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SPOTLIGHT ON REFUGEE SCIENTISTS IN AUSTRIA

CONSTANTIN SCHERER (ED.)

ZENTRUM FÜR SOZIALE INNOVATION

Respekt.net
CROWDFUNDING FÜR EINE BESSERE GESELLSCHAFT

CONTENT

Figure 1: Project managers Elke Dall and Constantin Scherer collecting donations on the occasion of ZSI's 25th anniversary celebration at the Vienna Town Hall, Nov. 2015

PREFACE

Since the summer of 2014, an unprecedented number of people from Middle Eastern and African countries—many of them fleeing war, persecution, and unrelenting poverty—have been crossing borders into and within Europe. Austria was faced with a hitherto unprecedented situation when tens of thousands of refugees arrived in our country after weeks and months of flight. Despite Austria's long history of welcoming refugees, the 2015 refugee surge was unprecedented in size and origin, and thus posed many challenges to local and national governments and to the Austrian society as a whole. Anxiety was prevalent in large parts of the population, while at the same time many people spontaneously engaged in support for the refugees. With the number of migrants arriving remaining at a high level for quite some time, a multitude of initiatives and activities were established in 2015 in order to professionalise the support available to refugees.

Many individuals at ZSI - Centre for Social Innovation - felt the necessity to get active and started developing ideas about how to make use of their individual abilities and the organisation's experience in the field of migration, inequality, labour market policy, and the Austrian research environment. These efforts resulted in a concept for a seminar programme, named "Science in Asylum" (SiA), which aimed to counteract the often inevitable

"de-qualification" of highly skilled refugees and contributing to the integration of this group into the Austrian labour market.

The highly participative project design, targeting not only refugees but also volunteers from scientific communities, allowed the project to launch soon after a short development phase. Without this support, and the sponsorship of numerous donors, the realisation of this project would not have been possible! The entire seminar course was held by local experts from scientific institutions and NGOs on a voluntary basis; scientific peers volunteered as peer reviewers; used laptops were donated for the participants to work on; and 7400€ were collected by means of crowdfunding.

Therefore, the Centre for Social Innovation wants to thank everyone who supported Science in Asylum and hand out this booklet to give an overview of the project's many activities and results.

PROJECT DESCRIPTION

Problem Statement

Asylum seekers as well as those granted asylum have great difficulties to access the Austrian labour market. This also holds true in the case of highly educated refugees, as scientists and academics. The chances to find adequate jobs in their respective fields are particularly low in Austria; Austria ranks very poorly among other OECD-countries concerning the utilization of foreign qualifications.

Thus, the Science in Asylum (SiA) initiative targets educated and experienced scientists and academics among refugees. Instead of pushing them into lower qualified jobs, SiA builds on the capacities and skills available, motivating and training refugees not only to look for adequate jobs, but also to enable them to create own businesses in science and research. To date, the target group had not been addressed by a structured programme, neither in Austria nor in Europe.

The ultimate goal is to gradually include academic refugees in the Austrian and European systems of science, research and innovation, paving the way to maintaining existing competencies, acquirement of new knowledge and appropriate labour market integration. Furthermore, through contacts with media and communication activities, it is possible to show to the broader public that refugees are able to contribute to society and to show a positive image of immigration.

Figure 2: The SiA participants receiving a certificate for their participation

Project design and implementation

In the fall of 2015, the Centre for Social Innovation communicated the initiative to refugees through its social media channels and through organisations directly in contact with the target group, such as counselling centres (e.g. "AST" contact points for persons with qualifications acquired abroad), basic care centres (Caritas Vienna, Red Cross) and universities. Both persons entitled to asylum as well as asylum seekers could participate in the programme. Thereby asylum seekers were given the opportunity to do something useful while waiting for the official outcome of their asylum procedures, during which they are not allowed to work.

Refugees were able to apply online or via Email with their CV. About half of the applicants were invited and interviewed at the orientation seminar. Subsequently a group of 25 participants was then accepted to participate in the programme, which consisted of a series of ten seminars that took place between February

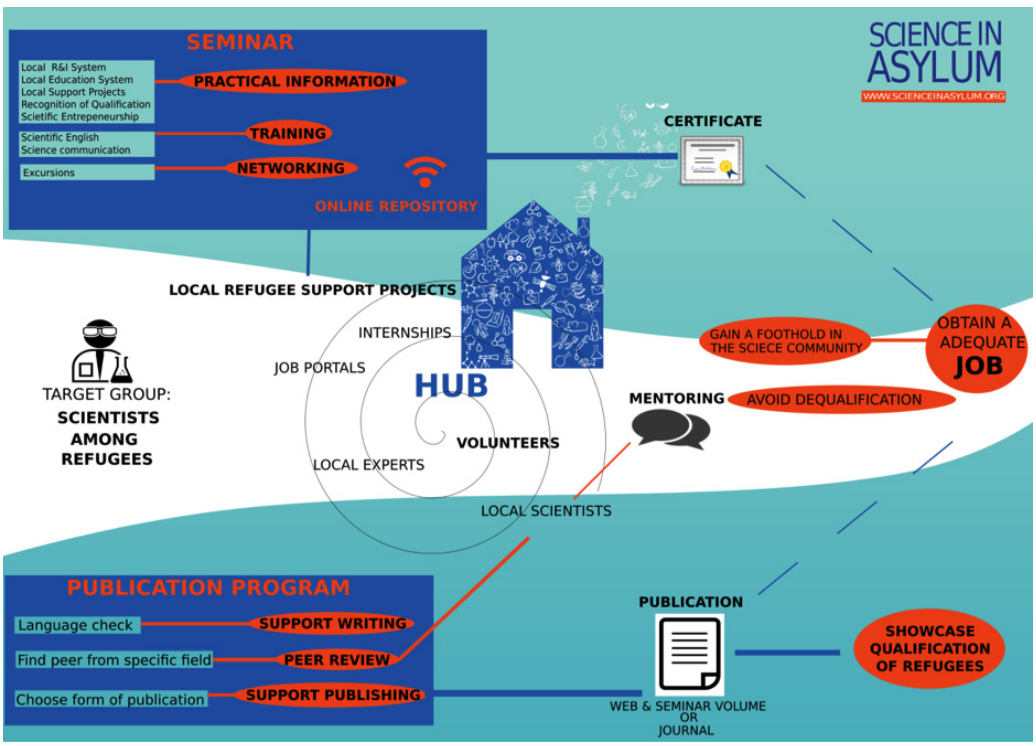

Figure 3: Illustration of the project design

and June 2016 in Vienna. The seminars covered both organisational and scientific issues like: recognition of academic qualification, information on the Austrian and European research systems, English training, scientific writing, how to continue tertiary education in Austria, etc. All seminars were documented in audio and video and were made accessible to the participants and other interested refugees via an e-learning repository.

