the rate of three times a day, once quite week, the monthly average being taken into account and it during 07 months as from the month of Mars 2008.

5- Technique of takings of samples:

To realize our sampling, we operated at a height varying 1, 50 m and 2 m of the ground. We took, every time 10 in 20 sepals around of the tree at the level of man to have a homogeneous average sample.

The taken samples are placed in plastic labeled bags carrying all the indications (in particular date and place of taking), closed by means of an elastic(rubber band) to limit the losses of water by evapotranspiration until the arrival to the laboratory.

6- Analytical techniques:

- After drying of samples in the steam room in 105°C, they are carefully crushed, put in piluliers where they are treated by the peroxide of hydrogen (hydrogen peroxide) until complete mineralization. The recent dosages of the lead were made by using the technique of spectrophotometry of atomic absorption (S.A.A). The measures were made from the solutions of 20ml of nitric acid for 2 %. For the same solution, three measures are made, the average being considered. Before proceeding to the dosage of the lead in samples, it is necessary to establish at first a curve of calibration from the solutions of lead known concentrations. The results are directly read on the device if it is preset according to the indications of the builder or on the curve of calibration in microgram of lead. The used device is a spectrophotometry (Perkin-Elmer model 400) - For the dosage of the chlorophyll, we used the method proposed by (Rao & Le Blanc, 1965), the used device is the spectrophotometer in two wavelengths 645nm and 663nm (GenesysTM 8).

- The method used for the dosage of the proline is the one (Troll & Lindsley, 1955) Simplified, finalized by (Dreier & Göring, 1974). The used device is the spectrophotometer in the wavelength 528nm (GenesysTM 8).

- Having taken the fresh samples, we weighed 1.5gr of fresh material then put in the steam room in 105 °C during 72 hour to determine the dry material. So the report M.F. / M.S. An idea onto the purity of the air of the site in question, more is defined to give us the air is pure is more the development of the vegetable is normal that is the Fresh material is in its optimum on the other hand if the air is polluted it entrained of the demonstrations of chloroses, necroses to the detriment of the Fresh material (Semadi, 1983).

7- Statistical analysis of the data:

The tests of analysis of the variance in two criteria of classification were used to make a comparison for every characteristic between sites on one hand and between months of experiment on the other hand (Dagnelie, 1999). All the calculations were realized by the command of stepwise of the software MINITAB.

Results

1- Variation of the monthly average of the road traffic during rush hours near 03 main highways.

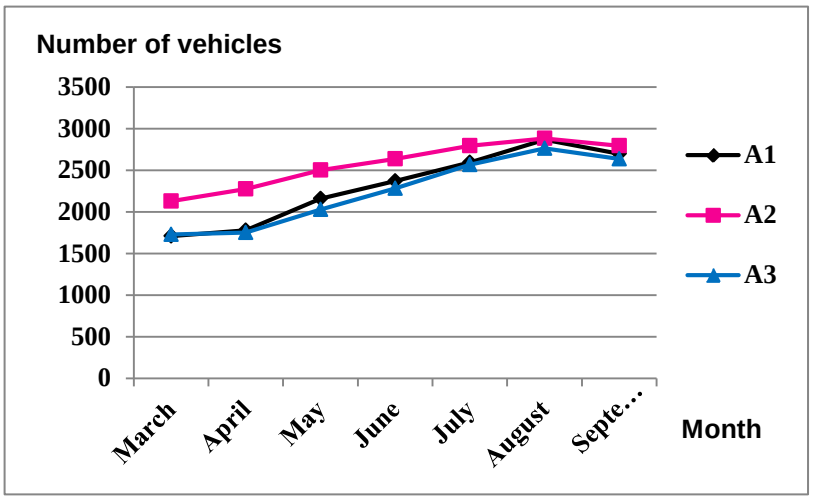


Figure 4: Variation of the monthly average of the road traffic at the level of three axes harming the urban area of Annaba during rush hours by *Cupressus sempervirens*

Especially at the level of the axis 2 **(Fig. 4).** This is bound to the environment of the axis and to its characteristics (surrounded with several important equipment's: commercial, industrial, urban areas etc.), thus the axis 2 seems the most frequented.

The analysis of the variance in two criteria of classification relative to the spatiotemporal variation of the road traffic at the level of three axes harmingthe urban area of Annaba during rush hours shows that this last one is significant in the space (p = 0,000 ***) and in the time (P = 0,000 ***).

2- Results obtained to the bio indicator:

2-1- Lead

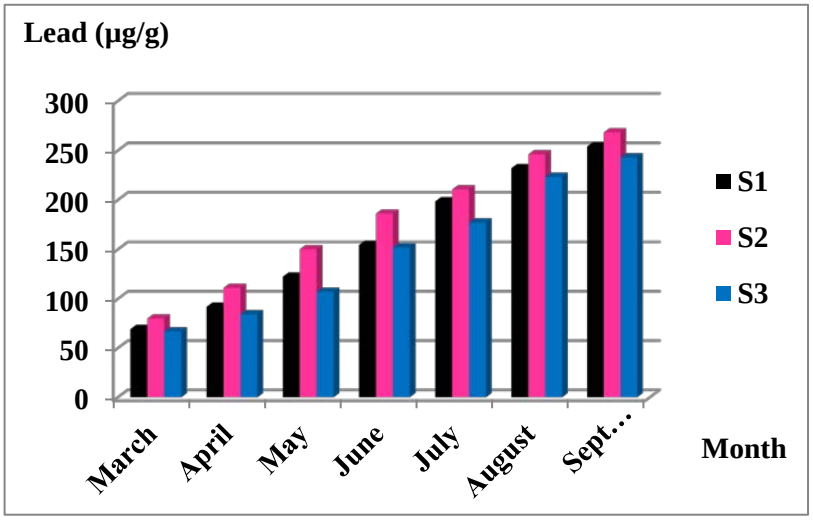


Figure 5: Spatiotemporal variation of the lead accumulated by *Cupressus sempervirens*

For the cypress, the accumulation of the lead is very clear some is the site; it increases gradually between June and September **(Fig. 5).** Although at the level of the site 2 the vegetable seems to accumulate more lead, this is certainly connected to the volume of road traffic as well as has the environment of the site.

The analysis of the variance in two criteria of classification relative to the spatiotemporal variation of the lead(shot) accumulated by Cupressus sempervirens show that this last one is very highly significant in the time(weather) (p = 0,000 ***) but it is only significant in the space (p = 0,011 *).

2.2- The chlorophyll:

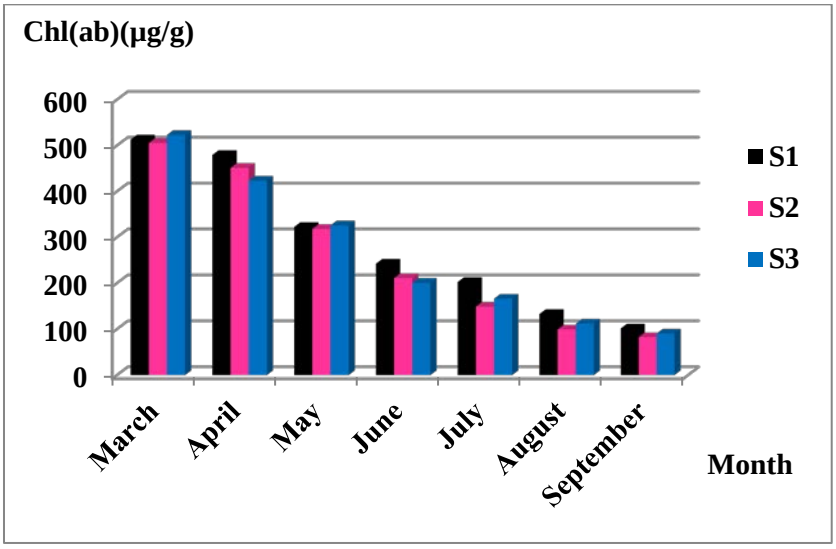


Figure 6: Spatiotemporal variation of the chlorophyll (ab) at *Cupressus sempervirens*

Further to the results obtained as regards the average content of the chlorophyll (ab) at Cupressus sempervirens and represented by the **fig. 6**, we notice a fluctuating variation during the months of study by all the sites.

It's the same for the comparison of the spatiotemporal variation of the chlorophyll (ab) at Cupressus sempervirens who shows that there is a very highly significant variation in the space (p = 0,000 ***) and in the time (0,000 ***). That is the content in chlorophyll to the vegetable depends on the position of the site and on the time of exposure although the more the time of exposure is long and the more the content in chlorophyll is less.

2.3- La proline :

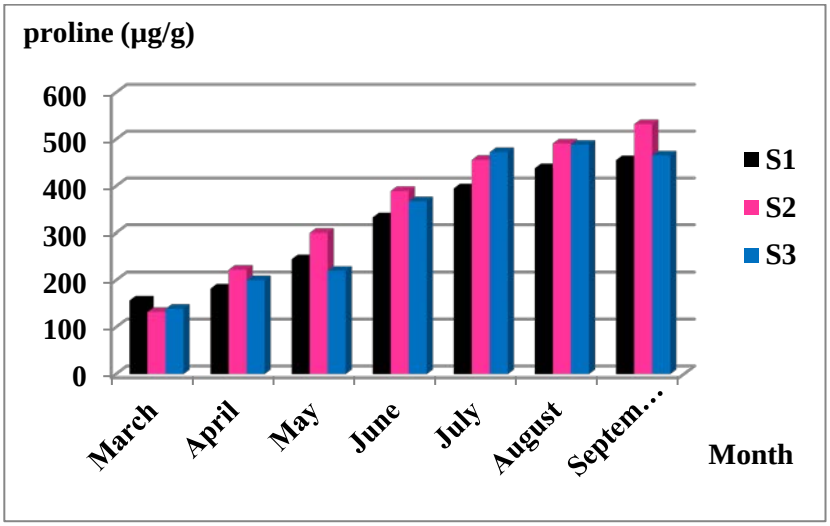


Figure 7 : Variations spatiotemporal of the proline at *Cupressus sempervirens*

According to the results illustrated in the **fig. 7**, we notice that the rate of the proline at Cupressus sempervirens increases from the first taking, this increase persists until the seventh taking; this is probably due to the stress of the vegetable provoked by the accumulation of pollutants.

The comparison of the content average of the proline at Cupressus sempervirens shows that the variation of the proline is very highly significant in the time (p = 0,000 ***) when in the space (p = 0,000 ***), stalled means that the contents it proline vary according to time and of the site.

2.4- MF/MS :

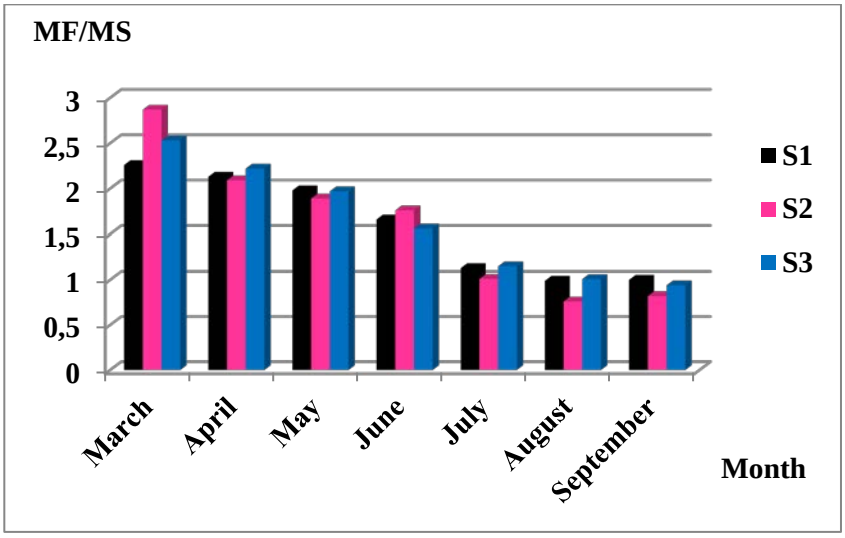


Figure 8 : Variations spatiotemporal of the report MF / MS at Cupressus sempervirens.

La figure 8 show that the report MF / MS at present Cupressus sempervirens of the fluctuations from March till June then stabilizes the rest of the months of study. We also notice that there is no big variation between both sites 1 and 3. This is doubtless due to the sustainability of the always green sort.

As regards the comparison of the spatiotemporal variation of the relationship MF / MS at Cupressus sempervirens, we notice that it is not significant in the space (P = 0,220) whereas it is very highly significant in the time (p = 0.000 ***).

Discussion

Considering its geographical position (in basin), Annaba is a coastal city characterized by a high rate of humidity throughout the year, an important pluviometry with the risks of temperature inversion which create a climate convenient to the development of the pollution.

Concerning the relative results in bio surveillance of the pollution plombique near main highways, we notice that: by comparison of the volume of traffic long-distance truck driver at the level of three axes for the same schedules of counting, we notice at first by the sites 1 and 3 that there is so difference according to the schedules of counting, on the other hand the difference is smelt at the level of the site 2 where the road traffic seems more intense during rush hours. Indeed this site harms the city El Bouni, the urban areas of El Hadjar, Sidi Amar, Chaïba, the University and the steel-making Complex as well as the other destinations towards Guelma and Souk Ahras; this is understandable by the importance of these urban areas and infrastructures harmed by these strongly frequented roads.

Concerning the accumulation of the lead(shot), the results(profits) which we obtained demonstrate well the presence of a strong plombique pollution of automobile origin, revealed to the cypress (Cupressus sempervirens) at the level of the site 2, where the road traffic is the most intense, Cupressus sempervirens accumulates 268,33 µg / g the September. These results denote a strong accumulation to the sorts in the persistent foliage.

This is approved by (Madany and al., 1990) which demonstrate that the emitted particles are better got by the rough surfaces where embossed and the presence of a pilosity which favors their retention that by the smoother skins where covered with cuticles for the same site and the same exposure in the automobile pollution. So (Little and Martin, 1974), notice that the rough sheets can collect ten times more lead(shot) than the smoother sheets. Par ailleurs, nous enregistrons une accumulation temporelle nette de plomb entre le mois de mai et le mois de septembre, soit pendant la période de sécheresse. Nous considérons en général que les précipitations durant le mois de mars et avril ont tendance à lessiver les polluants particulaires au niveau du feuillage, ce qui va influencer la concentration en plomb accumulé.

Thus dusts, containing heavy metals, accumulate on the air parts, particularly the sheets. This deposit of surface of leaves can be qualified as latent pollution because the cuticle is considered as a waterproof barrier which opposes to the penetration in leaves. (Arvik et Zimdahl, 1974) Showed that very fine lead particles could penetrate into stomate, but it is improbable that big lead quantities penetrate in this way and this process can be responsible only for a low part of the contamination of leaves by the lead.

However, when leaves age, the efficiency of this barrier is distorted, it appears microphone cracks and pollutants which remain normally on-surface can easily penetrate. Therefore, lead particles put deposited on the surface of leaves do not practically penetrate inside and can be easily washed.
This upper vegetable indeed shows of the air quality thanks to its power accumulator. However this last rest always function of the nature of the species (its morphology, its vegetative cycle), of the exposure time, the intensity of the pollution, and to the environmental factors such as the direction of winds, the precipitation, the humidity .etc. The spatiotemporal follow-up of the moderate physiological parameters (content in chlorophyll, it proline and the report MF / MS), indeed testifies of the air quality of every site.
The follow-up of the counting of vehicles on three road main trunk roads harming(serving) the urban area(conglomeration) of Annaba demonstrated well to us the volume of road traffic the most marked on the R.N.16Annaba - El-Hadjar and not insignificant on the other axes. The statistical processing allowed well us to classify its main highways.

Conclusion

The explanation of all these results integrates all the parameters of the environment, susceptible to influence on one hand the dispersal of pollutants such as the topography of sites, the direction and the wind speed, the situation of the road: the case of the axis 2, where the road is taken by the urban areas of El Bouni and Sidi Amar, the infrastructures of the industrial park thus pollutants tend to stagnate around the road. So the presence of trees near the road is also a factor of retention of pollutants. And on the other hand, the variation of the physiological parameters of the used vegetables of which the lead is a part but is not the only person in charge, so the other pollutants can interferes view the presence of several polluting infrastructures. However, all the species of a perimeter affected by a pollution do not react in the same way to pollutants. They are intrinsic factors in plants, morphological where physiological, which determine the resistance, the tolerance where the sensibility of plants. Other factors bioticks aged-related, at the physiological stage can intervene in the sensibility of vegetables in this plombique pollution.

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Online Tracking Nutrition and Health of High School Students

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Abstract: Nutrition and proper diet plays critic role on development of the high school students. During school age disorders due to diet of student may cause problems and open door to the some other diseases. Early detecting and tracking disorders may play important role on the youth health. We find Body Mass Index (BMI) would be relevant in our work in order to diagnose and keep track of disorders. We built computer program called Tracking Nutrition and Health (TNH) especially for high school students and kept track of height, weight, age of students to measure disorders. BMI values outside of the certain range are considered as a sign of disorder. In order to overcome disorders some tips and suggestions are given such as diet plans, exercises and etc. Activities and suggestions are being kept on the system and progress is analyzed over time to make decisions and observe progress that has been made. In this paper limitations, advantages and disadvantages of the proposed method is going to be discussed. Furthermore we will address experience, knowledge and skills we gained through implementations and research.

***Keywords*:** Online Information Collection, Body Mass Index (BMI), Nutrition Disorders, Computer Programs for Monitoring.

Introduction

Nutrition and proper diet plays critic role on development of the high school students. During school age disorders due to diet of student may cause problems and open door to the some other diseases. Early detecting and tracking disorders may play important role on the youth health. In our work we built computer program called TNH especially for high school students and kept track of height, weight, age of students to measure disorders. BMI values outside of the certain limits are considered as a sign of disorder. The project is about building up a web-based health tracking system for youth especially high school students. The desired Web oriented system would keep track of its members' health conditions and provide health suggestions to the members according to the personal information they subscribed. Our main concern on this project was to complete the user interfaces and built computer program for calculation, submission of data and displaying results and so on. The system we would like to implement is going to answer the needs of specific group of people. Instead of various and complex medical issues we will focus on more common problems such as height, weight problems Targeted users are teenagers from eleven to eighteen years old. By choosing specific user group, we did get more chance to focus on users' specific problems. We also realize making assumptions about individual especially for young people is challenging task. For privacy concerns we embed user authentication in our project. We wanted to prevent user information from unauthorized access and modification.