The programme also supported the participants to publish a scientific paper in the publication at hand, and on the project website (www.scienceinasylum.org) in order to showcase their competencies and to enable contacts with Austrian peers in the course of the reviewing process (see page 23).

Science in Asylum was characterized by a highly participatory project design. Not only has the project been partly financed by the Austrian civil society itself by means of crowd funding; the project also integrated a variety of volunteers in the creation and implementation of the course: as lecturer, as reviewer, or as mentor. ZSI acted as information hub, pulling together numerous experts from first class institutions in the areas of knowledge required, cooperating with other refugee support initiatives (MORE, refugees work, Solidee and others) and connecting the participants to journalists, organisations offering academic internships, or making them aware of possibilities to present themselves to a public audience.

DOCUMENTATION OF THE SEMINAR

Orientation Seminar
Date: January 27, 2016
Venue: ZSI

Description:

The kick-off event served mainly as orientation seminar; both for the participants and the course organisers. The concept of the project and the content were introduced so the participants could decide whether or not they could benefit from this course. Furthermore, the organisers could get to know the needs and motivations of the participants, in order to adjust the seminar content. After a welcome round with coffee and cake, guided face to face interviews were conducted by volunteering ZSI members in which the refugees were able to talk about their academic background and their professional situation.

The E-learning video consists of a welcoming speech and a detailed description of the project concept. http://bit.ly/2jEBza3

Figure 4: Group picture at the Orientation Seminar

THE AUSTRIAN RESEARCH AND INNOVATION SYSTEM

Date: February 2, 2016
Venue: Department of Development Studies, University of Vienna

Description:

The first content related seminar of the course started off in a playful and interactive way; with a quiz on research and innovation hosted by Dr. Klaus Schuch, CEO of ZSI. While this format triggered an active discussion about the Austrian research and innovation system, the following lecture, held by Mag. Martina Hartl from the Ministry of Science, Research and Economy, offered precise information about research, universities, higher education, research institutions, umbrella organisations, funding agencies and service points in Austria.

Lecturers:

Dr. Klaus SCHUCH, scientific director of ZSI – Centre for Social Innovation and senior scientist. Expert on techno-globalisation, research and innovation policies, and evaluation in research and technology policy.

Mag. Martina HARTL, sociologist, currently expert at the Office of Science and Technology Austria in Washington D.C. She worked at the Ministry of Science, Research and Economy and at the department for international research cooperation at the European Commission.
Link to E-learning video: http://bit.ly/2jYPsAL

THE EUROPEAN RESEARCH SYSTEM

Date: February 24, 2016
Venue: Department of Development Studies, University of Vienna

Description:

Elke Dall, who originally conceived the idea for the Science in Asylum programme, introduced the European research system in a short lecture,

explaining funding programmes like Horizon 2020, as well as its main pillars and priorities. Furthermore, the participants were instructed on how to write a résumé according to the Europass standard for CVs and informed about two European initiatives: the Science4refugees program (EU-job portal) and the Marie Skłodowska-Curie actions, supporting researchers at all stages of their careers, irrespective of nationality.

Lecturer:

> **Mag. Elke DALL**, head of the unit 'Research Policy and Development' at ZSI. Expert on networked organisations, quantitative and qualitative evaluation and in the field of S&T and innovation policy analysis. She initiated the Science in Asylum project.

Link to E-learning video: http://bit.ly/2kAJNny

EXCURSION TO THE VIENNA BIOCENTER

Date: March 9, 2016
Venue: Vienna Biocenter, Max Perutz Laboratories

Description:

The Max F. Perutz Laboratories (MFPL) are a centre established by the University of Vienna and the Medical University of Vienna to provide an environment for excellent, internationally recognized research and education in the field of Molecular Biology. Together with Renée Schroeder, Science in Asylum invited refugee scientists to MFPL. Approximately 30 people – half of them refugees and half of them MFPL scientists – joined the get-together and exchanged their experiences. Each refugee introduced her- or himself and gave a brief overview of their background. One much discussed issue revolved around the disadvantageous situation that someone not holding a Master degree due to differences between the Syrian and the Austrian educational system cannot apply for PhD positions. They all emphasized that they want to continue the carriers they have begun and that they are struggling due to a myriad of barriers. After the introductions the SiA participants could established first contacts with their professional colleagues and enjoyed a guided tour by their peers through the institute, getting an insight into the state of research

on molecular biology in Vienna. The great interest and cooperation of the many researchers and collaborators of MFPL was remarkable and extremely motivating for the "Science in Asylum" participants.

Lecturers:

Prof. Dr. Renee SCHROEDER, Professor of biochemistry. Her main research topic is the role of ribonucleic acids (RNA) during the origin of life and its present functions. She is the recipient of many research awards, including the Wittgenstein and the Eduard Buchner Prize.

Dr. Andrea MAJOROS, Junior scientist in vaccine R&D at ORIGIMM Biotechnology, organized the event and gave a guided tour through the laboratories of the MFPL.

Figure 5 and 6: Scientists at MFPL meet the SiA participants and Exursions at MFPL

SCIENTIFIC WRITING & COMMUNICATION

Date: March 23, 2016
Venue: Department of Education, University of Vienna

Description:

Although scientific writing and communication cannot be addressed sufficiently in a single lecture, it has been included in the seminar to emphasise the importance of excellent communication skills in science, and advise the refugees on how to improve their English. The seminar covered both oral and written communication in English language, and started with an exercise in which the participants were asked to introduce themselves in only two minutes. This simulated a situation, in which they would meet somebody important for their professional career, and must communicate the most important information about themselves efficiently and fluently. This was followed by a lecture on scientific writing and publishing including instructions on how to produce high quality text.

Lecturers

Tim SKERN, Ph.D, studied biochemistry, designs and develops courses on virology and scientific English, lectures Scientific English to students (almost exclusively non-native speakers), supervises master and graduate students, more than 60 peer-reviewed publications.

Dr. Josef HOCHGERNER, founder and senior researcher at the ZSI - Centre for Social Innovation. In research, teaching and practice he focuses on innovation and the particularities of social innovations; social use of knowledge and technology; working, learning and living in the global information society.

RECOGNITION OF QUALIFICATION IN AUSTRIA

Date: April 6, 2016
Venue: Department of Education, University of Vienna

Description:

In order make use of educational certificates in the job market of another county, the certificates have to be validated and recognised by the Ministry of the country of immigration. Therefore this procedure is essential for highly qualified immigrants in order to obtain an adequate job. However, the procedure is not always easy to comprehend and can pose another barrier to successful integration into the job market and the society. Thus, representatives from the two most relevant Austrian institutions were invited to provide valuable information and guidance: Dr. Heinz Kasparovsky, head of ENIC NARIC (National Academic Recognition Information Center) and Darjusch Rezazadeh Ardebili from AST (contact points for persons with qualifications acquired abroad).

Lecturers:

Dr. Heinz KASPAROVSKY, head of ENIC NARIC department at the Ministry of Science, Research and Economy. Author of publications in the area of higher education law. Lecturer for European education systems at Burgenland University of Applied Sciences.

Darjusch REZAZADEH ARDEBILI, coordinator of AST, studied social work at the FH Campus Vienna. Worked as a counsellor for recognition issues at the „Beratungszentrum für Migranten und Migrantinnen", PERSPEKTIVE.

Link to E-learning Video: http://bit.ly/2jYASct

Figure 7: Darjusch Rezazadeh Ardebili and Dr. Heinz Kas parovsky

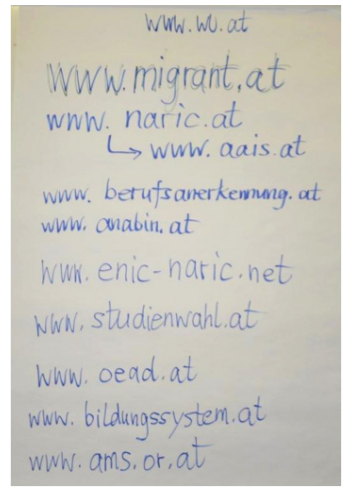

Figure 8: Links providing information on education and recognition in Austria

SUPPORT FROM VIENNESE INITIATIVES

Date: April 20, 2016
Venue: Department of Education, University of Vienna

Description:

The following Viennese initiatives and projects offering support to refugees were invited to present their projects and their support measures: the MORE programme (giving refugees access to university courses), Refugees work (Platform for jobs, internships and voluntary work), Refugee stories (project producing web interviews with refugees), Solidee (platform supporting a variety of projects) and an initiative of the FWF (Austrian Science Fund) to integrate refugees in research projects.

Lecturers:

Nadine Shovakar (MORE programme / Uniko)
Domink Beron (refugeeswork)
Gertraud Kremsner, Michelle Proyer (Solidee)
Raoul Kopacka (refugee stories)
Mikael Luciak (Universität Wien)

Link to E-learning video: http://bit.ly/2k9c4k6

SCIENTIFIC ENTREPRENEURSHIP

Date: May 5, 2016
Venue: ZSI

Description:

The course offered a short theoretical input on legal framework conditions in Austria with regard to self-employment, how to found a business, where to obtain support (legal counselling, financial support, etc.). Following this, the participants engaged in small groups in an interactive activity on business planning.

Lecturer:

Sara ALKAN, senior manager and authorised representative at AUSTIN BFP, a major Austrian consulting company. The focus of her activities lies in the area of business development, project management as well as financing and funding especially through national and EU R&D programmes. Sara Alkan worked in Syria as Expatriate Delegate in 2008.

Link to E-learning video: http://bit.ly/2jbM4pb

Figure 9: Interactive activity on creating a business plan

ONLINE STUDYING REFUGEES / SCIENCE AS A VOCATIONALFIELD

Date: May 18, 2016
Venue: ZSI

Description:

This course was divided in two parts, covering two very different topics: Tutor Constantin Scherer presented possibilities to take part in online education projects aimed at refugee students while ZSI founder Josef Hochgerner taught about "science as a vocational field", answering many questions of the young researchers aiming at a career in Science.

Lecturers:

> **Constantin SCHERER, M.A**., researcher and project manager at ZSI, tutor of the seminar and organiser of Science in Asylum project. He studied Urban Studies and Sociology at the University of Vienna and at the Hunter College, New York.
>
> **Dr. Josef HOCHGERNER,** founder and senior researcher at the ZSI - Centre for Social Innovation. In research, teaching and practice he focuses on innovation and the particularities of social innovations; social use of knowledge and technology; working, learning and living in the global information society.

Link to E-learning video: http://bit.ly/2kAJNEq

CLOSING EVENT/ FEEDBACK

Date: June 1, 2016
Venue: ZSI

Description:

The final course was a social event, which offered the possibility to celebrate

together and reflect on the course. After participants gave feedback via a short questionnaire and engaged in a collective discussion, they were handed out their course certificates in a festive manner.

Figure 10: Tutor Constantin Scherer handing out the course certificates

PARTICIPANTS

FIRST NAME	LAST NAME	FIELD	COUNTRY OF ORIGIN
Ferdous	AKTHAR	Environmental Studies	Bangladesh
Alaqabi	ALI	Chemistry	Irak
Faraj	ALLAH ALJABAWI	Pharmacy	Jordan
Hamdi	ALSAFFOURI	Genetics	Syria
Mouhannad	ALSALEM	Agriculture Engineering	Syria
Alharith	BASIL HAMMOOD	Pharmacy	Irak
Mohammed	DAWOOD	Pharmacy	Syria
Rana	ELIAS	Agriculture	Syria
Tetiana	GOIDENKO	Land development	Ukraine
Alketa	MAKSUTI	Physics	Albania
Nizar Safwat	MUTWALI	Medicine	Sudan
Tamim	NASHED	Business Administration	Syria
Saaeed Aljazaari	NEAMA	Agricultural engineering	Irak
Thaer	OHDE	Telecommunication engineer	Syria
Mohammad	QAYOOM	Business administration	Afghanistan
Farhan	RAZA	Social and Cultural Anthropology	Pakistan
Daryabi Mohammad	SHAPOOR	Agriculture	Afghanistan
Gaghfer	SHWIHNA	Pharmacy	Syria
Muhammad	YACOB	Medicin / Neurology	Syria

TESTIMONIALS

"Science in Asylum is a very important project for refugees, who are trying to build up a new academic or professional career in Austria. The project provides them with the required information, which enables them to recognise the next steps. One of the most important things for me was the possibility to network with other professionals and academics that acknowledge the refugees' previous experiences and encourage them to go forward. Moreover, I benefited directly from Science in Asylum Project after I got in touch with MORE Initiative. Via this new network I was able to attend a summer School in Brussels about Asylum and International Law, and this has opened new opportunities for me."

Tamim Nashed

After a year had passed since my arrival as a refugee in Austria, I almost forgot that I am a researcher. Participating in the "Science in Asylum" programme has helped me to "put my feet on the road again". Through the program, I met many refugee scholars, received a lot of information about scientific research as a profession in Austria, the recognition and equivalence of diplomas, as well as the labour market, scientific bodies and some organisations helping scientist refugees. Most importantly, through the programme we visited the biotechnology department at the Vienna Bio centre, which gave me the opportunity to work in one of the institutes for three months. The programme was very useful and informative. The staff of the project was treating us as collaborators, dedicated to help us as much as possible. For that I would like to thank them for their efforts".