Method

Body Mass Index is used to calculate individual body fat based on his or her body weight and height. The formula is very simple and universally used. BMI also can be calculated using BMI chart on (Body Mass Index Table). BMI formula can be calculated dividing body mass to individual`s square of height.

$$BMI = mass(kg)/height(m)^2$$

While calculation of BMI goes back to 19th century BMI gained popularity via published paper in 1972 which found BMI to be good approximation body fat percentage (JeremySinger-Vine, 2009)(Keys, Ancel. and friends, 1972). BMI is originally intended to use for population studies but because it`s simplicity it is used also for individual diagnosis in

spite of its inappropriateness. It provides how a person is thin or thick and allow professional to make decisions based on numeric value of BMI. For individuals we take value of BMI of 18.5 to 25 to indicate optimal weight; BMI lower than 18.5 suggests that the person is underweight while the number above 25 indicates that the person is overweight; BMI number above 30 indicates that the person is obese (over 40 is morbidly obese). We use certain ranges of numbers to indicate students have malnutrition or disorders. World Health Organization (WHO) considers BMI less than 18.5 as underweight and a sign for eating disorder. BMI greater than 25 is diagnosed as overweight and above 30 is considered as obese (BMI Classification). Table 1 below shows ranges and their interpretations according to number defined by WHO.

Table 1 Ranges of BMI values

Category	BMI range – kg/m^2	BMI Prime
Very severely underweight	less than 15.0	less than 0.60
Severely underweight	from 15.0 to 16.0	from 0.60 to 0.64
Underweight	from 16.0 to 18.5	from 0.64 to 0.74
Normal (healthy weight)	from 18.5 to 25	from 0.74 to 1.0
Overweight	from 25 to 30	from 1.0 to 1.2
Obese Class I (Moderately obese)	from 30 to 35	from 1.2 to 1.4
Obese Class II (Severely obese)	from 35 to 40	from 1.4 to 1.6
Obese Class III (Very severely obese)	over 40	over 1.6

BMI values above are used for adults and BMI for young's and children is used differently. Although calculation is as same as adult evaluations of BMI are done by comparing to typical values for other children of the same age. Instead of set threshold for malnutrition, the BMI percentile allows comparison with the children of the same gender and age (BMI for Children and Teens). BMI falls under 5th percentile is considered underweight, and above 95th percentile is considered to be overweight. We are giving special and careful attention to the people are categorized as underweight and overweight since that group of people are considered to have disorders according to BMI calculations. A reference BMI table for boys' age between 2 to 20 can be seen in Figure 1.

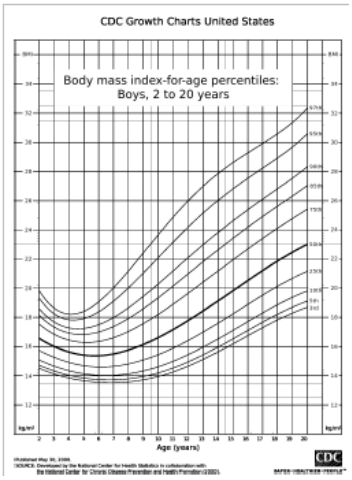

Figure 1: BMI for age percentiles for boys 2 to 20 years of age.

Although BMI is simple to calculate and interpret different BMI tables are available for different nationality and age and gender. To make appropriate decisions all aspects should be considered. Table for other groups and nations can be integrated into the software and more generalized system can be built as a future program. The recommended distinctions along the linear scale may vary from time to time and country to country making global longtitual surveys problematic. As we mentioned BMI can be changed and in 1998, the U.S National Institutes of Health and the Centers for Disease Control and Prevention brought U.S definitions into line with WHO guidelines, lowering

normal/overweight cut off from BMI from 28.5 to 25 and effect of this change 29 million healthy population becomes overweight (Who's fat: New definition adopted). BMI may differ from country to country and as an example BMI values for Japanese people are given in Table 2.

Table 2 BMI Range and Categories for Japan

Category	BMI range – kg/m^2
Normal	from 18.5 to 22.9
Overweight	from 23.0 to 24.9
Obese	25.0 and above

BMI data is becoming more and more pertinent to the growth of children, due to the majority of their exercise habits (Barasi, M. E.,2004). BMI has been used by WHO as standard for recording obesity statistics since early 1980. However accuracy of BMI is still debated. For example one problem in elderly and children is differences in bone density and that makes difference in total weight.

TNH consists of several components. The first part is the Subscription form. Subscription form allows new users to subscribe their personal information. The information submitted by the users will be recorded in the database and become a profile for user. User information can be viewed and changed when desired or needed. Keeping user information at each step will allow us to see improvements and deterioration of individual. In figure 2 submission and data gathering is shown.

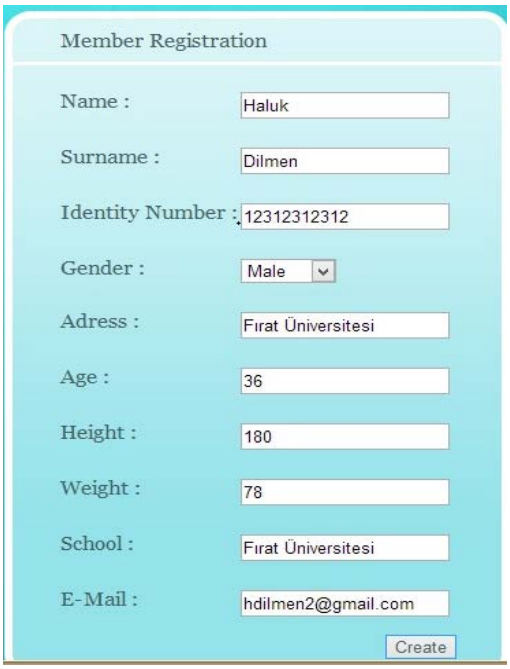

Figure 2: User information submission

The second part of the program is used for calculating BMI data for users. Based on BMI data, user will be categorized and class for user is determined. As indicated BMI range for categories are not static. From time to time depending on geographical regions and populations numbers can be interpreted differently. For example BMI number can be interpreted as a normal weight for individual in US and same number will indicate individual is overweight in Japan. Country, region, time criteria must be set for different regions and population. Once BMI data is calculated category of user is determined and written on the screen. To make interpretations and comparison easier, the user BMI

is located in the Figure 3. Since regular methods mostly just finds category for subject and let them to locate BMI on the table. In some situations process of getting exact location for BMI can be confusing. Designing system automatically to locate BMI on the chart makes system more usable and user friendly. In figure 3 result of BMI calculation is shown.

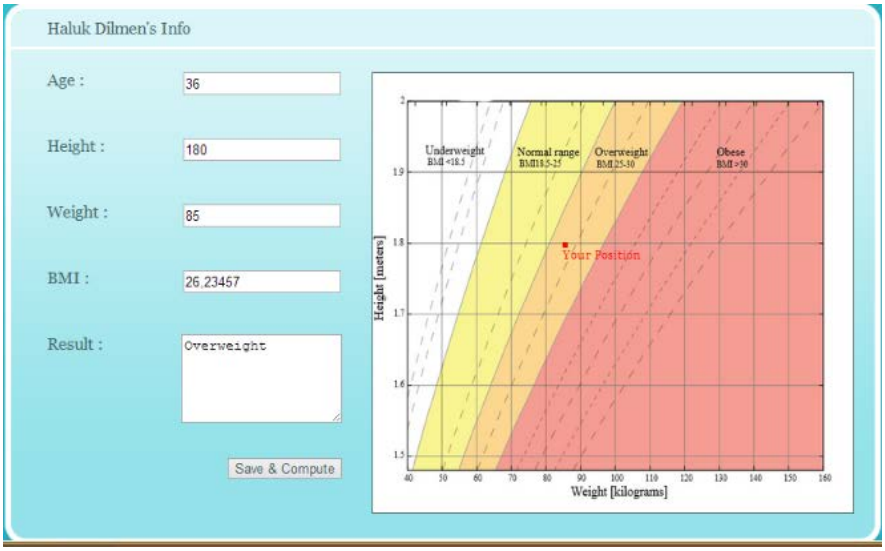

Figure 3: BMI calculation for adults

In this study our interested group was mainly young people. However since BMI calculated same way for young and the other we also make program to handle subject who is older than twenty. BMI is calculated same way but different chart is used for people are older than twenty. Result of that calculations are shown in figure 4.

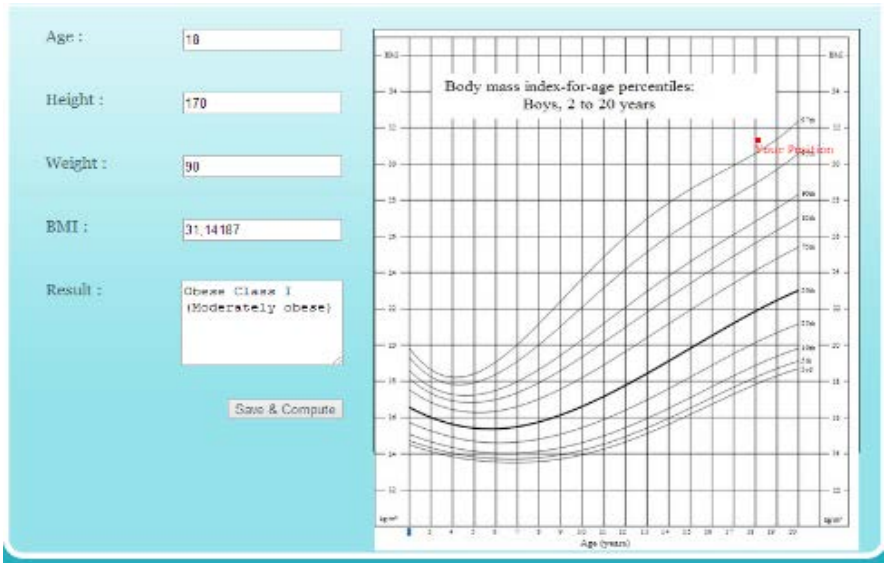

Figure 4: BMI calculation for young

The third part of the program is identifying categories to give suggestions consist of physical exercises and proper nutrition suggestions. TNH records improvements and progress has been made by subject. If no improvements are observed suggestions are adjusted accordingly. TNH is not meant to be used for medical treatment. If student conditions are worsening to get professional help TNH may suggest student to get professional help. In this study we

will not consider much about health care issues instead we will focus on computer program is built for solving addressed issues.

Conclusion and Discussion

The targeted computer program is described in above called TNH is built. Challenging issues we faced during research and implementation was the complexity of subject and methods applied to application in this area. BMI is used in this article may have different meaning for different age groups, countries and populations. Research main target youths are growing fast and people are within range of this age are under risk if the proper nutrition and care is not given. We believe the proposed system is going to help to identify and may solve issues given some tips and suggestions. BMI is used to identify and diagnose weight and height related problems. Since there is ongoing discussion about usage of BMI for diagnosing individual weight height related problems. We did not concern about is appropriateness. As a future work other measurements methods can be used instead of BMI for specific need and diagnosis.

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Pre-Service Teachers' Opinions about the Use of Web Adventure in the Course of Introduction to Computer

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Abstract: Within the present study, the opinions of the 1st year students from the department of mathematics teaching about the use of web adventure in the course of introduction to computer were investigated. The study group of the present study consists of 40 pre-service teachers. The students created groups of 2 or 3 students. The groups were asked to determine the characteristics to be possessed by a good teacher and then to make some comments and create graphs related to these characteristics. The students' comments and graphs were organized in a presentation program and then presented to their classmates. At the end of the application, a data collection tool aiming to elicit the students' opinions about the application was administered. The data collected were analyzed by two evaluators. And as a result, it was found that web adventure is a different and effective method and can be used in various courses by means of some enrichment.

Key Words: *web adevnture, pre-service teacher, mathematics teaching*

Introduction

In today's world, people can have access to incredible amount of information just by one click. This information is available for everyone. Yet, as the information is too much, students and teachers may experience some confusion and despair. Hence, there is a need to be cautious about the activities to be designed through web and much consideration should be given to create quality and appropriate activities. As the resources and steps of the activities to be designed by Web Adventure are under the control of the teacher, the process will be much more orderly for students and the teacher (Crawford and Brown, 2002).

Web Adventure is a tool developed by San Diego University in 1995 to have regular and meaningful information on Internet. The application was developed by Dodge and then its content was enhanced by March. According to Dodge (1998), Web Adventure provides access to internet resources, is group work-centered, and allows researching and using high level thinking skills. March (2003) points out that web adventure can make great contributions to the development of deep understanding of students, and helps them to be more autonomous and learning-centered. According to Polly and Ausband (2009), web adventure is a popular means of using technology in class.

According to Dodge (1998), web adventure represents inquiry-based activities for which all or part of information is received from the resources on internet. Through these activities, it is aimed that students interact with the resources on internet and learn from them. Two different types of web adventures can be designed depending on their time span. Short-term web adventure is limited to three class hours. Here, the purpose is the acquisition and integration of information. Long-term web adventure can last for one week or one month. Here, the objective is to expand and internalize information. Long-term web adventure is influential on many different types of thinking skills. Marzano (1988) states that long-term web adventure includes many thinking skills such as comparison, classification, induction, detection, analysis of mistakes, consolidation, abstraction and

analysis of different viewpoints. Dodge (2008) states that for the application to be successful, it should encompass the following sections:

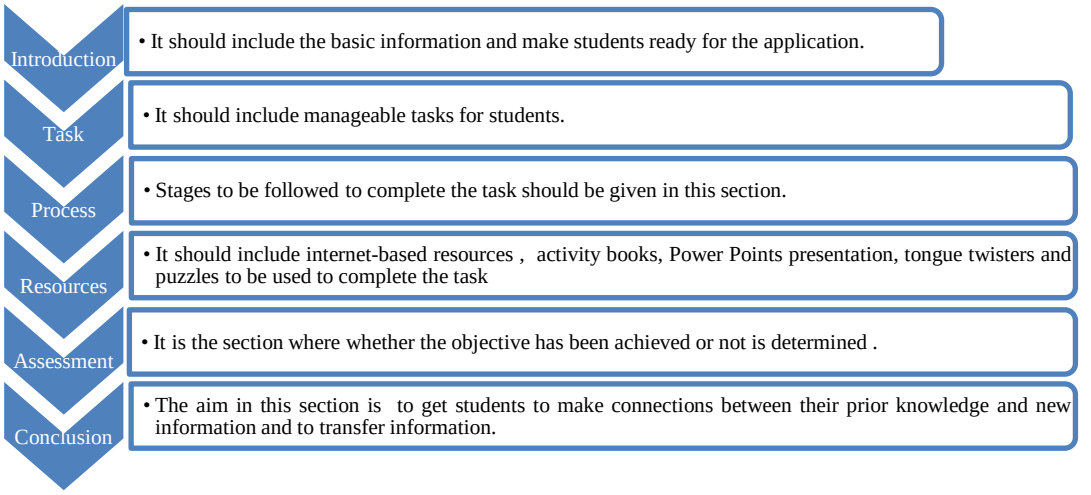

Figure 1. Sections of web adventure

The effects of web adventure on students have drawn the interest of many researchers and become the subject of many studies. When the literature was reviewed, it was observed that the effects of web adventure on higher level thinking skills, efficiency of students, teachers' perceptions and opinions were widely investigated. The results reported in the literature show that web adventure activities have positive effects on students (Halat and Jakubowski, 2001), provide students with real life activities (Crawford ve Brown, 2002), increase motivation and make contributions to the development of skills required to work on internet and have access to resources (Hassanien,2006) and pre-service teachers have positive attitudes towards the use of web adventure for educational purposes (Halat, 2007; Zheng, Stucky, McAlack, Menchana and Stoddart, 2005). The research mostly focuses on the teaching of mathematics and very limited number of studies looking at the effectiveness of web adventure in teaching of computer course was encountered in the literature.

The present study investigated the effects of web adventure used in a computer course on the students' opinions and moreover, responses to the question of what kind of characteristics can be added to make web adventure more effective were sought. The present study aims to determine the opinions of first-year pre-service mathematics teachers about the use of web adventure in a computer course. In this respect, the study seeks answers to the following research question:

1. What is the contribution of working with web adventure to students?
2. Addition of which characteristics to web adventure site can make it more effective for students?

Method

The opinions of the students about the application make up the basis of the study. Hence, this is a case study, which is one of the quantitative research designs.

Participants

The present study was conducted with the participation of the first year pre-service mathematics teachers taking computer course at the Education Faculty of Aksaray University in 2010-2011 academic year. The participants were selected out of the students who were taught by the researcher so that they could be observed throughout the application and they could seek help when they met any problem. The study was initiated with 47 students and then 7 students were excluded as they did not participate in the lessons. The students conducted the application first by doing individual activities and then working in groups. The groups consisted of 2 or 3 people.

Data Collection Instruments and Data Analysis

The opinions of the students about the application were collected through an interview form developed by the researchers. The form consists of 3 open-ended questions. The questions developed by the researchers were firstly refined based on the opinions of two experts and then administered to the students. In the analysis of the students' opinions, content analysis was employed, which is one of the qualitative research methods.

Application Process

Before the application, the students were informed about web adventure and the web site, which was already designed, was introduced. The students were given three weeks to complete the task. In the introduction section, within the framework of the computer course, the students were expected to make a presentation by using word processor, electronic graph and presentation program. The students were also asked to determine the characteristics to be possessed by a good teacher and explain why these characteristics should be possessed. During the application, the students were given the steps to be followed to complete the task.

In the second week, the students were asked to compare the characteristics expressed and analyze which characteristic was used by how many participants and then plot the findings on electronic graph program and send them to the course advisor through e-mail. In the scale used in the assessment section, the students' efficiency of using the software program, the coherence of the content, spelling and punctuation errors, originality of the product and presentation skills were evaluated and scoring was determined. The scores were assigned ranging from "very good (4)" to "poor (1)".

In the resources section, articles discussing teacher characteristics, manuals of office programs and office utilization animations were included. They were asked to work by using these resources. In the conclusion section, the students were given support for the task they carried out and brief information was given about the benefits of this process.

Findings

In this section, analyses of the data collected through the data collection instrument are presented. The students' opinions were analyzed by two different evaluators. The analyses revealed that there is a high degree of reliability between the evaluators ($r = .91$).

Students' Opinions about the Contribution of Web Adventure

The students' responses to the question "What is the contribution of working with web adventure to you?" asked in the form of web adventure student opinions form were classified under eleven categories. High majority of the students (85.0%) think that working with web adventure has positive contribution to them. Among the contributions of working with web adventure are there internalization of information (47.0%), increasing motivation (17.0%), felling happier (2.5%) and focusing on the information related to the topic at hand (2.5%).