Hamdi Alsaffouri

I want to thank all the organisers of the project «Science in Asylum». The project has opened a lot for me: I learned about my rights and opportunities and met with many people. Thanks to the project I was invited to Austrian Radio «Ö1» for an interview and was given the opportunity to participate in the "Kinder Uni 2016" as a teacher. The programme made me realise that my life is not over, it felt like a big breath of air that gave me hope for the future.

Tetiana Goidenko

Participating in Science in Asylum gave me the opportunity to meet asylum-seekers with similar interests and to learn about the Academic system in Austria and EU. The organizers were very friendly and I appreciate what they have done".

Saaeed Aljazaari

I was impressed by the fluency in English of the attendees and their scientific backgrounds. It is important for any one moving to another country to appreciate how professional interviews are carried out. I hope that the exercise we did of speaking for a few minutes will help the attendees to obtain a professional foothold in Austria or wherever they are eventually able to settle down.
Tim Skern (lecturer)

Science in Asylum is a social innovation. It did not change the society but it contributed to changing social practices beyond the dominant refugee-related security discourse in Austria. As scientific director of ZSI I sincerely like to thank all those who helped us to put this initiative into practice, the many donors from civil society and academia, the volunteers who shaped the implementation of Science in Asylum with their time and skills, the dedicated lecturers in the different seminars, the committed paper supervisors and last but not least Elke Dall, who pushed the idea to implementation and Constantin Scherer, who implemented it with the necessary sensitiveness in an extraordinary high degree of profession. I finally wish all our research fellows who took refuge in Austria all the best for their future. You are always welcomed!
Klaus Schuch (lecturer)

TEAM

Mag. Elke DALL, head of the unit on 'Research Policy and Development', studied Sociology/ Communication and Media Sciences at the University of Vienna. She has a background in research on networked organisations, quantitative and qualitative evaluation and in the field of S&T and innovation policy analysis.

Constantin SCHERER, M.A. is researcher and project manager. He studied Urban Studies and Sociology at the University of Vienna and at the Hunter College, New York. Until 2014 he worked as cultural manager at the "Aktionsradius Wien" organising events related to urban planning and local history. Since 2015 he is organising the "Science in Asylum"- programme.

Carmen SILLER holds a university degree in Applied Linguistics and Cultural Studies (English and Spanish). Since 2001, she has been managing a number of EU-funded projects in Framework Programmes 5, 6 and 7 with a focus on S&T dialogue and building sustainable networks. Her experience includes regular

trainings to different target groups.

Rida BERREZZOUG, cameraman, photographer and editor of the Science in Asylum E-learning videos. He studied IT management and computer science in Morocco. Mr. Berrezzough arrived in Vienna as a refugee.

Domenic J. DiZio, American Student of International Relations. In the course of his internship at the center for social innovation Mr. DiZio supported the participants by proof reading their scientific papers in regards to English writing.

DI (FH). Elisabeth HAUER, BA, working in the field of public relations for Viennese youth centres, studied pedagogy and media with a focus on video, volunteered as video editor in the Science in Asylum project.

MEDIA COVERAGE

APA Dossier: (27. Oktober 2016) – „Flüchtlingsinitativen: Wie sich Hochschulen und Wissenschaft engagieren"

Die Presse: Printversion (8. Oktober 2016) – „Im Labor sein – das ist mein Leben (Sonja Burger)

Orf.at SCIENCE: (19. Mai 2016) – Serie "Scientists Welcome?"- "I hope I find a place at BOKU" (Elke Ziegler)

Ö1: (19. Mai 2016) – das Ö1 Mittagsjournal berichtet über Tetiana Goidenko
derStandard.at: (31. März 2016) - "Flüchtlinge in der Warteschleife" (Heidi Weinhäupl)

Orf.at SCIENCE: (23. März 2016) – Serie "Scientists Welcome?"- "I find my way by learning Deutsch"

Ö1: (23. März 2016) - Wissen Aktuell berichtete über Hamdi al-Saffouri
derStandard.at: (18. November 2015) - "Hauptsache, etwas Neues ist nicht genug" (Julia Grillmayr)

APA Science: (18. November 2015) – „Science in Asylum": ZSI unterstützt geflüchtete Wissenschaftler

Tiroler Tageszeitung online: (18. November 2015) – „Science in Asylum": ZSI unterstützt geflüchtete Wissenschaftler

SCIENTIFIC PAPERS OF PARTICIPANTS

Two basic aims of the Science in Asylum project were to enable highly educated refugees to showcase their competencies and to develop contacts with Austrian peers. One method, developed to achieve both of these aims, was to support the participants in writing and publishing a scientific paper. In the course of the seminar, the participants were given the opportunity to hand in a short academic paper, illustrating their previous or current academic work. The SiA team then searched for Austrian scientists from the author's scientific fields, and asked them to review the paper on a voluntary basis. Their feedback and advice communicated via email or face to face, enabled the participants to improve their paper technically while at the same time the participants improved their writing through this exercise. In some cases the local scientists also gave advice to the refugees concerning further relevant contacts, projects, job information, etc. Three of the papers written and reviewed in the course of the seminar are published in this booklet.

HAMDI ALSAFFOURI Ph.D

Hamdi Alsaffouri

I grew up in a small village called Nafa'ah, close to the city Dar`a, in the south of Syria. After studying agricultural science (BSc) at Damascus University I accepted a job at the plant breeding department of the Dar`a research centre (GCSAR) for three years. Then I moved to Egypt to do a Master (2005) and Ph.D. at the Ain Shams University (Faculty of Agriculture, Genetics) in Cairo. I was able to return to Syria after accepting a job in Cotton Research Administration in Aleppo. Before coming to Vienna, I was the head of the Plant Biotechnology Department, General Commission for Agricultural Scientific Researches (GCSAR) in Syria and worked on many project related to crops; especially wheat, barley and cotton. When I visited Vienna in July 2014 in order to participate in a training course at the IAEA (International Atomic Energy Agency) I decided to stay and not to return, because life became very dangerous in Syria due to the war.

Since May 2016 I attended a 3-month voluntary internship at BFW at the Department of Forest Genetics. I have a good command of English and recently finished a B1 course in the German language. My mother language is

Arabic. I am married and have five children (3 sons, 2 daughters). I like sports a lot, especially football and swimming. I believe in the proverb "Hope is not a dream but a way of making dreams become reality". I am sure that I will find my way in Austria and work again in research, because I have not lost my hope. It is my dream to do something that benefits all humanity; the preservation of the environment and the biodiversity for future generations. I hope that I can do that!!!!

Peer Reviewer:

Bradley Till Ph.D, molecular biologist and genome scientist with over 15 years of experience in developing and running high-throughput mutation discovery assays and services. Currently working at the International Atomic Energy Agency.

MOLECULAR GENETIC STUDY FOR EARLINESS TRAIT IN COTTON

Alsaffouri Hamdi [1] , M. Rashed [2], A. Atta [2], and M. Ahamed [3]

1. Biotechnology Dept., General Commission for Scientific Agricultural Researches, Damascus, Syria.
2. Genetics Dept., Fac. Of Agric., Ain Shams University, Cairo, Egypt.
3. Agronomy Dept., Fac. Of Agric., Ain Shams University, Cairo, Egypt.

SUMMARY

A screening experiment was performed on eleven varieties of cotton to choose the earliest variety (Deltapin) and the latest variety (Sea Island). Crossing was carried out between these two varieties to obtain the F1 grains which were selfed to obtain the F2 seeds. The two selected varieties, their F1 and F2 plants were evaluated for their responses to earliness trait by recording two earliness-related traits . Bulks of the two extreme F2 plants (most early and most late groups), the two contrasting parents and their F1, were used to develop some molecular genetic markers associated with earliness trait in cotton. Out of 15 ISSR primers, only six primers showed 16 fragments associated with earliness trait. The two F2 extreme groups were selfed to obtain the F3 plants. The first flower of each group was taken to extract the total RNA to use in the differential-display analysis. There were 11 positive and

tow negative markers linked to earliness trait.

Key words: Cotton, earliness traits, bulked segregant analysis (BSA), molecular markers, Inter simple sequence repeats (ISSR), Differential -display (DDRT-PCR).

Cotton is a major fiber crop which provides world with natural fiber. The majority of commercial cotton present-day varieties belong to Gossypium hirsutum L. (n=2X= 26), while a few (10% of total production) belong to Gossypium barbadense L. (n=2X= 26). (Rana and Bhat, 2002).

Earliness of the crop maturity is the important in the avoidance of insect and disease build up, soil moisture depletion and weathering of open cotton. Earliness also has other advantages, such as allowing better rotation with a winter crop or extending the season for harvesting and ginning operations. Therefore, greater emphasis on earliness has been advocated by cotton breeders in order to increase production efficiencies and decreasing inputs by decreasing input of fertilizer, water, crop protection and in part, by pest management consideration.(Babar et al.,2002).

Molecular markers have been widely used in genetic analyses, breeding studies and investigations of genetic diversity and the evolutionary relationships between cultivated species and their wild progenitors because they have several advantages as compared with morphological markers, including high polymorphism and independence from effects related to environmental conditions and the physiological stage of the plant (Bertini et al.,2006).

The improvement of cotton through molecular breeding to diseases, insect pests, and abiotic stresses, would require an efficient application of DNA analysis to find out markers that facilitate the genetic improvement of closely related genotypes (Mohamed et al., 2003).

Biotechnology and genetic engineering hold great potential for plant breeding as it promises to expedite the time taken to produce crop varieties with desirable characters. Progress has been made in mapping and tagging many agriculturally important genes with molecular markers which forms the foundation for marker-assisted selection (MAS) in crop plants. Molecular tags, a prerequisite for MAS have been developed for

many crop plants using different kinds of molecular markers (Mohan et al., 1997).

Inter-simple-sequence-repeats (ISSRs-PCR) is a fast and cheap approach to the identification of unknown, yet unsequenced genome and is widely used for ecological, population, or phylogenetic studies (Barth et al., 2002). Additionally, cotton genome mapping offers the possibility to dissecting quantitative traits such as earliness, yield and fiber quality, into their single genetic determinants, the so-called quantitative trait loci (QTLs), thus paving the way to marker-assisted selection (Hoffman et al,. 2007; Rakshit et al., 2010 and Mishra et al., 2013). According to Said et al. (2013) results among QTL studies differed due to the use of different genetic populations, markers and marker densities, and testing environments. The genetic map could be considered as a framework map to overcome the limitations of conventional breeding for the improvement of cotton yield, earliness and fiber quality related traits through intra- or interspecific hybridization (Ismail et al., 2015; Jia et al., 2016).

Differential display is one of several methodologies that can be used to compare gene expression between mRNA populations. Even though it is not as high throughput as using gridded cDNA 'chips', the technique is sensitive for differential expression of rare transcripts and is applicable to small amounts of RNA. Refinements that offer focused differential screens are more useful than the original arbitrary approach and reduce the possibility of isolating false positives. These modifications make differential display an attractive method for identifying novel transcripts in various biological situations (Ali et al., 2001). Procedure called 'Differential Display' (DD-RT-PCR) was also described. In DD of mRNAs, the first strand of cDNA is synthesized by reverse transcription using a 3'-anchored oligo-dT primer, while the second strand synthesis and subsequent amplification of 3'-end portions of selected cDNAs are conducted by PCR using an arbitrary decamer, just like RAPD, and the anchored oligo-dT primer (Ito et al., 1994). Differential-display (DD-RT-PCR) is a powerful and reliable tool which was used to identify genes that are differentially expressed in Onchocerca volvulus exposed to stimuli that generate oxidative stress (Liebau et al.,2000) .

This study aims to screen the responses of two selected varieties to

earliness trait with respects to the performances of two earliness-related traits, to detect some DNA genetic markers associated with earliness trait using ISSR and RNA Differential-display-PCR (DD-RT-PCR) techniques using bulked segregant analysis (BSA) to be used in marker assisted selection (MAS) programs.

MATERIALS AND METHODS

1.Materials

This investigation was carried out in the Department of Genetics, Faculty of Agriculture, Ain Shams University, Shoubra El-Kheima, Cairo, Egypt during the period from 2005 to 2009.

Two varieties of cotton, namely; Deltapine (early variety) and Sea Island (late variety), were chosen after screening for earliness trait of eleven varieties in a previous study. These eleven varieties were four Syrian varieties (Raqa5, Aleppo33,DerAlzor22 and Aleppo40), four American varieties (Deltapine, Pima7,Tamcot and Sea Island) and three Egyptain varieties (Giza45, Giza70 and Giza83). The four Syrian varieties were supplied by the Cotton Office, Syria, while all the other varieties were obtained from the Cotton Research Institute , Agricultural Research Center, Giza, Egypt.

2.Methods

2.1.Field experiment

The two selected varieties (Deltapin and Sea Island) were grown in the field and crossed to obtain the F_1 seeds. Some of the F_1 seeds were sown in the field and selfed to obtain the F2 seeds. The two varieties, their F_1 and F2 grains were sown in a completely randomized complete design. All cultural practice i.e., irrigation, fertilization and pest control were applied as usual for the ordinary cotton production.

Data were recorded for all plants (the two parents, their F1 and F2 individuals) at flowering for the following earliness-related traits; number of days to the first flower (NDFF) and number of days to the first open boll (NDFOB). The F2 plants, represented by 168 individuals, were classified

into groups according to their performance for each trait. Samples of the two parents, their F1 and the two extreme groups of F2 individuals (the earliest and the latest) were used for further molecular analysis. The two extreme groups of F2 grains were sown in the field and selfed to obtain the F3 grains. The first flower of each group was taken to extract the total RNA to be used in the Differential-display analysis.