Table 1: Students' opinions about the contributions of web adventure

Statement	Frequency (f)	Percentage %
It has contribution	**34**	**85**
Internalization of information	19	47
Motivation	7	17
Real problems	6	15
Idea sharing	4	10
Opportunities to work on internet	4	10
Group works	4	10
Applied learning	3	7,5
Recognition of shortcomings	2	5
Happiness	1	2,5
Focusing on resources	1	2,5
No contribution	**6**	**15**
Total	**40**	**100**

Some of the students think that this application did not have any contribution to them at all (15.0%). This may be because of the fact that the students had not studied with such applications beforehand.

Students' Opinions about the Problems Encountered in Web Adventure

"Did you encounter any problems while carrying out web adventure project? If your answer is YES, explain the problems". Majority of the students stated that they had no problem during the application (57.5%). Most of the problems encountered stemmed from computer and internet connection (27.5%). The students stated that if they had personal computers, they would perform their task better.

"I encountered some problems. As I did not have a computer, I could not read all of the resources."

Table 2: Student opinions about the problems encountered during the application

Statement	Frequency (f)	Percentage (%)
I did not have any problems	**23**	**57,5**
I had some problems	**17**	**42,5**
Technical problems	11	27,5
Unfamiliar application	4	10
Inadequate information	3	7,5
Group works	2	5
Insufficient office facilities	1	2,5
Time	1	2,5
Total	**40**	**100**

As the web adventure is new in our country and it is not frequently used in classes, the students are not familiar with the application. Therefore, some students felt unfamiliar to the steps of the application (5%).

Student opinions about how to enhance the effectiveness of web adventure

The students' responses given to the question "What should be added to web adventure site to make it more effective and useful? Explain your suggestions." were classified under nine categories. Majority of the students think that there is no need to add something (67.5%). According to the students, enhancing the visual characteristics of the web site is one of the elements that can improve its effectiveness (25.0%). There are some students stating that resources should be shorter because reading the resources given is too time-consuming (17.5%).

Table 3: Student opinions about how to enhance the effectiveness of web adventure

Statement	Frequency (f)	Percentage %
There is no need to add something.	**13**	**32,5**
There is a need.	**27**	**67,5**
To improve visual characteristics	10	25
Shorter resources	7	17,5
Detailed process	3	7,5
Enhancing the visual	3	7,5
Sample application	2	5
Office resources	1	2,5
Different design	1	2,5
Guidance	1	2,5
Total	**40**	**100**

Discussions and results

The present study investigated the students' opinions about web adventure used in a computer course. In light of the findings, it can be argued that majority of the students have positive opinions about the administration. This is because they believe that web adventure increases motivation, provides opportunities to work with technology, includes various activities and allows group works. However, some problems such as lack of computers and internet connection failures affect the students' opinions about the process negatively. Such problems may result in the students' developing negative attitudes towards the use of such applications in their future classes. When the students' opinions about how to enhance the effectiveness of the application are investigated, it is seen that enhancing visual characteristics and presenting shorter resources are believed to make it more effective. Moreover, the students think that addition of detailed guidance and sample applications will also improve the efficiency. Future researches to be conducted on web adventure can be carried out in such an environment with better computer and internet infrastructure, and they should use web adventures having more visuals and shorter resources.

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Query Based Context Awareness Architecture for Healthcare Systems

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Abstract: Context-awareness develops human-centric, intelligent behavior in an integrated environment; however, context aware domain purely logic-based reasoning on respectively context and services may not be enough. This paper presents query based agent middleware architecture for providing context-aware services for incorporated spaces to afford effective support for context acquisition, representation, interpretation, and utilization to healthcare management application. A context inference mechanism based on an extended fuzzy logic approach is used to enable automated reactive and deductive reasoning. The middleware is used in a case study in a healthcare management, and performance evaluation result shows that the context reasoning algorithm is good for non-time-critical applications and that the complexity is highly sensitive to the size of the context dataset.

Key words: Context Aware and Reasoning, Context Awareness Middleware, Fuzzy Logic, Multi Agent System.

Introduction

Query based context awareness arranges human-centric, intelligent behavior in an integrated environment. The query based context awareness architecture realizes and conscious the selection of the data, preparation, pattern discovering, and pattern development processes in an agent-based structure within the multi agent system. As well as, it is designed to ensure communication between patients and hospital person to effective operation via agents within the multi agent system. Context plays an important role in intelligent area in providing information about the status of the people, activities, location, physical environment, and computing entities. Applications in intelligent areas use contextual information to become context-aware of changing situations relevant to the intelligent interactions with users (Dey, 2000; 2001).

The system is suggested in a way to process and evaluate fuzzy incomplete information by the use of fuzzy SQL query method. This paper presents query based agent middleware architecture for providing context-aware services for incorporated spaces to afford effective support for context acquisition, representation, interpretation, and utilization to healthcare management application. A context inference mechanism based on an extended fuzzy logic approach is used to enable automated reactive and deductive reasoning. The middleware is used in a case study in a healthcare management, and performance evaluation result shows that the context reasoning algorithm is good for non-time-critical applications and that the complexity is highly sensitive to the size of the context dataset. Also, the modeled system gains the intelligent feature, thanks to the fuzzy approach and makes predictions about the future with the learning processing approach. Context modeling and service representation is the main steps in the suggested architecture. Context modeling supports recognition of user conditions. Services representation relates to the context ontology models. Commonly, computing environment, a context model should provide application adaptability, resource awareness, mobile service, semantic service discovery in a everywhere. In particular, context modeling should describe the relationship between the domain vocabulary and the concept of the domain knowledge. A number of context modeling techniques exist such as key-value modeling, mark-up scheme modeling, graphical modeling, object-oriented modeling, logic based modeling and ontology-based modeling. This architecture emphasizes the need of synergic approach between ontology and fuzzy logic to model the user's context. In particular, healthcare context domain ontologies are used to model static (e.g., user profile, preferences, etc.) and dynamic context (e.g., temperature, lab

results etc.) data. On the other hand, soft computing techniques are used to enhance ontology context by means of qualitative representation of underling data context. As an example, blood pressure could influence some different contexts but in order to discover the right set of recommendations that may be useful to manage the situation there is a need to be aware about in which range falls parameters values (i.e., high/low blood pressure, etc.). This paper presents a query based context aware mechanism, a process in which the agents within the multi-agent system filter and evaluate both the knowledge in databases and the knowledge received externally by the agents

The paper is organized as follows: The next section presents an overview of works in the literature related to both query based context awareness and computational intelligence approaches that deal with healthcare; the next section introduces overall architecture which attains the proposed aims and emphasizes the roles played by all the system components; and describes the complete working flow and details theoretical approach on which relies the work; then, the next describes the process model applied to healthcare case study. Conclusions and future works close the paper.

Literature Survey

Context awareness represents the process of the context information during the change application behavior, which has been reported as a key essential for pervasive systems (Satyanarayanan, 2003). The query based context awareness system in agents utilizes fuzzy SQL queries from the agents, then creates and optimizes a query plan that involves the multiple data source of the whole multi agent system. Accordingly, it controls the execution of the task to generate the data set. Also set of design structure for location sensing, behavior adaptation related with mobility is so important components (Fortier et al. (2010), Kung and Lin (2006)). Query processing within peer to peer network structure with SQL structure was discussed generally (Idreos et al., 2004; Cybenko et al. 2004; Bernstein et al. 1981). Query processing and database was reviewed with relational database (Genet & Hinze, 2004). Lee et al.(2011) suggested the context-aware authentication and access control systems and verifies flexible and easy-to-use security systems to use for social network services in smart phone environment via scenarios. In addition, the paper also contains comprehensive reviews on algorithms that analyze contextual information of users and determine security level. Gui et al. (2009) developed client –side context aware search application which is built on the context-aware infrastructure. Qin et al. (2007) presented an agent-based middleware for providing context-aware services for smart spaces to afford effective support for context acquisition, representation, interpretation, and utilization to applications Fortier et al. (2010) presented set of design structure for location sensing, behavior adaptation related with mobility. Kung and Lin (2006) categorized the context-aware research scope.

Fenza et al. (2012) presented an integrated environment aimed at providing personalized healthcare services which appropriately meet the user's context. Mansour and Hopfner (2009) proposed XML-based XXREAL model. The Semantic Web formalisms are expressed the model healthcare services and context with an integrated environment aimed at providing personalized healthcare services which appropriately meet the user's context (Fenza et al. (2011), Fenza et al. (2012)).

Lee and Chung (2011) suggests context-aware authentication and access control systems and verifies flexible and easy-to-use security systems to use for social network services in smart phone environment via scenarios. In addition, the paper also contains comprehensive reviews on algorithms that analyze contextual information of users and determine security level. Zhang et al. (2007) presented context aware mechanism in dynamic fuzzy logic. Jiang et al. (2010) presented a distributed fuzzy context domain relevance model for presentation in fuzzy ontologies relevance relations between fuzzy context ontology and distributed fuzzy domain ontologies. Bobillo et al.(2008) proposed formal model for representing in ontologies relevance relations between context descriptions and domain knowledge subsets. Ko and Sim (2008) suggested Bayesian Network based context reasoning for probabilistic inference to solve the uncertain reasoning in flexible and adaptive situation. Strassner et al. (2008) proposed autonomic networking model. Doulkeridis and Vazirgiannis (2008) proposed context-based index for services on top of any traditional service directory and design algorithms for construction search, update and merge of such directions. Fuzzy set was proposed by Zadeh (1965) and the division of the features into various linguistic values was widely used in pattern recognition and in the fuzzy inference system. Some scientists, making use of this, came up with various results. Relational database system particularly assists the system in

making evaluations for making decisions about the future and in making the right decisions with fuzzy logic approach (Raschia & Mauaddib, 2002; Tatarinov et al. 2003; Galindo et al. 2001; Chaudhry et.al. 1999; Saygın et.al. 1999; Turgay et al.2006).

Context Aware Management

Context aware model provides context information that could be collected, processed, inferred, and distributed to spontaneous applications. It offers this interaction faultlessly without revealing the inherent complexity required to manage the heterogeneous sources that provide the context information. All this is realized all the way through a layered architecture. In the first layer, context is sensed and captured through sources embedded in the environment. In the second layer, the context is interpreted and structured by the context represent module. The context inference module deduces other contextual information that has not been explicitly sensed by the first layer. Context is now ready for invocation by applications and mobile users. However, Context-Aware Model provides additional functionalities such as service discovery that provides context awareness about services in the environment.

Agent Based Context Aware Management

Agent based framework provides he feasibility and cooperate with each other agent to accomplish task in suggested architecture. Several context aware architecture have been developed to assist patients and medical professionals. Some studies about context information architecture approaches are represented as COSS(Brones, 2004), and COPEUS (Samulowitz, et al., 2001). On the other hand, medical knowledge on the context environment, patients data are sources of imprecision and vagueness. The nature of these data reveals the requirement of treating the uncertainty by means of robust theoretical modeling. Fuzzy approach and semantic formalisms integrated an appropriate coding of this kind of knowledge. This approach presents a hybrid system which main aim is related to provide an integrated environment that combines theoretical support and technologies in the Computational Intelligence domain. The suggested architecture based on the FIPA framework.

Suggested framework includes the following procedures wıth concurrency; distributed computation; modularity; cooperation features:

:

- automated identifying actual patient and local environment upon approach,
- automated recording the events with coming to and leaving off the actual patient,
- automated presentation of the orders or service due on the current location and with,
- supported documenting the required information keying in a minimum of data into prepared form entries.

The distributed query context awareness mechanism was proposed as a cooperative agent-based solution for information management with fuzzy SQL query. A multi-agent approach to information management includes some features such as:

The knowledge, rule and task are symbolized with the fuzzy approach in the system as follows:

- Knowledge : $str(K_{iy},A_i) = str(L_{im}(Q_{in}\ (At_i \leftarrow true) \leftarrow true) \leftarrow true)$,
  - if $K_{i,y}=L_{i,m}(Q_{i,n}(At_i \leftarrow true) \leftarrow true) \leftarrow true$ is a fuzzy
- Rule : $str(R_{i,x},A_i) = \min \{str(R_i, A_i),\ldots, str_(R_{i,x}, A_i)\}$,
  - If $R_{i,x}= L_{i,m}(Q_{i,n} \leftarrow true) \leftarrow L_1,\ldots,L_m$, is a knowledge, where $R_{i,x}$, is the rule in A_i with conclusion L_m.
- Task : $str(T_{i,t},A_i) = \min \{str(T_i, A_i),\ldots, str_(T_{i,t}, A_i)\}$,
  - If $T_{i,t}= L_{i,m}(Q_{i,n} \leftarrow true) \leftarrow Q_1,\ldots,Q_n$, is a rule, where $T_{i,t}$, is the task in A_i with conclusion $Q_{i,n}$..

Query Processing

The agent performs two types of query in the process of defining keywords, concepts or attributes during knowledge processing. The first is external query, which is realized among the agents, while the second is the internal query, where the agent scans the knowledge within itself. During these query processes, the fuzzy SQL approach is applied. The multi-agent system consists of more than one agent.

$A=\{A_1, A_2,\ldots,A_i\}$

The task set is $T=\{T_1, T_2, ...,T_j\}$. The task base is <Definition of Task, Attribute, Dependency Situation, Agent > . The rule set is $R=\{R_1, R_2, ...,R_x\}$The rule base is <Definition of Rule, Attribute, Dependency Situation, Agent > . The knowledge set is $T=\{K_1, K_2, ...,K_y\}$The knowledgebase is <Definition of Knowledge, Attribute, Dependency Situation, Agent > (in Figure 3).

Table 1. The Nomenclature of Query Based Context Awareness Management System

A	i agent set $\{A_1, A_2,...,A_i\}$
T	j task set in $\{T_1, T_2, ...,T_j\}$
$A_{i,x}$	i agents x percept
$\bigcup_{k=1}^{m} T_{jk}$	i agent's j task sets refers to continuing subsets from k to m situation
$L_{i,m}$	i agents m learning situation
$Q_{i,n}$	i agents n querying situation
At_i	i agents attribute situation
$R_{i,r}$	i agent's r decision situation
$K_{i,y}$	i agent's y knowledgebase
$R_{i,x}$	i agent's x rule base
$T_{i,t}$	i agent's t task base
t_0	represent target contex
t_i	represent the i th context
$d_s(t_0, t_i)$	denotes the distance between
t,	is the jth smallest value in all distances
x_{0s} and x_{is}	are corresponding values of the two contexts on the s th feature

When data arrives from the external environment, it is perceived as input : $<A_{i,x}, A_i, \varnothing>$ When "x" is perceived by Agent i, it is referred to as $A_{ix.}$ This input can also be used in knowledgebase, rule base and task base.

Feature-Attribute At and relation R are elements formed among the components within the system. These elements are the databases of knowledgebase, rule base and task base. While attribute refers to agent specifications, Resource includes not only raw data externally received but also knowledgebase, rule base and task base which each agent possesses.

$A=\{At, R(K_{i,y}, R_{i,x}, T_{i,t})\}$

Let P(At) denote the set of all possibility distributions that may be defined over the domain of an attribute At. A fuzzy relation R with $\cup$ schema $A_1, A_2, \ldots,A_n$, where A_i is an attribute is defined as $R=P(At_1)xP(At_2)x\ldots xP(At_n)xD$, where D is a system-supplied attribute for membership degree with a domain [0,1] and x denotes the cross product.

Each data value V of the attribute is associated with a possibility distribution defined over the domain of the attribute and has a membership function denoted by $\mu_v(x)$. If the data value is crisp, its possibility distribution is defined by

$$\mu_v(x)=\begin{cases}1 & if \quad x=v\\ 0 & otherwise\end{cases} \qquad (1)$$

Like standard SQL, queries in fuzzy SQL are specified in select statement of the following form:

SELECT	Attributes
FROM	Relations
WHERE	Selection Conditions.

The semantics of a fuzzy SQL query is defined based on satisfaction degrees of query conditions. Consider a predicate XΘY in a WHERE clause. The satisfaction degree, denoted by d(XΘY), is evaluated for values of X and Y. Let the value of X be U and that of Y of V. Then, $d(X\Theta Y)=\max_{x,v}(\min(\mu_u(x), \mu_v(y), \mu_\Theta (x,y))$, where x and y are crisp values in the common domain over which U and V are defined. Note that, in this definition, the comparison Θ may be non-binary, i.e. defined by similarity relations, and crisp, V is fuzzy

and Θ is binary equality(=), trapezoidal membership functions and binary equality is considered, then d(X=Y) is the height of the highest intersection point of the two possibility distributions.

As shown in Figure 2, bids are taken as a set, the frequencies of the received bids are fixed and then the bids are decomposed into groups. The decomposed bids are included into databases of the multi-agent system. The information in databases is fuzzified and the interrelation between them is determined in terms of weight and importance level. The execution semantics of Query N is as follows. Each pair of tuples r in R and s in S satisfy the selection condition with a degree

$$d_{r,s} = \min((\mu_R(r), \mu_S(s), d(P_1(r\ )), d(P_2(s\ )), d(r,Y=s,z)) \quad (2)$$

ıs represented.

The Proposed Query Based Context Aware Management Framework

In this section, query based fuzzy context awareness is suggested. The fuzzy query based context-aware middleware is designed based on a multi-agent system which aims to support applications that make use of contextual information in a smart space environment. The agent model consists of several individual, collaborating agents as depicted in Fig. 1.

Suggested model structure includes the four main phases: knowledge acquisition interface; dynamic index creation; context awareness mechanism; query based fuzzy context confidence identification mechanism and context importance degree ranking mechanism. The main purpose of the system is to serve as patients and physicians. The system provides recommendation for controlling the diseases depends on the symptoms. It can be used as a tool to aid and hopefully improve the quality of care given to patients. Fig. 1 shows the architecture of the fuzzy query based context awareness system.

Knowledge acquisition interface: It includes the past and present all of the data which is gathered by this part. The knowledge base is diverse and linked through a number of indices, frames and relationships.

Context representation: It involves the some what should be contained in a case; how to choose the storage structure of a case; and how to organize and index the cases to facilitate the retrieval of potentially useful cases. The organization and indexing aspects are especially important when the system handles thousands of complex cases.

Context retrieval mechanism: It is the process of finding the potentially useful cases and choosing the best match utilizing the search information.

Dynamic index creation: It involves assigning indices to cases to facilitate their retrieval. The main indexing methods include near neighbor, induction, knowledge guide, or their combinations.

Context importance degree ranking mechanism: It is the process of comparing pair-wise cases to determine the degree of matching on the two cases. For numeric values, the most commonly used similarity measure between pair-wise cases on each feature is derived from the distance, which can be calculated as follows.