2.2.Molecular genetic studies

2.2.1.Genomic DNA extraction

DNAs of the samples (the two parents, their F1 hybrid and the tow extreme groups of F2 individuals) were isolated according to the method of Bushra et al.,(1999).

2.2.2.Inter simple sequence repeat (ISSR) analysis

ISSR-PCR reactions were conducted according to Sharama et al., (1995) using 15 preselected primers with the following sequences:

ISSR1	5' TAT (CA)7 C 3'	ISSR10	5' (TCC)5 AC 3'
ISSR2	5' CAC (TCC)5 3'	844A	5' (CT)8 AC 3'
ISSR3	5' TTT (TCC)5 3'	844B	5' (CT)8 GC 3'
ISSR4	5' CAT (CA)7 T 3'	17898A	5' (CA)6 AC 3'
ISSR5	5' ACA G (TG)7 3'	17898B	5' (CA)6 GT 3'
ISSR6	5' (GA)8 CG 3'	17899A	5' (CA)6 AG 3'
ISSR7	5' ATT A (CA)7 3'	17899B	5' (CA)6 GG 3'
ISSR8	5' (AG)8 CT 3'		

The reaction conditions were optimized and mixed (12 µl total volume) which were composed of dNTPs 2,5mM (0.25 µl), MgCl2 25mM (1.25 µl), 10X buffer (1.25 µl), primer (1 µl), DNA (1 µl), and Taq DNA polymerase 250 U (0.2 µl). The ISSR amplification was carried out in a Primus Thermocycler , programmed for 35 cycles as follows: 94 oC / 2 min (1 cycle) and 94 oC / 30 sec; 44oC/45 sec; 72 oC/1.5 min (33 cycles); 72 oC 5 (1 cycle); then 4oC until use. To visualize the PCR products, 7.5 µl of each reaction was loaded on 1.5% agarose gel. The gel was run at

100 V for about 1.25 hr and visualized with UV Trans-illuminator and photographed using UVP gel documentation system.

2.2.3.Differential display (DDRT-PCR)

RNA was extracted from the first open flower of both extreme groups of F3 plants using the RNeasy Mini Extraction Kit. RNAImage kit was used to obtain cDNA. The RT program was carried out in a GeneAmp® PCR System 9700 instrument, which programmed at 65°C for 5 min (1 cycle); 4°C for 3 min; 42° C for 60 min (1 cycle); 95°C for 10 min; 72°C for 5 min (25 cycle), then held at 10°C. A1 µl of Moloney murine leukemia virus (MMLV) RT enzyme was added to each tube after 10 min of incubation at 37°C.

The reaction mixture of Differential display were dNTP 25 µM (2.0 µl), T11 2.0 µl,10X PCR buffer 2.0 µl, Taq DNA polymerase 0.2 µl, ddH2O up to16.0 µl. which programmed at 94°C for 1 min (1 cycle); 94°C for 30 sec, 38°C for 2 min, 72°C for 30 sec (40 cycles); 72°C for 5 min (1 cycle), then held at 4°C. Acrylamide-urea gel (6%) was prepared and 8 µl of sample and a 2 µl of loading dye (95% formamide, 0.05% bromo phenol blue, 0.05% xylene cyanol) were mixed and denatured at 80°C for 2 min before loading on gel.

The protocol of DD-PCR relies on the isolation of RNA with high purity, which is a very important factor in the successive completion of the first step of DD-PCR. RNAs were isolated from the first flower of each of the two F3 extreme groups. RNAs were treated with RNase-free DNase I to remove DNA contamination. RNAs were utilized as template for synthesizing the first strand of cDNAs by reverse transcription with the anchor primers T11A. The cDNA was employed in the display-PCR reaction in which anchor primer (Metabion, Germany), to target the polyA tail at the 3` end and the random primer of ARP1(GenHunter RNA Image Kit, USA). Since inconsistent PCR conditions may be another source of false-positive bands, RNA isolation and sampling were duplicated during reverse transcription (RT) and PCR steps. Differentially expressed bands were consistent with the expression in each of the two samples which are our target. DD-PCR products were planned to be loaded on gel, and the gel was staining with silver staining.

3. Data analysis

Data of polymorphic and monomorphic bands for all analyses(ISSR and Differential display) was scored using Total Lab software. Amplicon sizes were estimated using 1 kb DNA ladder standard (Bioron, Germany).

RESULTS AND DISCUSSION

1. Earliness- related traits

1.1. Response of the parents and F1 plants

The means of earliness- related traits of the two parents and their F1 plants are shown in Table (1). NDFF trait exhibited marked decrease in the mean value for the early parent (78.9D) comparing with the late parent (86.7D), while the F1 plants showed moderate value (82.1D) for this trait. Also, NDFOB trait of the late parent showed higher mean value (147.1D) comparing with the early parent (129.1D), while the F1 plants exhibited moderate value (138.0D) for this trait. These results indicated that these two traits are inherited in a co-dominant fashion from the two contrasting parents. In a comparable, study Gody and Palomo(1999) studied inheritance of earliness trait in upland cotton (G.hirsutum L.) and recorded signitificant additive genetic variance for days to first flower and days to first open boll traits. Moreover, Chang et al. (2001) tested five cotton varieties for earliness trait and found that CRIS-133 was the earliest variety , while CRIS-9 was the latest variety. In addition, Ali et al.(2003) evaluated fourteen cotton varieties for earliness trait and concluded that less number of days to first flower was recorded by CIM-443 variety, while more number of days were recorded in CIM-1100 variety.

Table (1): Means of the two earliness-related traits for the two parents and their F1 plants.

Genotypes	NDFF	NDFBO
Deltapin	78.90	129.10
Sea Island	86.70	147.10
F_1	82.10	138.00
LSD 5%	3.28	5.27
LSD 1%	4.97	7.98

1.2. Responses of the F2 plants

The F2 plants were presented by 168 individuals were classified into groups according to their performance for each trait. Then, each trait was classified according to its range as presented in Table (2) which shows the minimum, the maximum values and the averages of the two studied traits. The F2 plants were arranged in descending order according to their frequency, so plants with high frequency in group one were taken to represent the earliest F2 plants, While plants in the last group were taken to represent the latest F2 plants.

Table (2): The minimum and the maximum values and the means of F2 plants for the two earliness- related traits.

Trait	Minimum values	Maximum values	Averages
NDFF	68	94	82.19
NDFBO	121	154	138.55

According to these classifications, ten F2 plants were selected to represent the earliest F2 plants and ten were chosen as the latest ones to flowering for each trait as shown in Table (3). These twenty plants were used for bulked segregant analysis to elucidate molecular markers (ISSRs) associated with earliness trait in cotton.

	Plant No.	NDFF	NDFBO
The most earliest F2 plants	11	68	126
	2	69	125
	21	74	125
	37	71	126
	137	69	121
	86	72	125
	96	69	123
	102	72	126
	67	68	122
	115	71	124
mean		67.6	124.3

Table (3) : The earliest and the latest F2 plants according to the two earliness- related traits

The most latest F2 plants	69	92	150
	58	91	149
	28	90	150
	95	91	152
	96	93	152
	136	92	150
	56	93	154
	147	93	150
	29	89	152
	57	94	152
mean		91.8	151.1

2. Molecular genetic markers for earliness in cotton

2.1. Molecular genetic markers using ISSR-PCR analysis:

DNA isolated from the two contrasting parents, Deltapine as an early parent and Sea Island as a late parent, their subsequent F1 plants and F2 bulks of the early and late groups plants were tested against 15 preselected primers. Eleven primers showed polymorphism with the studied genotypes, while only six primers exhibited 16 molecular markers for earliness and lateness traits as shown in Fig (1) and summarized in Table (4). ISSR2, ISSR3, ISSR4 and ISSR7 Primers gave nine markers for earliness trait which were found only in the early parent (Deltapine) , the F1 plants and the early F2 bulk plants, while they were absent in the late parent (Sea Island) and the late F2 bulk plants. The molecular sizes of these nine markers were 2453, 1626 and 1501 bp for ISSR2 primer, 344, 239 and 182 bp for ISSR3 primer, 1157 and 221bp for ISSR4 primer and 360 bp for primer ISSR7. On the other hand, ISSR2, ISSR7, ISSR8 and ISSR10 primers showed seven markers for lateness trait , which were found only in the late parent (Sea Island), the F1 plants and the late F2 bulk plants, while they were absent in the early parent (Deltapine) and the early F2 bulk. The molecular sizes of these seven markers were 1410bp for ISSR2 primer, 233bp for ISSR7 primer, 807, 524, 441 and 330 bp for ISSR8 primer and 1180 bp for ISSR10 primer. However, these nine positive and seven negative ISSR markers could be considered as reliable markers for earliness and lateness traits in cotton. Domenyuk et al. (2002) used a F2 maize segregating population

for identification of ISSR markers and were able to reveal significant differences between alleles by a quantitative index. Moreover, Atta et al. (2006) detected three ISSR markers linked with iron deficiency tolerance in maize using bulked segregant analysis for F2 population plants of the cross between G221-D (most tolerant) and L230 (most sensitive) inbreeds.

ISSR markers closely linked to important agronomic traits have greatly contributed to crop improvement programs. In chickpea, ISSR markers, UBC855500 generated by primer (AG)8YT and UBC8251200 using primer (AG)8T, were linked to the gene conferring resistance to race 4 of Fusarium Wilt (Ratnaparkhe et al ., 1998). Moreover ISSR markers linked to the traits of agronomic important have been sequenced and used as STS markers in marker aided selection. In rice, an ISSR marker generated by primer (AG)8YC was converted to sequence tagged site STS marker to identify the fertility restoration gene Rf-1 (Akagi et al., 1996).

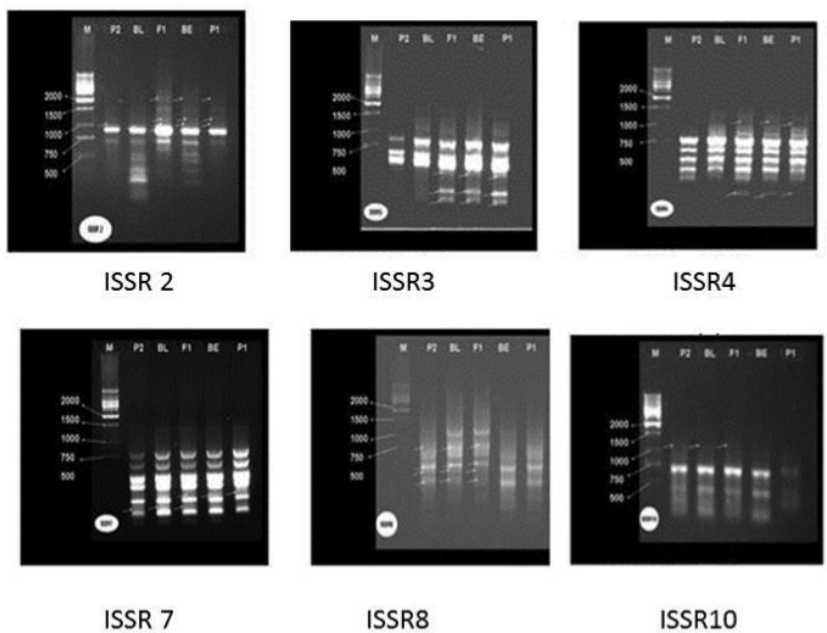

Fig.(1): ISSR-PCR fragments of six primers for the early parents (p1), late parent (p2), early F2 bulk (BE), late bulk (BL) and F1.

Table (4): ISSR-PCR fragments of six primers with the tow parents, their subsequent F1 and the tow bulks of F2.

Primer name	BN	Bp	P1	BE	F1	BL	P2	MT
	1	2453	1	1	1	0	0	P
	3	1626	1	1	1	0	0	P
	4	1501	1	1	1	0	0	P
	5	1410	0	0	1	1	1	N
	6	344	1	1	1	0	0	P
	7	239	1	1	1	0	0	P
	8	182	1	1	1	0	0	P
	2	1157	1	1	1	0	0	P
	10	221	1	1	1	0	0	P
	5	360	1	1	1	0	0	P
	8	233	0	0	1	1	1	N
	2	807	0	0	1	1	1	N
	5	524	0	0	1	1	1	N
	7	441	0	0	1	1	1	N
	9	330	0	0	1	1	1	N
	1	1180	0	0	1	1	1	N

P1= Early parent P2=Late parent BE= Early F2 bulk BL= Late F2 bulk
BN= Band Number P = Positive N= Negative MT= Marker Type

2.3. Differential-display (DD)-RT-PCR

The profile of DD-polyacrylamide gel of the first flower cDNA for the F3 early and late groups utilizing ARP1 primer is shown in Figure (2) and analyzed in Table (5). There were eleven positive markers which appeared only in the early group and disappeared in the late group at relative fronts of 0.067,0.112, 0.133, 0.223, 0.292, 0.34, 0.515, 0.675, 0.703, 0.72 and 0.952. On the other hand, only two negative markers were detected which occurred only in the late group and were absent in the early group at relative fronts of 0.278 and 0.755. In a comparable study, Song and Allen (1997) compared transcripts from immature fibers and stripped ovules of cotton by differential display to identify cDNA fragments. They isolated eight independent fibers–specific

cDNA fragments that represent mRNAs which are primarily expressed in cotton fibers. They concluded that during the evolution of cotton plant, a member of the ACP gene family has been recruited for specific expression in cotton fibers. Recently, Chao-Zhu et al. (2006) amplified cDNAs of leaves of 24 pest-resistant cotton crosses and their parents in full opening flower stages They identified different bands which were displayed by DDRT-PCR with 45 primers combinations. Their result showed that genes which have dominant and specific expression in top leaves of full opening flower stages were beneficial to yield formation and heterosis occurrence.