Analysis models are used to analyze the target case, identify and elicit the information used to find the best match. It can be illustrated in Figure 1. During the analysis process, suggested approach consider the below index list in Table 1.

The system is able to process incomplete or fuzzy knowledge intelligently with the fuzzy SQL query approach.

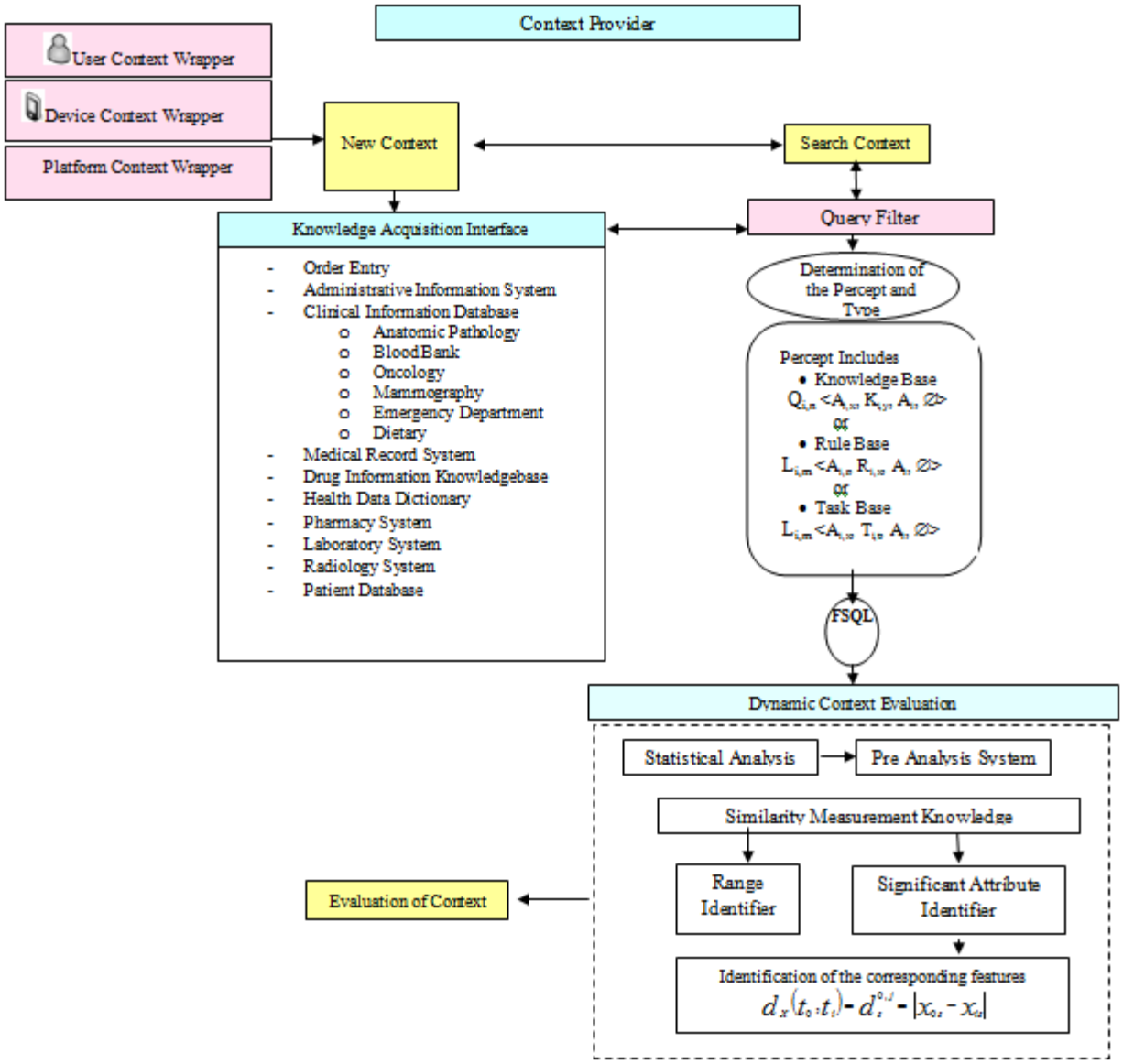

Figure 1. Context model extensions

Context analysis

Data pre-processing: collected data are processed through filtering and normalization procedures, in order to get an accurate and homogeneous representation of the information with fuzzy logic.

$$d_X(c_0, c_i) = d_s^{0,j} = |x_{0s} - x_i|, \quad (3)$$

The following parameters out of the range of normality: blood pressure, temperature, hearth beat that are considered and obtained the rule base like this:

R1: If x1 is A11 and x2 is A12 and … and xn is An then y1

The proposed fuzzy query based context awareness framework steps applied subsequently to the medical decision case in below, During the evaluation healthcare warehouse framework, also we consider

the Ritter & Kohonen study's and Sencer et al. (2012) symptom and diseases evaluation matrix(In Table 2, Table 3).

Table 2. Attribute values sample (Sencer et al. 2012)

	X_0	X_1	X_2	X_3	X_4	X_5	X_6	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	Y_7
Patient Number	Fever	Cough	Headache	Muscle pain	Swelling	Vomitus	Angina Pectoris	Influenza	Bronchitis	Arthrosis	Pneumonia	Arthritis	Myocardial attack	Fuzzy Ranking Values
5	1	0,14	0,352	0,089	0,118	0,835	0,983	1,118	2,378	2,911	0,983	0,983	0,983	0,9826
14	1	0,499	0,713	0,104	0,508	0,994	2,197	0,684	2,604	3,696	2,197	2,197	2,197	0,6835
19	1	0,851	0,049	0,12	0,441	0,285	2,832	1,966	0,853	3,086	2,832	2,832	2,832	0,8534

Table 3. Obtained weight values (Sencer et al. 2012)

Weights for Diseases	Fever	Cough	Headache	Muscle pain	Swelling	Vomitus
Angina Pectoris	0.054	0.078	0.167	0.173	0.167	0.961
Influenza	0.806	0.552	0.682	0.067	0.167	0.806
Bronchitis	0.917	0.884	0.078	0.172	0.044	0.018
Arthrosis	0.215	0.067	0.154	0.852	0.961	0.117
Pneumonia	0.107	0.955	0.167	0.067	0.018	0.041
Arthritis	0.142	0.126	0.107	0.905	0.078	0.117
Myocardial attack	0.311	0.02	0.067	0.098	0.167	0.943

Conclusion

This paper discusses a variety of issues in adapting query based fuzzy context awareness concepts to an active multi agent database system which incorporates active rules in a multi computing environment. The partitioning of the rule set into multi agent system events has also been discussed as an example of inter-rule fuzziness. Similarity based event detection has been introduced to active multi agent databases, which is an important contribution from the perspective of performance. This system helps patients to reach healthcare resource easily.

Finally, due to frequent changes in the positions and status of objects in an active mobile database environment, the issue of temporality should be considered by adapting the research results of temporal database systems area into active mobile databases.

The paper presents briefly query based context awareness systems to help patients and physicians with easily communication and diagnosis. It presents an essential technology of building intelligent agent based context evaluation system for medical diagnoses that can aid significantly in improving the decision making of the physicians. These systems help physicians and doctors to check, analyze and repair their solutions.

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Some analysis on a first course in linear algebra

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Abstract: The aim of this paper is to analyze some topics about linear algebra course, along with researches and opinions which are original and useful. The considered topics are the content, textbooks, students' learning profiles, teaching methods, using computer programs, and connections with other mathematics courses .According to the main results of the analyses, it is an oversimplification to think that there is a unique right way to teach this course. Although many mathematicians could expect that the first linear algebra as if were the same everywhere, the reality is different from this idea. The recent editions of linear algebra textbooks are usually good materials for what is being taught at the introductory level. It seems that only expressing and showing of teacher may not significantly improve students' learning of an abstract course. In recent years, linear algebra researchers have formulated some efficient teaching methods in order to facilitate meaningful learning. Software provides helpful visualization in two or three dimensional vector spaces. By the creating interactive environment of the computer programs, students can explore with matrices, linear transformations and numerical representations. And finally, there is an obvious connection between linear algebra, calculus, differential equations, and statistics.
Keywords: learning and teaching linear algebra, textbook, computer program

Introduction

There is a general view expressed in the literature that students having problem with linear algebra course have very little understanding of the basic abstract concepts. Carlson (1993) stated that solving systems of linear equations and calculating products of matrices is easy for the students. However, when they get to subspaces, spanning, and linear independence students become confused and disoriented. Carlson (1993) further identified the reasons why certain topics in linear algebra are so difficult for students; presently linear algebra is taught far earlier and to less sophisticated students than before. The topics that create difficulties for students are concepts, not computational algorithms. Also, different algorithms are required to work with these ideas in different settings.

The effective ways to teach linear algebra is one of the main study subjects who focused on linear algebra teaching. When a teacher has taught a course a few years, it is very easy to slip into a routine teaching manner in this course. The textbook, the material, the lectures, the questions, all become familiar. The instructor has no hesitation what must be done each session of the course. In such a case, everybody knows the effective ways to teach linear algebra. But, it is suggested that there are deeper issues on the teaching the course that need a new modification (Carlson at al., 1993). Elementary linear algebra courses are taught large and very diverse students in the last years. How much emphasis should be done on theorems, proofs and applications? How abstract should the concepts be? How effect computer can be benefited? How connection is there with the other mathematics courses? And which teaching strategies are effective? These questions have revealed a wide interest in linear algebra teaching. There have been widespread discussions, workshops of experts, special sessions at the meetings and panels. Also, it has been presented many research articles and textbooks on linear algebra education. After all, what can be said about teaching linear algebra?

In this study, it is analyzed goals and content, students and teaching approaches, texts and computer software. By an educational perspective, nobody is professional the art of teaching linear algebra. It is not easy to say that there is a unique right teaching way for this course. Although many linear algebra teachers speak of the first linear algebra course as if it were the same everywhere, the reality is far, richer and more diverse (Harel, 1998). Even our student group described linear algebra courses for this study that reflect different goals, and approaches. The purpose of this article is to share some of these questions, along with resources and opinions.

The Content

The Linear Algebra Curriculum Study Group (LACSG) recommended a core curriculum for a first linear algebra course (Carlson at al., 1993). The group members first interviewed from a variety of linear algebra instructors, and they developed their report after much discussion about that needs linear algebra and what is reasonable to teach in a first course, and how computer software should affect the teaching. As a result of the recommendations proposed by LACSG, the emphasis in linear algebra was shifted to a matrix-oriented course concentrating on applications and reducing the emphasizing on abstraction of concepts. While this shift in focus is valuable to mathematics and non-mathematics majors, the relegation of abstraction to an "also ran" in comparison to applications is doing mathematics majors a great disservice. According to Alan Tucker (1993, p. 4), "linear algebra was positioned to be the first real mathematics course in the undergraduate mathematics curriculum because its theory is so well structured and comprehensive, yet requires limited mathematical prerequisites". It is the first class where undergraduates are expected to prove theorems and is thus a pivotal course with respect to their ability to conjecture and write coherent proofs. Tucker (1993, p.5) emphasizes that "A mastery of finite vector spaces, linear transformations, and their extensions to function spaces is essential for a practitioner or researcher in most areas of pure and applied mathematics". The content of many textbooks reflects the LACSG recommendations, and computer software (such as matlab and mathematica) has become more powerful (Howard, 1997; Richard, 1997; Kolman, 1999).

In 1998, a study group from the Park City Mathematics Institute (PCMI) considered the idea of trying to update this recommended curriculum, in light of how it is actually being used today (Day & Kalman, 1999). In the PCMI there were as many ways to construct a first linear algebra course as there were different departments' students for linear algebra, and they expect the first linear algebra course to play different roles in the their own curriculum. Some have a large population of engineering students, with an emphasis on physical science applications. It was soon clear for the study group that no single model curriculum would serve the needs of all these different approaches, and they abandoned any hope of either updating the LACSG recommendations.

What should be the content of the first linear algebra course? After the above discussions, we can say that a first step toward answering this question is to decide what curriculum model makes sense at your department. That means your department must pay attention to what topics you hope the students will learn.

Textbooks

Linear algebra did not really come to be recognized as a subject until the 1930's. Particularly influential in this process were the book of B. L. van der Waerden (1936) and the book of Garrett Birkhoff and Saunders MacLane (1941). Both were on "Modern Algebra" but included chapters on linear algebra. The separate linear algebra course became a standard part of the college mathematics curriculum in the United States in the 1950's and 1960's (Schneider & Barker, 1968). It appears that the Introductory linear algebra course was one of the first times it was offered there as a regular course in 1965 at Indiana University (Cowen, 1997).

From the 1970s until today, every concrete Linear Algebra textbook based approach starts with practical computations, such as Gaussian row reduction, or with applications such as systems of linear equations and progresses to the underlying concepts. It is driven by concrete forces and attempts to understand abstract concepts from examples (Anton, 1973). This approach has persisted into the 1990's (Lay, 1994).

I have reviewed eight recent editions of linear algebra books received from different publishers, to discern any general trends in the teaching of introductory linear algebra (Strang, 2005; Poole, 2007; Lawrence, Insel, & Friedberg, 2008). These texts are a good representative sample for what is being taught at the introductory level. Given that most authors of textbooks try to pack in enough material so as to make the text useable for more advanced linear algebra courses, it is not surprising that the general theory of vector spaces is introduced at some point towards the middle or the end of the text. Several authors introduce the language of the general theory early, first only in the context of R^n, as a transition from the concrete to the abstract.

We see in these books that traditional applications of linear algebra which have tended to come from Physics and Engineering are now augmented by simple applications from disciplines such as Economics, Biology, and Computer Science. It would be rare indeed to see a linear algebra text nowadays without links to calculator and computer technology and without some discussion of computational issues. Some texts envision the technology as a fully integrated component, and others as an add-on. The technology aspect appears either in the form of an accompanying Lab manual, a reference to web-based activities, or as "technology exercises" at the end of each chapter. However, all of the texts are written in a way that allows one to use them without any technological components.

Students' learning profiles

Who are linear algebra students? What are their goals? Why are they learning linear algebra? All of the subjects in linear algebra education, the issue of understanding how students learn is the one that made the greatest impact on the researchers (Dubinsky, 1997; Dorier, Robert, Robinet, & Rogalski, 2000).There is not a great deal of published literature on how students learn linear algebra. Guershon Harel has been studying some aspects of this for several years, and his papers provide some suggestions for linear algebra teachers (Katz, 1995; Harel, 1998). David Carlson (1993) presents an interesting hypothesis about the special difficulties that linear algebra presents for students, and Ed Dubinsky (1997) offers another point of view.

Many teachers accept that students have to construct their own knowledge in order to achieve meaningful learning. To be more accurate, we are, as teachers, not sure how to assist students in this construction, but it seems that simply showing what is true and telling students what we wish them to know is not generally sufficient. Several studies in calculus course have showed that students do not generally have a rich conceptual understanding of graphs and functions (Davis, & Vinner, 1996). It was analyzed that linearity and independence are also concepts with which most students struggle (Bogomonly, 1999). And it seems clear that simply doing a better job of telling and showing may not significantly improve their learning of such difficult topics.

The researchers (Day, & Kalman, 1999) from the Park City Mathematics Institute proposed that we should become better listeners. Specifically, they suggested that we select a few students and interview them in depth, instead of correcting their misconceptions. This means taking time to observe and listen carefully to what they are really doing when they think about linear algebra. Explore what the student is thinking, paying careful attention to the ideas behind what the student says. How does a student reach conclusions that we find wrong? Over time, such interviews may reveal some ways in the thinking and misconceptions of our students that lead us to a better understanding of how they learn.

As mathematicians, we are aware of the rich interconnections of different ideas and concepts in mathematics. We would like our students to learn how different ideas work together, supporting and validating each other. We know from experience that understanding of this kind is not acquired as a result of being told of each definition or principle. It develops through actively exploring a mathematical topic, discovering and rediscovering the interconnections until they become familiar and commonplace. But we who have developed understanding on this level risk forgetting the effort that came before: the missteps, false generalizations, incomplete and inconsistent conceptions. Meaningful learning is difficult to achieve and it rarely occurs unless students actively grapple with the ideas.

Teaching strategies

The usability of computers has forced mathematicians to rethink the way they are teaching mathematics. When a calculation can be operated quickly and satisfactorily by a computer program, one has to ask 'what is it that a student really needs to learn?' As a response, at the least, students need to develop critical thinking skills, to understand well the main concepts of mathematics and to be able to apply them in different situations.

In his study, Herrero defined five strategies to effective using of computer in the teaching linear algebra (Herrero, 2000). The following strategies are described: (1) exploration of new concepts through computer exercises; (2) teaching linear transformations as early as possible; (3) emphasis on geometry; (4) teaching to write mathematics through development of a portfolio; (5) using computer projects for motivation and applications. The purpose of each of these projects is to introduce students to a new subject in linear algebra through a hands-on approach. They are intended to provide motivation for new definitions, show the need for the new theorems, make conjectures, and realize the usefulness of the new theorems by applying them to solve various problems. Computer-based instructions may lower the quality of learning if too much emphasis is placed on individual work with the computer. Incorporating technology into mathematics teaching works best, when it is done with teaching strategies that benefit from critical thinking and increase communication between students and teachers.

What can linear algebra teachers do to enrich lecturing, in order to better facilitate meaningful learning? Guershon Harel and Larry Sowder (2003) used an intense lecture-discussion method in his linear algebra classes at Purdue, which could be described as a rich extension of lecture. He insists that the students participate in working through all concepts. He uses MATLAB in a brief but important way, to facilitate examples: together the class figures out what must be calculated, how to do it and what results are expected; then he does the calculation and they discuss whether the results were what they expected and how to verify them.

Day (1997) applied "Mazur's polling method" in linear algebra classes. The author, in particular, tried a few variations on the method. She used polling spontaneously and very quickly, to liven up lectures (Show

hands. Who thinks that idea will work? Who doesn't?). She also used it more formally after many students missed the following question on an early test: "True or False?" *If A and B are invertible then A + B is invertible.* Before returning the graded tests, she asked the class to vote on this question, and about half said "true", half "false". Then she asked students to find someone who disagreed with them and discuss which answer was really correct. She moved around, listening and occasionally asking pointed questions, for about 5 minutes. Then they voted again and about %80 got the correct answer. Some of the students who understood correctly explained how they went about answering it. This exercise took about 15 minutes, but it was a productive way to get students to think about how to analyze such a question, and to see how effective it can be to look for really simple examples.

Using computer programs

Why and how to use technology is another question for linear algebra teaching. There are several different roles that technology can play in instruction, from eliminating computational drudgery in realistic applications, to providing environments for actively exploring the properties of mathematical structures and objects (Herrero, 2000). Linear algebra teachers have different views and experience using computer programs (MATLAB, Maple, Mathematica, Mathwright) in the lectures. Some of them assign computer projects to be done outside of class. Some use computer demos and examples to enrich lectures, and others rarely lecture at all, instead using software as a primary means for delivering mathematical material to the students, with a significant proportion of class time spent interacting with the computer.

The main purposes can be summarized from the different views about why and how to use software in teaching linear algebra are: for computation in meaningful applications; as a matrix calculator; as a direct focus of instruction; for visualization; to provide an environment for active exploration of mathematical structures; and to explore some of the limitations of floating point calculations.

It is possible to find many applications that will be of interest to students from just about any background. However, in most real world problems, the dimensions of the matrices make hand calculation completely inadequate. Even with relatively low dimensional problems, the overhead of hand calculation quickly becomes distracting or simply overwhelming. Some teachers use technology just to provide students first-hand experience with real applications in realistic settings.

Calculators and software like Matlab, Maple, and Mathematica provide students a means of instantly and effortlessly performing matrix computations, and thus free them to concentrate on what the computations mean, and when and why to perform them (Tucker, 1993). Many instructors use software in this context. Rather, students are intended to answer questions about what happens when certain computations are performed, without having to think too much about the mechanics of carrying out the operations. For example, students might experiment with the effect of scalar or diagonal matrices as multipliers, without actually performing all the matrix multiplications by hand. Most instructors feel that doing some of the matrix multiplications by hand provides insight about why results appear as they do. But, we can say that the ability to rapidly investigate a large number of examples makes a contribution to understanding.

Software can provide helpful visualization with two and three dimensional graphics. The ATLAST project provides a number of excellent tools. For example, the program span plots in 3 space the images of a large number of vectors, under multiplication by a particular fixed matrix. Software can be used to create interactive environments in which students can explore and experiment with vectors, matrices, transformations, etc., with graphical, symbolic, and numerical representations. Usually students must learn some syntax to use the software, but it is possible to free them from that by creating activities with a windows-style point and click interface. Matlab supports this kind of development, and to a more limited extent, Maple and Mathematica can be used in a similar way. There is a version of Mathwright that is available for free on the Internet, along with sample activities for students (Mathwright, 2008). The library includes a few linear algebra activities.

Connections with other mathematics courses

Guershon Harel (1997) has pointed out that calculus rests on a foundation of several years of background study at the secondary level, while linear algebra demands mastery of a number of critical ideas with little or no prior foundation. He goes on to propose that students be exposed to linear algebra at the secondary level, so that in college they have a suitable basis for abstraction and continued study.

What about students' prior knowledge is important for linear algebra teachers to consider? At the most concrete level, it is important to find out what linear algebra topics your students may already have seen. Have they worked with vectors, lines and planes in R^3? How many have already used matrix inversion on graphing

calculators to solve linear systems? How many have worked with row operations? How do the answers impact your decisions about what to include in the course, and how long to spend on each topic (Cowen, 1997)?

The apparent connections between linear algebra, calculus, and differential equations are understandable by students. Also, it can be seen some contact points of linear algebra with other areas such as statistics and abstract algebra. The question of how to organize these connections is determined by linear algebra teachers. However, the prerequisites for linear algebra definitely affect what topics students can learn and how they can use them. If multivariable calculus is a prerequisite, then ideas about two and three dimensions that were presented in the calculus course can be more easily generalized in linear algebra. If students are required to see linear algebra first, then it can be used freely in calculus in the discussion of topics such as derivative and continuity (Katz, 1995). At many departments, neither of these courses is a prerequisite for the other. In that case, concepts like linearity of functions must be developed independently as needed in each course.

Conclusions

How to teach linear algebra is an important research question. We all know how to teach this course, and none of us do. We all know in the sense that we all have a good idea what we will do the next session we are scheduled to teach that course. But we need to understand better how students learn, and to aware that the appropriate content, strategies and context will be different in different settings. There is no one right way to teach that course, and there are some issues that may not be definitively resolved. We hope that this article has had a useful effect on the reader, and that the references may provide resources for further study.

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Students' understanding of the concept of limit of a function in vocational high school mathematics

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Abstract: The authors report on a study which used the APOS theory to examine vocational high school students' understanding of limit of functions. The limits of real functions were taught to computer technology, electricity-energy, electronics and automation, construction, and machinery-metal technology programs students at a vocational high school in Kocaeli University in Turkey. It is given the analysis of students' responses to four types of questions on limits of real functions; limits of split-functions, limits at infinity of rational functions, limits of functions not defined at a point, and continuity of real functions. As a main finding of the study, vocational high school students find difficult to understand the limits of real functions. Also, it suggests that this is possibly the result of many students not having appropriate mental structures at the process, object and schema levels.

Keywords: limits of real functions, the Apos theory, vocational high school.

Introduction

APOS (Action - Process - Object - Schema) theory suggests that an individual has to have appropriate mental structures to make sense of a given mathematical concept. The mental structures refer to the likely actions, processes, objects and schema which are required to learn the concept. Research based on this theory requires that for a given concept the likely mental structures need to be detected, and then suitable learning activities should be designed to support the construction of these mental structures in the students' mind (Dubinsky & McDonald, 2001).

APOS theory

The main mental operations for building the mental structures of action, process, object, and schema are called "interiorisation" and "encapsulation" (Dubinsky, 2010; Weller et al., 2003). The descriptions of action, process, object and schema are based on those given by Weller, Arnon and Dubinsky (2009);
Action: A transformation is first conceived as an action, when it is a reaction to stimuli which an individual perceives as external. It requires specific teaching, and the need to perform each step of the transformation explicitly. For example, a student who requires an explicit expression to think about a limit of a function,$\lim_{x\to a} f(x)$, and can do little more than substitute values of $x$close to $a$for the variable in the expression $f(x)$and manipulate it, is considered to have an action understanding of a limit of a function.
Process: As an individual repeats and reflects on an action, it may be interiorized into a mental process. A process is a mental structure that performs the same operation as the action, but wholly in the mind of the individual. Specifically, the individual can imagine performing the transformation without having to execute each step explicitly. For example, an individual with a process understanding of the limit of a function;$\lim_{x\to a} f(x)$; will construct a mental process for values of x close to a and think in terms of inputs, possibly unspecified, and transformations of those inputs to produce outputs.
Object: If one becomes aware of a process as a totality, realises that transformations can act on that totality and can actually construct such transformations (explicitly or in one's imagination), then we say the individual has encapsulated the process into a cognitive object. For example, for the limit of a function concept an individual may confront situations requiring him/her to apply various actions and/or processes. These could include thinking about an operation that takes two functions and produces a new function, such as in

$\lim_{x\to 2^+} \frac{|x-2|}{x-2}$. In order to operate on the one sided-limit of this new function, the process understanding must be encapsulated and converted to an object.

Schema: A mathematical topic often involves many actions, processes, and objects that need to be organised and linked into a coherent framework, called a schema. It is coherent in that it provides an individual with a way of deciding, when presented with a particular mathematical situation, whether the schema applies. For example, the coherence might lie in the understanding that to determine the existence of a limit of a function,$\lim_{x\to a} f(x)$, the following must be considered: input values to the left and right of a, the corresponding output values, and a means of transforming elements of the inputs to elements of the outputs.

The ACE teaching cycle

This pedagogical approach, based on APOS theory and the hypothesis on learning and teaching, is a repeated cycle consisting of three components: (A) activities, (C) classroom discussion, and (E) exercises done outside of class (Asiala, et. al., 1996). The activities, which form the first step of the cycle, are designed to foster the students' development of the mental structures called for by an APOS analysis. In the classroom the teacher guides the students to reflect on the activities and its relation to the mathematical concepts being studied. Students do this by performing mathematical tasks. They discuss their results and listen to explanations, by follow students or the teacher, of the mathematical meanings of what they are working on. The homework exercises are fairly standard problems. They reinforce the knowledge obtained in the activities and classroom discussions. Students apply this knowledge to solve standard problems related to the topic being studied. The implementation of this approach and its effectiveness in helping students make mental constructions and learn mathematics has been reported in several research studies. A summary of early work can be found in Weller et al. (2003).

Literature review

There are many studies on students' understanding of the concept of a limit of a function (e.g. Cornu, 1992; Davis & Vinner, 1986; Li & Tall, 1993; Maharajh, Brijlall, & Govender, 2008; Monaghan, Sun, & Tall, 1994; Tall, 1992; Tall & Vinner, 1981; Williams, 1991). These studies indicate that students have difficulties with the concept of a limit of a function in the context of functions and continuity or series and sequences, and many of the difficulties encountered by students in dealing with other concepts; for example continuity, differentiability and integration; are related to their difficulties with limits.

Some researchers (Cornu, 1992; Sierpińska, 1987) reported that a high percentage of students have a static view of mathematics. Such students can only deal with a very specific calculation that is placed before them. Students with such a view will have difficulties with the limit of a function concept. The term "precept" is used to indicate that mathematical symbolism can ambiguously represent either a process or a concept (Monaghan et al., 1994). So, the symbol $\lim_{x\to a} f(x)$is an example of a procept since it represents the process of getting to a specific value, or the value of the limit of the function itself. However, unlike the procepts of elementary mathematics, where an algorithm can be used to calculate the specific value of the concept, the limit value does not have a universal algorithm that works in all cases. Further, the limit of a function concept is not restricted to a finite computation that gives a definitive answer. This is precisely where the distinction between an action and a process comes in. It could be argued that once a calculation involves an infinite number of steps, it could only be understood through a process conception. A commonly cited difficulty that students have in constructing a process conception of limit of a function is their perception of a limit of a function as something that is actually never attained (Cottrill, Nichols, Schwingendorf, Thomas, & Vidakovic, 1996; Dubinsky, 2010).

It seems that many students perform poorly because they: (a) are unable to adequately handle information given in symbolic form which represent objects (abstract entities), for example functions, and (b) lack adequate schema or frameworks, which help to organise and link different objects (Maharaj, 2005). Giraldo, Carvalho and Tall (2003) distinguish between a description of a concept, which specifies some properties of that concept and the formal concept definition. Some descriptions commonly employed in the teaching of limits of functions include table of values, graphical and algebraic representations. Individually these involve limitations that do not fully reflect the mathematical situation. The teaching implication is that a variety of representations should be used, and to encourage students to engage with a flexibility of mathematical conceptions of$\lim_{x\to a} f(x)$. The research questions for this study were:

- How should the teaching of the concept of a limit of a function be approached?

- What insights would an APOS analysis of students' understanding of the concept of a limit of a function reveal?

Materials and Method

The participants for this study were 672 vocational high school mathematics students at a university in Turkey in 2012; about %92 of these were first year students. The students were studying a compulsory mathematics course. The aim of the course studied is to introduce students to the fundamental principles, methods, procedures and techniques of mathematics as the language of science. These students attended their lectures for two hours in a week. I was the lecturer to all the students. This was the context for the theoretical analysis of the limit of a function concept.

The key question for a 50 minute lecture session was: When does $\lim_{x\to a} f(x)$ exist? Activities were formulated and these were projected by use of a PC tablet. A reasonable time was given for students to reflect and work on each activity; they were free to discuss with other students sitting beside them and to use the prescribed textbook. While students engaged with the activities I observed how they worked, their difficulties and aspects that required further explanations. These informed my explanations; using a PC tablet; to the class. Another 45 minute session was devoted to activities based on techniques for finding limits of functions, including limits at infinity. The activities and explanations incorporated use of graphical representations to answer questions on limits of functions, including limits of split-functions of the types given in symbolic notation. Activities and classroom discussions were followed by homework exercises, which students had to work on as part of their tutorial requirements. A PC tablet was used to summarise the lecture-room discussions .In their groups they could further discuss the homework exercises with their tutors.

About 3 weeks after the tutorials a multiple choice questions (MCQs) test was administered to 646 students. The questions set were similar to those for the activities and homework. Students were required to first work out the solutions in the space below each question and then to mark their choices on the multiple-choice-question cards. Note that the fourth question is based on the concept of continuity, which incorporates the concept of the existence of a limit of a function. The teaching for the section on continuity was similar to that outlined above, in that the ACE teaching cycle was followed. The options given for each of the MCQs were constructed bearing in mind the APOS levels of mental structures.

Results and Discussion

To represent the analysis, findings and discussion for each of the four questions in a reader friendly format, the following subheadings which describe the type of question are used:

- Limits of split-functions
- Continuity application of split-functions
- Limits of functions not defined at a point
- Limits of rational functions at infinity

Under each of these subheadings the relevant test item and question analysis is given. The question analysis indicating number of student choices and the percentage (correct to one decimal place) for each of the four questions are indicated in Tables 1 to 4 below. In each of these tables "*" denotes the letter of the correct answer. The Omit index gives the number of students who did not mark any of the alternatives, and the Bad index gives the number of students who marked more than one choice.

1. Limits of split-functions

Let $f(x) = \begin{cases} 2x+1; & x > 5 \\ 3x-6; & x \leq 5 \end{cases}$

$$\lim_{x\to 5} f(x) = ?$$

A) 11 B) 9 C) 10 D) does not exist E) none of these

Tablo1: Question 1 analysis of student choices (N = 646)

	A	B	C	D*	E	Omit index	Bad index
Student choices	95	102	21	332	33	59	4
Percentage	14,7	15,7	3,2	51,3	5,1	9,1	0,6

Question 1 is based on finding the limit of a split-function f (x), as $x$approaches a value in the domain where the function is split. The question analysis in Table 1, using the totals for choices A and B, indicates that 197 students conceptualized $\lim_{x\to 5} f(x)$to be the same as one of the one-sided $\lim_{x\to 5^+} f(x)$or $\lim_{x\to 5^-} f(x)$. In the APOS framework, using the genetic decomposition I arrived at, this means that those students' mental constructions were at best at the action level. This suggests that for evaluation of limits of split-functions, approximately %30 of the students had mental constructions developed up to the action level. The numbers for choice C suggests that a total of 21 students (approximately %3) had no idea of the basic technique for finding the limit of a split-function given in algebraic form; that is when the split-function is expressed in symbolic notation. A possible reason for 218 students selecting choices A, B or C is that they did not fully understand the concept of a split function. This implies that it seems that approximately %33 of the students did not understand the concept of a split-function when such a function is represented in algebraic form.

Table 1 also indicates that 332 students marked the correct choice for Question 1. In the context of my decomposition this suggests that for evaluation of limits, of the type of split-functions under discussion, approximately %51 of the students had mental constructions developed up to the object level. Table 1 indicates that 33 students chose option E. This suggests approximately %5 of the students could have made calculation errors; and if this is accepted; their mental constructions were probably functioning at the object level. So it seems that approximately %56 of the students had appropriate mental structures in place for some sort of effective schema to evaluate the limit of a split-function f(x) given in symbolic form, as $x$approaches $a$value in the domain where the function is split. Table 1 also indicates that a large number of students (59, about %9) did not indicate any choice. One of the reasons for this is that they did not have any idea of how to work out the solution of such questions.

2. Limits at infinity of rational functions

$$\lim_{x\to\infty} \frac{4+7x-5x^2}{-1-10x^2} = ?$$

A) 1/2 B) ∞ C) 0 D) -1/4 E) none of these

Tablo2: Question 2 analysis of student choices (N = 646)

	A*	B	C	D	E	Omit index	Bad index
Student choices	302	136	41	34	102	25	6
Percentage	46,7	21	6,3	5,2	15,7	3,8	0,9

Question 2 is based on finding the limit at infinity of rational functions; the case where the polynomials in the numerator and denominator are of the same degree. Table 2 implies that the 177 students (approximately %27); those who chose options B and C; had no appropriate schema to deal with finding the limits at infinity of rational functions. Noting that $-1/4$ is the reciprocal of $-4/1$, Table 2 suggests that the 34 students (approximately %5) had mental constructions not even at the action level. Table 2also implies that at least 302students (approximately %47) had appropriately developed schema to deal with problems based on finding the limits at infinity of rational functions; in particular the case where the polynomials in the numerator and denominator are of the same degree. The 102 students (approximately %16) who chose option E could have

made calculation errors; and if this is accepted; their mental constructions probably incorporated appropriate schema for finding limits of rational functions, at infinity. So it seems that at most approximately %62 of the students had mental structures appropriately developed to some sort of effective schema for finding limits of rational functions, at infinity; in particular the case where the degree of the polynomial in the numerator is equal to that of the polynomial in the denominator.

3. Limits of functions not defined at a point

$$\lim_{x\to 25} \frac{\sqrt{x}-5}{x-25} = ?$$

A) 1/5 B) 0 C) 1/10 D) ∞ E) -∞

Tablo3: Question3 analysis of student choices (N = 646)

	A	B	C*	D	E	Omit index	Bad index
Student choices	83	212	185	72	30	61	3
Percentage	12,8	32,8	28,6	11,1	4,6	9,4	0,4

Question 3 is based on the evaluation of limits of functions not defined at a point. The limit of the function cannot be found by finding the corresponding function value. The technique here is to express the function in factorised form $\frac{\sqrt{x}-5}{(\sqrt{x}+5)(\sqrt{x}-5)}$ noting that$x \neq 25$ simplifies this to$\frac{1}{(\sqrt{x}+5)}$ and then findinglim$_{x\to 25}\frac{1}{(\sqrt{x}+5)}$. Noting that$\frac{-5}{-25} = \frac{1}{5}$, Table 3 suggests that the 83 students (approximately %13) had mental constructions which were not even at an action level. The distracters given as options B, D and E were designed for responses at a limited action level. If this is accepted then Table 3 suggests that 314 students (approximately %49) possibly used mental constructions at some sort of action level. The 185 students (approximately %29) who marked the correct answer, conceptualized lim$_{x\to 25}\frac{\sqrt{x}-5}{x-25}$as an object. Further, using this object it seems they had appropriate schema to deal with the relevant imbedded and implied information. Table 3 suggests that 61 students (approximately %9) did not have any idea of how to work out the solution of such questions. So, it seems that at least %22 of the students had mental constructions not developed to any of the levels indicated in APOS Theory.

4. Continuity application of split-functions

Let $f(x) = \begin{cases} \frac{3x^2+5x-2}{x+2}; & x \neq -2 \\ mx+1; & x = -2 \end{cases}$

What is the value of m that will make the function f continuous?

A) 2 B) 4 C) -2 D) 3 E) none of these

Tablo4: Question3 analysis of student choices (N = 646)

	A	B*	C	D	E	Omit index	Bad index
Student choices	96	166	25	63	61	228	7
Percentage	14,8	25,6	3,8	9,7	9,4	35,2	1,0

An analysis of Question 4 reveals that the point of discontinuity occurs at$x = -2$. This is the crucial observation from the structure of the given split-function. The question is based on finding an unknown coefficient of one of the functions; in a split-function; which will make the entire function continuous on the interval$(-\infty, \infty)$. This requires continuity at$x = -2$, which implies that the condition $\lim_{x\to -2} f(x) = f(-2)$ must be satisfied. The type of mental conception required here involves the formulation of $\lim_{x\to -2} f(x) = f(-2)$ as an equation which should be treated as an object. Further the successful use of this equation depends on an appropriately developed schema. This must incorporate conceptualization of split-functions represented in symbolic form, as objects.

Note that in Question 4, if $x \neq -2$then$\frac{3x^2+5x-2}{x+2}$. So options A, C and D deal with distracters which were arrived at from this structure. If this is accepted then the question analysis in Table 4; using the totals for options A, C and D; indicates that 184 students (approximately %28) possibly had mental constructions which were not even at the action level. Table 4 also suggests that 166 students (approximately %26) possibly had appropriately developed schema for applications on continuity of split-functions represented in symbolic form. Since 61 students chose option E, this suggests approximately %9 of the students could have made calculation errors. If this is accepted then their mental constructions probably incorporated appropriate schema for applications on continuity of split functions represented in symbolic form. So it seems that approximately %35 of the students had appropriate mental structures in place for some sort of effective schema for applications on continuity of split-functions represented in symbolic form. Table 4 also indicates that a large number of students 228 (approximately %35) did not indicate any choice. One of the reasons for this is that they did not have any idea of how to work out the solution of such questions.

The above analyses indicated that the types of MCQs used basically gave information on the highest potential mental structure levels of those students, according to APOS Theory.

Conclusions

Useful insight into the relevant mental structures towards which teaching should focus was revealed by the APOS genetic decomposition of the limit of a function concept. The findings of this study confirmed that the limit of a function concept is one that students find difficult to understand, and suggests that this is possibly the result of many students not having appropriate mental structures at the process, object and schema levels. It seems that my genetic decomposition was adequate. However, my reflections on the teaching design indicated that more time needs to be devoted to helping students develop the mental structures at the process, object and schema levels. This implies that teaching should focus on (1) verbal and graphical approaches to finding limits of functions; including split-functions in symbolic form, (2) unpacking of structures given in symbolic form, and (3) modeling possible schema. A graphical approach should facilitate the development of mental structures at the process and object levels, while a focus on symbolic structures should aid object conceptions. If schemas organize and link the relevant actions, processes and objects then this should be a part of the teaching. The impact of such a focus on teaching will require further research.

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Study of the effect of pesticides on some physico-chemicals and microbiologicals parameters of soil and water in north-eastern Algeria

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Abstract: Among the chemicals most commonly used currently in our environment, Those are undoubtedly pesticides and related products. If pesticides are at first appeared beneficial, harmful side effects have been gradually revealed. Their toxicity, due to the molecular structure is not limited indeed to only species that we wish to eliminate. They are particularly toxic to the various components of the environment.

Our study aims to assess the degree of pollution of soil and surface water in farming areas situated in the North-Est of Algeria and subject to the effect of pesticides for several years. To do this, the physico - chemical characteristics of water and soil were determined. The analyzes have focused on pH, BOD5,COD, electrical conductivity, organic matter, nitrites and nitrates. The total microflora samples of water and soil was also evaluated. The physico-chemical parameters studied were analyzed by standard methods according to the general guidelines for storage and manipulation. The fungal microflora was determined using identification keys. The identification of isolated and purified bacteria was instead performed by a scan apiweb software (Api web Biomerieux France).

The results show that there is a pollution of water and soil. The values of some parameters often exceed the prescribed standards and especially those of nitrite and electrical conductivity. The isolated microflora consists of 97% whose most frequent are Bacillus and Micrococcus and 3% of fungi with a predominance of Aspergillus.

Keywords: pesticides, physico-chemical parameters, water, soil, microflora, bacteria, fungi.

Introduction

Most pesticides used in developing countries are highly toxic chemicals. Approximately 73% of imports of pesticides belong to categories 1a (extremely toxic) and 1b (highly toxic) according to World Health Organization. Although the application of these pesticides ensures a certain quality of crop production (in particular the performance and phytosanitary quality), it contributes to contaminate the different compartments of the environment, especially soil and water resources.

Pesticides affect soil quality by reducing fertility (loss of nutriments and organic matter, reducing the total microbial biomass). Herbicides such as sulfonylureas, bensulfuron methyl (B) and metsulfuron methyl generate a considerable reduction of the soil microbial biomass (Taiwo and Oso, 1997; Boldt and Jacobsen, 2006; Baxter and al., 2008). Also Agricultural pesticides also pollute surface water and groundwater. This contamination is seasonal, the highest concentrations being measured during and after application of rainfall period (up to a few µg / l can then be measured in the samples analyzed). In recent years, various studies realized in Algeria have demonstrated the presence of many pesticides in water (Annaba, Algiers, Sétif) and also in our food: more than 50% of fruit and vegetables produced by intensive agriculture contain various molecules of pesticides. All these toxic compounds eventually end up in our organism, brought by the soil, water and food.

So ahead this situation, the main objective of our study was to check the quality of soils and waters surface in regions of north-eastern Algeria subject to the effect of several pesticides.

Material and methods

Collect of samples

Samples are taken from farming areas located in the north-eastern part of Algeria intended to the vegetable crops (tomato, potato, pepper and wheat) and subject to the effects of many pesticides. The main pesticides used are: bromuconazol, fluazifop- p butyl, cimoxanil, propineb, mancozeb, deltamethrine, pendimethaline and tebuconazol. Soil samples were collected in sterile tubes closed.

They are then placed in the same conditions in which they are mixed to obtain a representative microflora, and then kept at 4 ° C until analysis. Water are collected in bottles designed for water samples. These are stored at 4 ° C and transported to the laboratory on the same day with a view to analysis.

Analysis of physico-chemicals parameters

Regarding water, the analyzes focused on pH, electrical conductivity, BOD5, COD, nitrates and nitrites. The techniques used are those described by Rodier (1996). Regarding the soil, only the following parameters: organic matter, electrical conductivity, pH were evaluated by standard methods and compared with the scales reported in soltner (1981), Gaucher (1981) and durand et al., (1992) .

Evaluation of the total soil microflora

The suspension is prepared by the dilution method described in the standard DIN 54379 for the total count of colonies.

1 g of soil from each sample was stirred in 100 ml of sterile Ringer's solution (cassagne, 1966). The resulting suspension is diluted to 1/10th and 1/100th and 1/1000th from which 1 ml is taken that spread in a Petri dish and empty 10 ml of sterile culture medium. The dishes are incubated at 30 ° C temperature for 5 to 7 days.

Isolation of fungal species is made on PDA and Muller-hinton method of Warcup (Parkinson and Waid., 1960) by seeding depth. Aliquots of soil are distributed in Petri dishes (90 mm diameter) and covered with sterile nutrient medium. The petri dishes in triplicate for each case were incubated at 30°C

Identification of the microflora isolated

Bacterial isolates were purified by subculturing on Muller-Hinton. After studying the morphology, Gram staining and study of physico-chemical characteristics galleries with API 20 E and API 20 NE, identification is then performed by a scanning software API Web (Web API Biomerieux France) .

Regarding fungal strains after purification on Sabouraud medium, they are determined using identification keys de Botton et al., 1980 (Tome1 and 2)

Results and discussion

Analysis of water physico-chemicals parameters

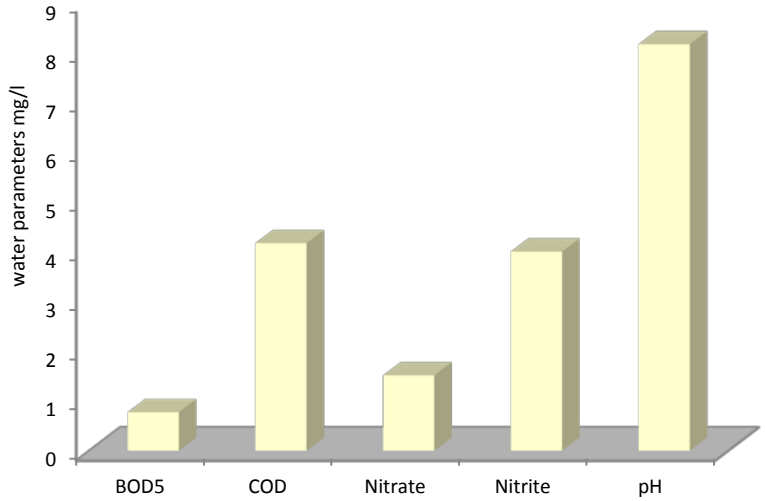

Figure 1 : mean values of physico-chemicals parameters of waters analyzed

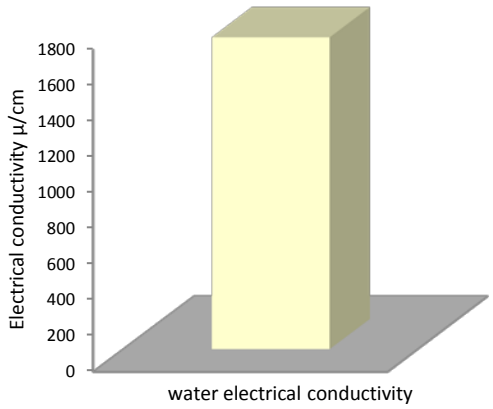

Figure 2 : Mean values of the electrical conductivity of waters analyzed

The physico-chemicals analyzes performed on water samples show firstly a high concentrations of nitrite (4 mg/l) above the allowable values which are between 1 and 3 mg/l, indicating the presence of toxic substances. Nitrites are toxic to organisms. It seems that the situation is very critical when a concentration is more than 3 mg/l of nitrite (Lisec, 2004). On the other hand, the values obtained for the electrical conductivity are also very high above international standards eligible with an average of 1745µ/cm. These high values show the presence of salts dissolved in water (MSPE, 1987). Other analyzed parameters appear below the standards values.

Analysis of physico-chemicals soil parameters

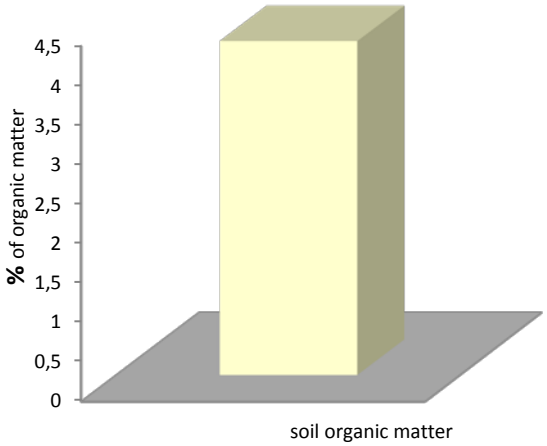

Figure 3 : Mean values of organic matter soils

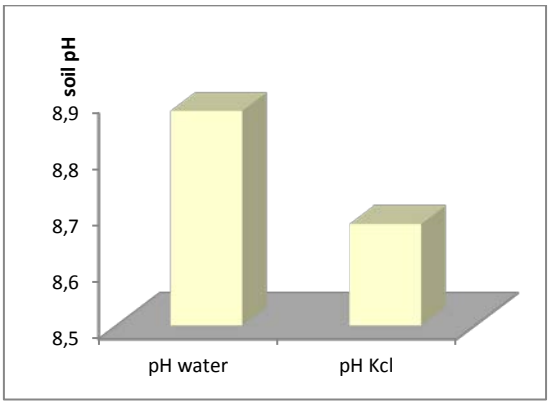

Figure 4 : mean values of pH soils

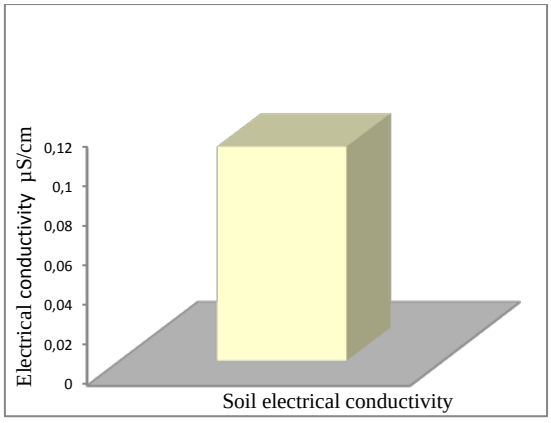

Figure 5 : Mean values of the electrical conductivity soils

The values of the parameters determined and compared with those of several authors scales indicated that the soil is rich in organic matter, with basic pH and unsalted poor in minerals with a very low conductivity probably due to the presence of pesticides.

Evaluation of the total soil microflora

Table 1: Evaluation of fungal and bacterial microflora of different analyzed soils

number of bacteria /gramme of soil	number of fungi / gramme of soil	Total
51407	1088	52495

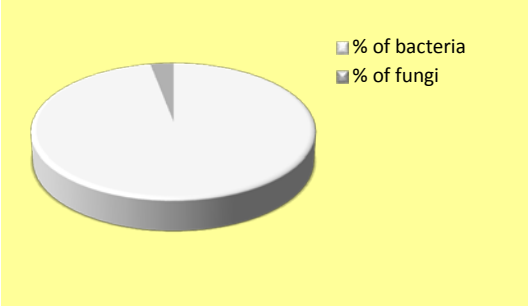

Figure 6 : percentage of bacteria and fungi/ gramme of soil analyzed

Table 2 : Identification of isolated soil microflora

bacterial strains	fungal strains
Aeromonas *Bacillus* *Chryseobacterium* *Micrococcus* *Pasteurella* *Pneumotropica*	*Absidia* *Aspergillus* *Fusarium* *Penicillium* *Trichoderma*

Serratia *Vibrio*	

The total microbial microflora isolated is composed of 52495colonies / g soil, most of which consists of bacteria (97%). The bacteria appear to be more tolerant to the effects of pesticides sprayed on the ground. The fungal microflora appears to be more sensitive because it is less abundant with a much smaller number (3%). In addition, we find that there is not much difference from a sample to another, the same genera are present in almost all samples with higher or lower frequencies.The most common bacteria are mainly *Micrococcus*, *Bacillus*, *Aeromonas*, *Chryseobacterium* and *Serratia*. *Aspergillus*, *Penicillium* and *Trichoderma* are the most predominant among fungal microflora.

Conclusion

This study allowed us to obtain a fairly rich microflora distributed almost uniformly throughout all sites. It is composed of several microbial species which may survive in the conditions of a highly polluted soil by the action of several herbicides, fungicides and insecticides. However, the growth of fungal species is sometimes inhibited in most samples. We think that this inhibition is probably due to the presence of pesticides in the treated soil. The accumulated doses following repeated treatments for several years, become toxic to the fungal strains.
Micrococcus, *Bacillus* and *Aspergillus* particular are the most predominant microorganisms of the microflora. They are resistant to various pollutants and endure high concentrations of herbicides (Domsch and al., 1980; Sage and al., 1997 ; Steiman and al., 1992).

The distribution of the soil microflora is influenced by the characteristics of the habitat, such as, pH, organic matter content, humidity, soil texture and electrical conductivity.

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The Effects of Nature Education Project on the Environmental Sensitivity

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Abstract: The purpose of this study is to investigate the effects of the project "Nature Education in Ihlara Valley (Aksaray) and Its Surrounding Area III" supported by The Scientific and Technological Research Council of Turkey (TUBITAK) on environmental sensitivity. "Environmental Sensitivity Scale" were used to collect data in the present study. The study was carried out in line with the pre-test-post-test design. The difference between the environmental sensitivity pre-test and post-test scores of the participants was found to be statistically significant as a result of the t-test analysis ($t_{(29)}$= -3,518, $p<0.01$). In light of this result, it can be argued that nature education raised the environmental sensitivity of the participants.

Key words: environmental sensitivity, nature education, pre-service teachers

Introduction

In today's world where global environmental problems are growing rapidly, the carbon emission has already reached the possible highest level and ecologic foot traces have climbed to the top of the loading capacity of the earth environmental education has gained greater importance.

In the analysis of the environment, perceiving the unity of nature and our planet, and raising our environmental awareness and sensitivity, environmental education is of vital importance (Schmidt, 1996; Erten, 2005). Training of teachers with ecological knowledge and experience sufficient enough to carry out theoretical and applied environmental works efficiently can make the biggest contribution to the development of environmental education and achieving its goals (Kahyaoğlu et al., 2008). Environmental education should not only provide information but also lead to changes in human behaviors. The main objective of environmental education should be permanent and positive changes of behaviors and active participation of individuals in efforts made to find solutions to problems (Özgen, 2012). In order to train environmentally-sensitive individuals, education systems promoting the active participation of individuals should be adopted (Çabuk & Karacaoğlu, 2003). Environmental sensitivity is 'an empathetic or understanding view of the environment', and is characterized by the individual who 'refuses to litter highways and natural areas... conserves natural resources... works to preserve ecologically important natural areas... strives for a stable and appropriate human population level... respects hunting and fishing laws... insists on rational zoning requirements... etc.' (Hungerfordh, Peytonr & Yolk, 1992; Sivek, 2002).

When environmental education is given in the natural environment, it may increase the interest in nature and enable the participants to look at the life by creating empathy with nature; hence, it is very important (Atasoy, 2006; Ozaner, 2004; Palmberg & Kuru, 2001). Many authors have emphasized that nature education informs individuals about natural processes, makes them more sensitive and conscious, when it is accompanied by field trips, the information gained can be turned into behavior more easily and becomes more permanent and makes contribution to the creation of more independently thinking individuals (Shepard & Speelman, 1985; Dresner & Gill, 1994; Erten, 2004; Farmer et al., 2007). The purpose of this study is to investigate the effects of the project "Nature Education in Ihlara Valley (Aksaray) and Its Surrounding Area III" supported by The Scientific and Technological Research Council of Turkey (TUBITAK) on environmental sensitivity.

Materials and Method

Study group

The study group consists of 30 pre-service teachers studying in 4 different departments (preschool education, primary education, social studies, science and physics) of the education faculties of 17 universities who participated in nature education program carried out on 27 August-02 September 2012 with the support of TUBITAK. 18 (54%) of the participants are girls and 12 (46%) are boys.

Activities carried out within the framework of the nature education

With this project, where active learning methods were used, the pre-service teachers were introduced to geological, geomorphologic, floral, faunal and cultural features of the natural environment and to the problems stemming from the mass tourism activities taking place in the region. In this respect, some field studies were carried out on the volcanic structure around Ihlara Valley and Hasan Mountain. Besides field studies, some activities in a classroom setting were also carried out. In the classroom setting, creative drama activities were performed for the pre-service teachers to get to know each other and take individual responsibilities.

Data collection instruments

"Environmental Sensivity Scale" developed by Çabuk and Karacaoğlu (2003) was used to evaluate the changes in the pre-service teachers' environmental sensivity as a result of the nature education they participated in. The scale consists of 24 items designed in the form of 3-Point Likert type (always, sometimes, never). The Cronbach Alpha reliability coefficient was found to be .72. This scale was administered as pre-test on the first day of the program and post-test on the last day of the program.

Data analysis

SPSS program package was employed to analyze the data, and after presenting the descriptive statistics related to the scores, paired t-test was used to find out whether there are significant differences between the pre-test scores for environmental sensitivity and those of the post-test.

Results

In this section of the study, the data obtained through "Environmental Sensitivity Scale" designed to elicit the environmental sensitivity of the pre-service teachers are discussed. In the evaluation, first the means of the pre-service teachers' scores concerning their opinions about air pollution, water pollution, soil pollution, ecologic balance, participation in environmental works and training taken in their formal education institutions were descriptively evaluated in the form of pre-test and post-test. Then, t-test was conducted to test whether the pre-service teachers' environmental sensitivity scores significantly changed as a result of education given. Mean values of the pre-service teachers' scores taken for their sensitivity towards air pollution (pretest-posttest) are presented in Table 1.

Table 1: Pretest-posttest mean values for the pre-service teachers' sensitivity towards air pollution

No	Items (Air pollution)	N	Mean (pre-test)	Mean (post-test)	t	p
1	Do you pay any attention not to use consumption goods (deodorants etc.) including substances harmful to Ozone Layer?	30	2,20	2,33		
2	Even if you had your own vehicle, would you use public transportation not to pollute the earth?	30	2,23	2,43		
3	Do you pay attention not to disturb other people while you are talking or using some tools?	30	2,90	2,93		
4	Do you warn people to be sensitive towards air pollution?	30	2,50	2,66		
	Total	30	**9,83**	**10,35**	**-1,606**	**,119**

As can be seen in Table 1, the mean values obtained for the responses given by the pre-service teachers to the items concerning their sensitivity towards air pollution have increased as a result of the application for the four items. On the other hand, the participants' posttest mean score concerning air pollution ($\overline{X}$ **=10.35**) was found to be higher than their pre-test mean score ($\overline{X}$ **=9.83**), yet, this difference is not statistically significant (t=-1.606; p>.05).

Mean values of the pre-service teachers' scores taken for their sensitivity towards water pollution (pretest-posttest) are presented in Table 2.

Table 1: Pretest-posttest mean values for the pre-service teachers' sensitivity towards water pollution

No	Items (Water pollution)	N	Mean (pre-test)	Mean (post-test)	t	p
5	While purchasing cleaners, do you pay attention to whether they include harmful chemicals or not?	30	2,23	2,26		
6	Are you thrifty in any circumstances in water use?	30	2,80	2,86		
7	Do you pay any attention to prevent harmful chemical substances such as engine oils, paints from being dumped into sewer system?	30	2,46	2,50		
8	Do you warn people to be sensitive towards water pollution?	30	2,63	2,76		
	Total	30	**10,12**	**10,38**	**-,830**	**,413**

The score obtained for the responses of the pre-service teachers to the items concerning water pollution is higher for one item favoring the posttest score. In general, the mean score of the pre-service teachers taken from the posttest ($\overline{X}$ **=10.38**) is higher than that of the pretest ($\overline{X}$ **=10.12**). The difference found between these two scores (0.26) is not significant (t=-.830; p>.05) (Table 2).

Mean values of the pre-service teachers' scores taken for their sensitivity towards soil pollution (pretest-posttest) are presented in Table 2.

Table 2: Pretest-posttest mean values for the pre-service teachers' sensitivity towards soil pollution

No	Items (Soil pollution)	N	Mean (pre-test)	Mean (post-test)	t	p
9	Do you pay attention to using the both sides of a paper you are writing on?	30	2,66	2,83		
10	Are you thrifty in any case in terms of using paper tissues?	30	2,46	2,50		
11	Do you plant trees by looking for suitable environments for them to grow?	30	2,26	2,36		
12	Do you pay attention for wastes to end up in garbage?	30	2,80	2,90		
13	Do you sort out the wastes by using suitable boxes to achieve the most effective recycling?	30	2,70	2,76		
14	While leaving your garbage out, do you sort out it?	30	2,36	2,46		
15	Do you warn people around you to be sensitive towards soil pollution?	30	2,36	2,56		
	Total	30	**17,60**	**18,37**	**-2,292**	**,029**

As can be seen in Table 3, it is clear that the pre-service teachers' sensitivity towards soil pollution changed significantly for 7 of the items as a result of the application. In general, the posttest mean score of the pre-service

teachers ($\overline{X}$ **=18.37**) was found to be higher than their pretest mean score ($\overline{X}$ **=17.60**) and this difference is statistically significant (t=-2,292; p<.05). Hence, the application can be claimed to have made important contributions to the sensitivity towards environment.

Mean values of the pre-service teachers' scores taken for their sensitivity towards ecological balance (pretest-posttest) are presented in Table 4.

Table 3: Pretest-posttest mean values for the pre-service teachers' sensitivity towards the concept of ecological balance

No	Items (The concept of ecological balance)	N	Mean (pre-test)	Mean (post-test)	t	p
16	I you were/are married, would/do you pay attention to family planning considering ecological balance?	30	2,83	2,90		
17	Do you support experiments carried out on animals for the benefit of humanity?	30	1,53	1,40		
18	Do you warn people around you to be sensitive towards the protection of ecological balance?	30	2,63	2,73		
	Total	30	**6,99**	**7,03**	**-,128**	**,899**

Posttest mean score obtained from the pre-service teachers' responses to the items aiming to elicit their sensitivities towards the concept of ecological balance ($\overline{X}$ **=7.03**) is higher than their posttest mean score ($\overline{X}$ **=6.99**). However, this difference is not statistically significant (t=-.128;p>.05) (Table 4).

Mean values of the pre-service teachers' scores taken for their sensitivity towards participation in environmental works (pretest-posttest) are presented in Table 5

Table 4: Pretest-posttest mean values for the pre-service teachers' sensitivity towards participation in environmental works

No	Items (Participation in environmental works)	N	Mean (pre-test)	Mean (post-test)	t	P
19	Do you participate in scientific activities on environment such as seminar, panel, conference etc.?	30	2,40	2,60		
20	Do you take part in the activities of voluntary organizations working on environment?	30	2,26	2,43		
	Total	30	**4,66**	**5,03**	**-1,779**	**,086**

As can be seen in Table 5, the posttest mean score obtained for the pre-service teachers sensitivity towards participation in environmental works ($\overline{X}$ **=5.03**) is higher than their pretest mean score ($\overline{X}$ **=4.66**), yet, this difference is not statistically significant (t=-1.779; p>.05).

The mean values of the pre-service teachers' scores taken from their opinions about the education they were given in formal education institutions are presented in Table 6.

Table 5: The mean values of the pre-service teachers' scores taken from their opinions about the education they were given in formal education institutions

No	Items (Environmental education in formal education institutions)	N	Mean (pre-test)	Mean (post-test)	t	p
21	Do you think that you have had enough instruction to raise your awareness of air pollution?	30	1,93	2,26		
22	Do you think that you have had enough instruction to raise your awareness of water pollution?	30	1,96	2,33		
23	Do you think that you have had enough instruction to raise your awareness of soil pollution?	30	1,93	2,36		
24	Do you think that you have had enough instruction to raise your awareness of ecologic balance?	30	1,86	2,56		
	Total	30	**7,68**	**9,51**	**-3,596**	**,001**

As can be seen in Table 6, for all the items, posttest scores taken by the pre-service teachers from the items concerning their sensitivity towards the environmental education taken at formal education institutions are higher than those of pre-test scores. The mean score taken from the posttest ($\overline{X}$ **=9.51**) is higher than that of the pretest ($\overline{X}$ **=7.68**) and this difference is statistically significant (t=-3.596; p<.01). This shows that the pre-service teachers included the training they took during the application in their general formal environmental education and think that the application enhanced their sensitivity.

In order to test whether there is a significant difference between the pre-service teachers' environmental sensitivity before and after the application, their general scores were evaluated.

Table 7: T-test results concerning environmental sensitivity pretest and posttest scores

Environmental sensitivity scale	N	$\overline{X}$	S	Sd	t	p
Pretest	30	56,96	4,76	29	-3,518	,001
Posttest	30	60,66	4,63			

p<.01

The results of the analysis revealed that before participating in nature education project, the mean pretest environmental sensitivity score of the pre-service teachers is $\overline{X}$=56,96, and after participating in the nature education project, it became $\overline{X}$=60,66. The difference found between environmental sensitivity pretest and posttest mean scores is statistically significant (t=-3,518, p<0.01) (Table 7). Hence, it can be argued that seven-day nature education project significantly improved the participants' environmental sensitivity.

Discussion, conclusions and suggestions

In light of the findings of the study, it is seen that prior to nature education, the participants' environmental sensitivity was high. Moreover, at the end of education, their environmental sensitivity significantly improved. In a study looking at the environmental sensitivity of the social sciences high school students, the environmental sensitivity of the students was found to be medium (Aydın & Kaya, 2011). In another study a profile of environmentally sensitive high school students was developed (Sivek, 2002).

In another study employing the same scale used in the present study, it was found that the environmental sensitivity of university students varied significantly depending on gender and education level. In addition to this, the same study also revealed the students have poor attitudes towards participating in activities of environmental organizations. However, the present study showed that the participants have positive attitudes towards participating in environmental activities. Again, in the same study, while the students have positive attitudes towards using animals

and humans in medical experiments, the participants of the present study have negative attitudes (Çabuk & Karacaoğlu, 2003).

The effectiveness of nature education in improving the students' environmental sensitivity shows the importance of environmental education programs integrating active teaching techniques used in nature. Therefore, such programs should be promoted and made widespread. To be able to carry out such programs, first thing to be done should be to train pre-service teachers.

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The role of using Facebook in improving English

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Abstract: The study aimed at investigating the role of using facebook in improving Ajloun College English Students' Achievement, It attempted to answer the following main question: What is the role of facebook in improving English vocabulary?
To answer the question of the study, the researcher prepared a project based on facebook for the experimental group. Forty female students were purposefully chosen from Ajloun College- English Department in the summer semester of the academic year 2012. The participants of the study consisted of two assigned sections. The experimental group was taught according to facebook; while the control group was taught according to the conventional way (Lecture Method). The researcher used a test as an instrument. A suitable statistical treatment was used to find out the effect of the instructional program on the students' achievement in vocabulary. On the basis of the results of the present study, the researcher proposed a number of recommendations and suggestions for future research.

Keywords: Computer assisted language learning, achievement, instructional program, facebook.

Introduction

Computer assisted language learning (CALL) is an approach to teaching and learning. Nowadays, web sites that cater to foreign language learners especially those learning English are so numerous and varied (Graham, 2007). Stockwell's study (2007) investigates mobile-based intelligent vocabulary learning system, learners completed vocabulary activities through either their mobile phones or personal computers. Results of the study revealed that mobile phones were less preferred than computers in vocabulary learning and students achieved better scores on computers.

Facebook technology has an impressive role in people's social life and it could play a distinguished role in foreign language learning and teaching. It has become more and more popular such as a main means of communication. One of the basic causes for the popularity of the facebook is the fact that it is free and available wherever internet is connected on mobile phones, laptop or desktop computers. Therefore, the possibility of using facebook as a tool for learning increases. More than any aspects of language learning vocabulary can be efficient taught by facebook. British council launches English vocabulary App for Facebook - Pic - Your - Wits is the latest in a number of free English language learning for vocabulary- to help learners build vocabulary and improve their English language skills (Ann Foreman)

Learning vocabulary is the primary step to learn a foreign language so many studies are conducted to increase efficiency of vocabulary learning (Akin & Seferoğlu, 2004; Bruton, 2007; Erten & Tekin 2008; McCarten, 2007; Newton, 2001; Tang & Nesi, 2003). Vocabulary has been one of the most commonly taught language areas through technology in recent years (Dodigovic, 2005 and Yoshii, 2003).

Several studies investigate using different technologies and CALL in learning and teaching, in particular, L2 learning. In fact, rare studies conducted about the role of facebook in L2 learning. In Jordan there is no study dealt with L2 learning or learning vocabulary using facebook. This study is considered a pioneer in this domain. Therefore, more studies should be conducted to investigate the effectiveness of using facebook in language learning. In this respect, this study was designed to determine the role and effectiveness of facebook use in vocabulary learning in Al-Balqa' Applied University.

Statement of the Problem

The learners in the Jordanian universities, (private and the public) still have problems in acquiring vocabulary. Many children still face difficulties in acquiring the vocabulary. The researcher believed that this might due to the strategies used in teaching vocabulary. At this stage, it is known that the most widespread and free technology is facebook wherever the internet is available in Jordan at universities, cafes, houses, and on mobile, as well. Thus, language teachers and researchers have started to consider this technology. Learners show very little effort to deal with their problems about newly learned words (Meara, 1980). During the lesson teachers often tend to have an attitude to make the students deal with this problem outside the class on their own (Baykal and Daventry, 2000). However, learners do not have enough knowledge about the vocabulary learning techniques and they have difficulty in dealing with this problem themselves (Akin and Seferoglu, 2004).

Questions of the study

The study attempts to answer the following question:

- Are there any statistically significant differences between the students' vocabulary achievement test attributed to the instructional method of teaching (traditional and facebook)?

Significance of the Study

To the researcher's mind, studies about facebook instruction in Jordan are not existed. The study attempts to use facebook in teaching and learning vocabulary. Moreover, it may help EFL curricula designers and EFL methodologists develop teaching materials which suit various ways of teaching and match students' level of achievement in vocabulary.

Limitations of the Study

This study is limited by the following:

- The EFL learners in the summer semester 2012 at Ajloun University College.
- The study is restricted to the vocabularies in Cause and Effect course for reading.
- The sample consisted of 40 participants.

Definition of Terms

Facebook: An approach to language learning that is enhanced through the use of the internet and provided the ability to use/write vocabulary items via interaction.
Achievement: the scores obtained by students in vocabulary post-test.

Related studies

Warschaur (1995) stated out that learners could have more opportunities to expose themselves to real communication and they can acquire independent learning and enrich their experience of an institution could encourage using e-mail system in language learning Nader (1996) pointed out that it would be a challenge for teachers to find individual and group activities that draw both , upon the internets resources and the students interest in searching them using the internet is fairly beneficial for exploring different cultures more directly and effectively . Students and teachers collaborate and share ideas relevant to their interests and concerns by communicating with friends all over the world (Choi & Hilary .1998). Call offers an excellent opportunity for task in this type of learning. Felix (1997) suggests that teaching grammar through computer may be useful and that a benefit of this type of language learning is that students are able to work at own pace.

A study conducted by Kaya Tadayoshi (2006) about the effectiveness of adaptive computer use for learning vocabulary aims at investigating the benefit of the adaptive computer application for language learners' benefit in the field of second language acquisition. The researcher designed two types of learning-style based materials for English vocabulary learning. The sample consisted of 145 Japanese university students received computerized vocabulary instruction based on their learning

preferences. The findings indicated no significant differences on vocabulary achievement between the experiment group and the control group. Another study conducted by Palmberg (2008) about CALL, the internet, and the foreign language teacher aims at investigating the importance of CALL and Internet methodology in motivating the learners in oral communication and vocabulary development. The researcher designed a pedagogical meaningful CALL program an online program. The sample consisted of 162 university students. The findings showed a profitable educational point of view by the learners in their vocabulary exercise performance. A study conducted by Kraijka (2008) about using the internet in ESL writing instruction aims at investigating the use of the internet in enhancing the classroom learning. The researcher proposed web pages, emails connection and created class websites.The results of the study showed great enhancement and enrichment in learners' choice, variety, and authenticity in writing. The study conducted by Kyoko (2003) about the effects of three computer assisted programs on the acquisition of the transitive/intransitive verbs by beginning level Japanese language students aims at investigating the effects of animation on beginners' learning of Japanese vocabulary (transitive and intransitive verbs).three types of multimedia CALL vocabulary enhancement exercises were used for the treatment. Forty three participants were randomly assigned to one of three treatment groups. The results indicated no differences on the posttest and the retention test in learning Japanese transitive/intransitive verbs among the learners who used ANIME, PICT and TEXT. The questionnaire responses indicated that the students who received ANIME and PICT found the learning process more interesting than the students who received text.

Reviewing the related literature implies many studies about CALL in teaching and learning language aspects: grammar, writing, vocabulary and pronunciation. The researcher did not find studies conducted on using facebook in enhancing English or vocabulary learning. Therefore, this study is different from the previously mentioned studies because the researcher herself redesigned the syllabus of "Cause and Effect". To the researcher's best knowledge, no studies were conducted on teaching vocabulary through facebook in Jordan. For this purpose, the researcher developed an instructional program for teaching vocabulary via facebook.

Methods and Procedures

Population and Sample of the Study

The population of the study was the university EFL learners at AL Balqa' Applied University – Jordan. The participants are English major. The sample consisted of 40 university learners enrolled in Ajloun University College – public AL Balqa' Applied University. The participants of the study consisted of two groups: the experimental group and the control group, each consisting of 20 learners. The experiment started on the tenth of June and ended on 20th August during the summer semester of the academic year 2011-2012.

Instruments of the Study

The researcher has developed two types of instruments: an achievement test, and a facebook instructional program.

The Achievement Test

The test was designed by the researcher. It was used as a pre-test and a post-test to find out the effect of the facebook instructional program on students' vocabulary achievements. The test comprises (30) multiple-choice items of four alternatives. The students' previous knowledge was assessed by the pre-test administered to both groups (control and experimental)before the study started. The objective of the pre-test was to assess the students' background knowledge of words. The same pre-test was used at the end of the study as a post-test to assess the students' achievement on the topic, the vocabulary items. The objective of the post-test was to assess the effect of both instructional methods (facebook and conventional) on learners' achievement.

The Facebook Program

For the purpose of this study, the researcher designed an instructional program to teach the vocabulary items by using the students' facebook. A lesson plan also was included in the instructional

program. The program was based on the content of Cause and Effect course for reading. The program included the following:

Introduction
Construction
Use
Vocabulary Preview
Guess the meaning from context
Understanding parts of speech
Expanding vocabulary
Finding related words
Compound words
Suffixes and prefixes
Expressions and idioms
Drills and practice
Test yourself.

The program also provided model answers for the items presented in the exercises. In addition, the learner receives feedback for his/her achievement simply because the program contains a system for correction. The learner can easily get his/her scores when s/he finished any exercise.

Validity and Reliability of the Test

The test content was validated by a group of English language specialists in teaching, CALL and language acquisition. The judge jury validated the suitability of the test and the objectives of the study, the number of questions and the suitability of the time allocated to the test. All comments and suggestions were taken into consideration and the demanded modifications were done. The test reliability was verified through a test-retest method which was applied on a pilot study of (20) participants randomly chosen from the population of the study and excluded from the sample.

The test reliability was obtained through a test-retest method, which was applied on a pilot group of (20) students who were randomly chosen from the population of the study and excluded from the sample. The reliability was computed using Pearson correlation formula. The obtained value was (0.80) which is considered suitable and accepted for the purpose of the study.

Validity of the Facebook program

The content of the program was validated by TEFL and curricula designing specialists. The validating committee consisted of six Ph.D. holders in curricula and instruction, the two of them are specialized in educational technology, and two highly qualified instructors of English and supervisors in the ministry of education in Jordan.

The conventional method is used in the lecture in which the instructor presents new words and uses open pair work involving a pair of students in class participation while the other learners listen. The general procedures for teaching vocabulary items are as follow:

- The instructor puts the new vocabulary items in meaningful sentences and writes them on the board, then reads those sentences and asks the students questions to help them build up answers using such new items.
- The instructor also uses flash-cards for the pictures of the new words and asks the students questions to urge them to build up meaningful sentences using the new words. The instructor uses the difficult words in real situations to make such words familiar to the students' mind.
- Before reading the text, the instructor asks the students to talk about the topics of the text. The instructor uses the title of the text and illustrations and asks those learners to describe a scene in the picture by using familiar words.
- The instructor uses the pre-reading while reading and post-reading questions.
- The instructor sets each student read the whole text silently on his\her own to examine the meaning of the words and aloud reading to check the pronunciation.
- The instructor asks the learners to memorize vocabulary items from pre-determined lists.
- Learners should complete vocabulary workbook exercises, which were discussed only one day each week.

- The instructor uses flash cards, written definitions, blank filling sentences. The learners write sentences for the vocabulary items.
- Learners also have to do several exercises by choosing the correct words to be put into pre-made sentences or writing their own sentences using the weekly vocabulary items.

Design of the study

Participant were divided into two groups the first experimental group, called "the facebook group" and consisted of 20 participants. The second control group consisted of 20 participants. The experimental group was taught through the facebook program, whereas the control group was taught through the conventional method (lecture method). The two groups were given a pretest to ensure that they were comparable. The study consisted of two variables the independent variable (facebook) and the dependent variable (vocabulary items).

Procedures

The researcher implemented the following procedures in conducting her study during the summer semester of the academic year 2011-2012:

- Reviewing the related literature about the roles of using CALL in teaching and learning vocabulary.
- Designing the instruments of the study.
- Establishing the validity and reliability of the instruments.
- The pre-test was administrated to both groups before implementing the strategy.
- Holding a meeting with the participating students to clarify the purpose of the study.
- Before the experimental process was started, a vocabulary acquisition program to be operated on facebook was selected.
- All the details and objectives of the experiment were explained.
- Starting the experiment under investigation in the first semester of the year 2011-2012.
- Keeping in touch with the students. So as to guarantee that they are appliying the treatment correctly.
- The test was administrated as a post-test to both groups after implementing the strategy.
- Analyzing statistically the obtained data to reach conclusion and suggest pedagogical implications and possible recommendations.

Statistical Procedures

The study aimed to investigate the effect of facebook in improving English, on teaching vocabulary. The mean scores, standard deviations and t-test were done to detect any significant differences between the two groups (experimental and control) on the achievement pre-test.

Findings and Discussion of the study

To make sure that there were no statistically significant differences between vocabulary achievement of the experimental group and control group due to the instructional strategies (facebook and conventional), the students were given a pre-test. Table (1) shows the mean scores, standard deviations and t-test for both groups on the achievement vocabulary test.

Table 1: Result of Means, Standard Deviations and T-Test on the Achievement Vocabulary Pre-Test for Both Groups, Experimental and Control.

	Group	N	Mean Score	St. deviation	F-value	T-value	Sig.(2.tailed)
Pre-Test	Experimental	20	13.4000	1.78885	0.168	0.363	0.719
	Control	20	13.6000	1.69830			

It is clear from Table(1) that there were no statistically significant differences at the level (α0.05) between the performance of the two groups (experimental and control) on the vocabulary achievement pre-test where t-value was (0.363) in a references degree of (0.719). This shows that there were no differences in the pre-test for both groups.

To answer the question of the study: Are there any statistically significant differences between the students' achievement in vocabulary attributed to the instructional method of teaching (facebook and traditional)?

The mean scores, standard deviations and t-test were done for two independent samples, both groups: experimental and control. Table (2) shows that.

Table 2: Result of Mean Scores, Standard Deviations and T-Test for Both Groups Experimental and Control on the Vocabulary Achievement Post-Test.

Post-Test	Group	N	Mean Score	St. deviation	F-value	T-value	Sig.(2.tailed)
	Experimental	20	16.3500	1.18210	1.467	8.459	0.000
	Control	20	12.7000	1.52523			

It is evident from Table (2) that there were statistically significant differences between the performance of both groups the experimental and control on the achievement vocabulary post-test. The mean score of the experimental group was (16.35) in a standard deviation of (1.1821); whereas the mean score of the control group was (12.7) in a standard deviation of (1.52523). The t-value was (8.459) in a statistical reference of (0.000). Those differences are in favor of the facebook instructional strategy, for the experimental group. This means that the facebook strategy in teaching vocabulary is more effective than the conventional (current) method.

Conclusion

The studies of vocabulary teaching and learning problems and needs have been neglected for a long time. This neglected area has been reported by many researchers. Wilkins (1972) emphasized that in order to use language correctly you need mastery of grammar and vocabulary. "We could not accept that vocabulary word be initially less important that grammar. The fact is that without grammar very little can be conveyed, without vocabulary nothing can be conveyed". (Wilkins, 1972:111).

The intent of this paper was to investigate teaching vocabulary through facebook. It has been argued that CALL systems should be used as instructional tool for vocabulary teaching it also has been argued that this type of learning is beneficial for second language learners, that it considerably increases learners' confidence. The reasons could be found in frequency of exposure due to a larger input, students' control of learning. The study showed that EFL students significantly improved in vocabulary performance and confidence after being exposed to call vocabulary case for students that had similar teacher fronted instruction. The participants in the study favored this type of vocabulary instruction and supported students' control of learning immediate feedback provided by the system. They were really motivated to challenge themselves to improve their English by building up good sentences using the right words. Moreover, the participant began commenting and sending some ideas to their instructor on facebook.

The findings of the study are in congruent with Brown (2008) and Baki (2010) who studied the effectiveness of using Mobile strategy on vocabulary and showed that there were significant differences in increasing vocabulary abiliyu in favor of the experimental group. The lessons delivered via facebook are more appealing to students. Working on the internet and dealing with each other through facebook anytime and anywhere is trendy among all people, in particular learners. Hence, the facebook can be a more effective medium for self-learning English vocabulary than the paper material. This study is also congruent with the British Council vocabulary App that improves the learners' English skills. The students also made improvement in their achievement test and in their performance as a whole. The findings of the current study are in harmony with the theoretical and practical studies previously mentioned.

Based on findings of the study, the researcher came up with the following recommendations:

- Adopting the facebook strategy by the instructions at universities in teaching English skills and components for the effectiveness of it in improving students' academic achievement.
- Conducting similar studies on other language aspects and skills so that the generalization could become more valid and widely applicable.

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Value of Blended Learning in Supporting Leadership Development Programs

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Abstract: The future is now! Blended learning is evident in professional development training for educational leadership development programs today. With the limitation of funding and time constraints, more professional development training organizations are infusing blended learning as another educational tool to use during the leadership development training process. The leadership development process continues after face-to-face training with the support of blending learning technology. Blended learning has many definitions, but the most common meaning for blended learning is used to show a combined effort with face-to-face instruction to meet the needs of participants in the instructional environment. Leadership development programs must include three dimensions for participants such as awareness of concepts, definition and procedures/policy, understanding of measurable skills and knowledge and the application of such skills and knowledge. This study will discuss research related blended learning and its benefits, an approach to blended learning, vision and mission, professional development, collaborative leadership practices and learning communities, monitoring and evaluating program quality.

Keywords*:* blended learning, facilitators, professional development, participants, learning communities

Introduction

Leadership development training programs for school leaders are utilizing software programs to improve the delivery of instruction and assessment of participants' work. Program participants are able to self-check their work before submission to program facilitators. Therefore, needed programs and technology tools are a must to have today in leadership development training programs. It is important for facilitators of the training program at the university to have the support from the leadership team at the university. The leadership team at various levels at the university should make sure that the infrastructure is in place to accommodate or support blended learning programs. It is important too, to have at the maintenance stage blended learning teaching programs that are strong. Blended learning programs should be mapped out properly strategically, updated and improvements should be clearly defined by facilitators in all planning and implementation stages and evaluation of new or improved technology for blended learning program activities. Blended learning programs should be updated only when it is necessary in meeting the current needs of participants. Regardless of the instructional methods for training, it is important to have quality course content. Participants in leadership development training should give feedback at the end of each session in order for facilitators to improve program quality. Regardless of training experiences for participant feedback is important (Garrison & Vaughan, 2008). The leadership team at the university should support quality blended learning programs by providing needed resources to facilitators guiding the program to ensure that participants are receiving quality services.

What is blended learning and Its Benefits?

There is not any one definition for blended learning. However, the most common definition is using a percentage of online learning combined with face-to-face instructional services is a common definition. The benefits of blended learning are as follows: learning can be used easily for over long periods of time with limited instructional facilitation, learning gives times for participants to reflect on their own practices immediately and learning offers multiple contexts of practices globally (Graham, 2006)**.**

Blended learning is a practical framework that can be used to communicate a broad range of effective approaches to learning, teaching and leading. Blended learning uses various contemporary technologies to enhance learning, and the development of flexible approaches to course design and instructional methods to enhance participants' engagement (Queensland University of Technology, 2011)

An Approach for Blended Learning

From the literature review there is little information to suggest that there is a formal systematic approach to blending learning. The leadership development facilitators should seek common ways of using blending learning tools to engage participants in various training sessions by frequent engagement individually or as a group as follows:

1. Provide blended learning training that is relevant for program participants.

2. Use several technology tools to engage participants in a number of learning activities related to leadership.

3. Keep participants focused on immediate tasks and exercises during the training session.

4. Seek input/feedback from participants based on their views about blended learning practices used during the leadership development training experience.

5. Monitor how well participants are performing using blended learning based on tasks completion in a timely manner.

Some common tools used in blended learning training sessions are power point, videos and interactive whiteboards; virtual communication tools such as discussion boards, chat rooms and podcasting; social networking software such as blogs; e-learning systems and group collaborative software, mobile and face book learning (Gillani & Relan, 2007).

Vision and Mission

The participants in the leadership development program need to gain skills in writing a collaborative vision based on where the organization wants to go. Usually the vision statement's origin is based on values in essence what drives the organization toward its mission. The mission statement tells participants in the training program what the organization intends to do to get to where the organization wishes to go to achieve its vision. The participants in the leadership development program need to know how to articulate a typical vision and mission statement to a larger audience during the training experience (Littlejohn & Pegler, 2007).

Professional Development Activities

Relevant professional development is a must for participants in the leadership development training program and the upgrading of skills and knowledge in order for these participants to keep up with the latest trends in online learning or blended learning at the university. The leadership team at the university should continue to update facilitators, faculty and students' skills and knowledge regarding new and improved technologies through blended learning. Therefore, it is important for university leadership team to communicate the online policy for new or improved programs; schedule differentiated professional development based on participants' needs, offer participants incentives to participate in program training. The facilitators of the leadership development program should also offer mentoring services to participants in order to show participants how to use the variety of technology management tools to enhance skills and knowledge in leadership (Krause, 2007). Research indicates educational district leaders are responsible for many tasks in school districts and at the university and these individuals must

have knowledge and know the expectations within the job description. District school leaders for example must show competence (*without this author altering words*) by:

1. Developing a broadly collaborative vision and mission to guide district decisions and to support change at the school level and knowledge of how to develop trust, that is a requisite variable in shared visioning, for school improvement by using data technology evidence to inform district decisions, and knowledge of the importance of professional development
2. Developing school culture and climate is critically important; therefore, the district leaders must apply knowledge of how to create a culture of trust, learning, and high expectations by building effective learning communities by the support of blended learning.
3. Knowing curriculum planning and how to develop the curriculum to motivate students in learning environments using various technology tools to enhance instructional services.
4. Infusing technology into leadership practices has become a recognized domain of practical knowledge essential to effective instructional leadership and that is why blended learning is so important.
5. Using best practices regarding management of a district organization, operations, and resources for a safe, efficient, and effective learning environment using blended learning.
6. Knowing how to craft systemic management and operations, organize education improvement efforts, coordinate accountability systems using technology, and create policy coherence that influences school outcomes and student learning.
7. Knowing the importance of creating systems that focus on school personnel and other
Needed resources related to common goals and creating processes by using technology that facilitates effective teaching, learning and leading, because there should be ways to encourage teachers to be leaders.
8. Supporting ways to promote the success of every student by ensuring the management of the district's organization, operation, and resources through monitoring and evaluating district management and operational systems by using technology systems.
9. Using human, fiscal, and technological resources within the district; promoting district-level policies and procedures that protect the welfare and safety of students and staff across the district.
10. Training others as leaders in the capacity for distributed leadership and ensuring that district time focuses on high-quality instruction and student learning by the use of blended learning support tools.
11. Making it a point to collaborate with faculty, families and caregivers, and district community partners; understanding of diverse community interests and needs; and best practices for mobilizing district community resources by the use of technology support systems.
12. Knowing how to collect and analyze data information pertinent to the district's educational environment, and using appropriate strategies and data technology.
13. Supporting the practices of inclusive leadership, and leadership for diversity.
14. Providing clinical experiences with the support of blended learning for all individuals or participants who are seeking certification for district leadership positions from the leadership development training programs (NPBEA, 2011).

Observations by educational experts affirm that an effective district leader must be reflective about leadership practices in order to improve student learning (Knapp, Copeland & Talbert, 2003). Using typical standards articulated by NCATE can guide the success of leadership development training programs, because these standards can give program facilitators a consistent way to plan, organize, implement, monitor and evaluate program effectiveness.

Collaborative Leadership Practices and Learning Communities

A continuation of learning must take place for participants in the leadership development training program. Therefore, collaborative leadership practices and learning communities are all assets to the professional growth of participants in the leadership development training program.

The collaborative practice is encouraged so that participants in the leadership development training program may have mastery of skills in the sharing of power, decision-making and valuable resources. The collaborative leadership practice helps to broaden the network of resources for participants during and after the training experience. The success of collaborative practices creates positive relationships through trust, mutual respect,

broader understanding of diversity and improves communication. Collaborative leadership practices offer a chance for participants in training to be full supporters for their areas of interest within the organization and within their own community (Garrison & Vaughan, 2008).

Collaborative learning for the participants in the leadership development training program are in a unique position to establish a viable learning community by using blended learning or e-learning opportunities. Facilitators of the blended learning community can create opportunities for participants to connect to various community technologies to extend the face-to-face into blended learning solutions that include pre and post time for online community building as a practice for participants long after the formal training experience in the leadership development program has ended (Chris lip, 2001).

The benefits of a collaborative electronic learning community for participants are many. For example blended learning communities are able to:

1. Extend interactive learning opportunities informally for all participants
2. Seek unlimited ways to receive and share knowledge and skills with others
3. Share relevant and practical ways to address problems and issues in education and business at the district or building level
4. Allow small and large groups of individuals to work on organizational projects through the use of technology without the expense of travel or hotel (Educes, 2009).

With electronic learning communities, online conferences could be help often for professional development practices. For conference activities, participants may view relevant videos and power point presentations in narrative format that encourage group interaction. Online and blended learning conferences give the participants the opportunity to ask questions, examine resources and network with other participants during the conference. After the conference has ended, if information was saved electronically, participants who wish could review selected presentations for more clarity.

There are many tools available for blended learning or online learning as follows:

1. Asynchronous Tools include discussion boards, calendar, group announcements, messaging or email, decision support tools, surveys and polls and website links.
2. Synchronous Tools include audio conferencing, chat, instant messaging, video conferencing, web conferencing and white boarding.
3. Content Integration includes narrated slideshows, interactive activities, streaming audio and video and web books.
4. Document Management includes document collaboration, permission based access, resource library and version tracking and control (Kaplan, 2002).

In order to have a clear understanding for tool use by participants, the facilitators must ensure that all participants know how to use the electronic tools with maximum proficiency during the leadership development training program.

Monitoring and Evaluating Program Quality

In order to have high quality assurance for all leadership development programs, it is essential that there is a monitoring system in place. Facilitators are responsible for the overall monitoring of the leadership development training program. The facilitators must also encourage participants to self-monitor their own performance too. Evaluation or assessment of the program can be time consuming; however, facilitators must have effective management skill and be able to monitor each assignment to see if certain requirements have met weekly and provide written feedback to participants through document collaboration (Quality Matters, 2008).

Conclusion

From all research, there is added-value to using blended learning in leadership development programs, because of the broad range of integrated and use of electronic tools such as audio, video and web conferencing opportunities and others. Blended learning has many advantages too, because it is cost effective, provides an opportunity for broader audience of diverse participants, many interactive capabilities and provides broader means of communication within learning communities on a global scale.

Bio of Author

Dr. Ann Toler Hilliard is an assistant professor who teaches in the Department of Educational Studies and Leadership at Bowie State University, U.S.A. As an assistant professor, Dr. Hilliard coordinates activities that provide professional experiences for those individuals who are seeking the opportunity to serve as a school administrator. She has held leadership positions at the building level as a principal, college program director, and district level as an academic achievement specialist in Maryland and in the District of Columbia and an international consultant in Europe and Asia. Her experiences as a leader in the area of administration extend from elementary school through graduate school. Dr. Hilliard's research interests include: Leadership Trends, Issues and Data Use, Relationship Building and Teaching, Assessment Standards for University Improvement, and Educators as Entrepreneurs. Dr. Hilliard earned a Doctor of Education degree, George Washington University; Master's of Science degree, The Johns Hopkins University; Master's of Arts and Teaching degree, Trinity University – Washington; B.S. degree, Elizabeth City State University; and earned Consulting Certificate from Harvard University and holds an Advanced Professional Certificate, Maryland State Department of Education, U.S.A.

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