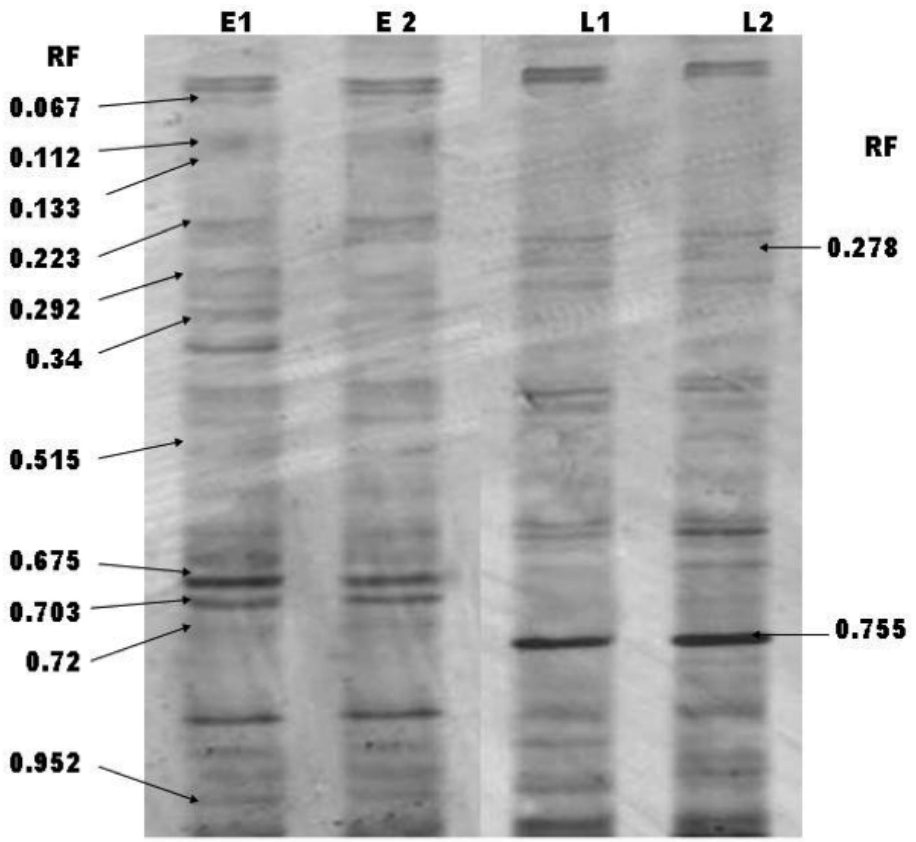

Fig. (2): DD-polyacrylamide gel of the first flower cDNAs for each the F3early and late groups utilizing ARP1 primer.
E1 =E2= The first plant gave the first flower from the F3 earliness group
L1=L2= The first plant gave the first flower from the F3 lateness group
RF= relative front

Table (5):DD RT- PCR fragments of ARP1 primer with the first flower cDNAs for the F3 early and late groups.

BAND No.	RF	E1	E2	L1	L2	MT
1	0.021	1	1	1	1	-
2	0.038	1	1	1	1	-
3	0.067	1	1	0	0	P
4	0.112	1	1	0	0	P
5	0.133	1	1	0	0	P
6	0.223	1	1	0	0	P
7	0.247	1	1	1	1	-
8	0.278	0	0	1	1	N
9	0.292	1	1	0	0	P
10	0.311	1	1	1	1	-
11	0.34	1	1	0	0	P
12	0.378	1	1	1	1	-
13	0.423	0	0	0	1	-
14	0.435	1	1	1	1	-
15	0.473	1	1	1	1	-
16	0.515	1	1	0	0	p
17	0.561	1	1	1	1	-
18	0.596	1	1	1	1	-
19	0.618	1	1	1	1	-
20	0.656	1	1	1	1	-
21	0.675	1	1	0	0	P
22	0.703	1	1	0	0	P
23	0.72	1	1	0	0	P
24	0.755	0	0	1	1	N
25	0.784	0	0	0	1	-
26	0.843	1	1	1	1	-
27	0.874	1	1	1	1	-
28	0.9	0	0	0	1	-
29	0.919	1	1	0	1	-
30	0.936	0	0	1	0	-
31	0.952	1	1	0	0	P
32	0.981	1	1	1	1	-

E1 =E2= The first plant gave the first flower from the F3 earliness group
L1=L2= The first plant gave the first flower from the F3 lateness group
MT=Marker Type RF = Relative Front

In conclusion, the level of polymorphism detected in molecular markers followed by using marker-assisted selection (MAS) have been proven to be good alternative methods which depend on phenotypic selection, as it provides plant breeders with environment-independent genetic markers for certain economic traits.

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SAAEED NEAMA M.Sc.

I was born in Baghdad, Iraq in 1969. I graduated in 1992 at the University of Technology in Baghdad. I finished a Master in the field of Science in Integrated Design Studies at the University Putra Malaysia UPM. The title of my thesis was: "Effect of Radiant Cooling on Thermal Comfort in Energy Commission Building in Putrajaya, Malaysia Q. I am a member of the Iraqi Engineers Union, and I was a member of the American Institute of Architect AIA, ASHRAE and USGBC New York Upstate Chapter.
After working for one year as a design engineer at the Nuclear Commission in Iraq, I was a contractor until 2006. These 14 years of extensive construction work that I have done, comprised residential, commercial, and governmental projects with a variety of structures, material and construction methods. The following years until the present I have made use of the field experience to elevate the career stage of the design and consultancy service. I have designed Interdisciplinary projects for local and international companies. USACE and LUKOIL Overseas approved my designs.

THE EFFECTS OF SWEATING ON WORKERS' THERMAL SENSATION IN OFFICE WITH RADIANT COOLING SYSTEM IN MALAYSIA

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SUMMARY

This study investigated workers' sweating occurrence in radiant cooling office in Malaysia. We studied the Energy Commission's Diamond Building in Putrajaya, which is equipped with radiant slab cooling. The objective was to determine the effect of sweating on workers' thermal sensation. We adopted the survey procedure from the ASHRAE 55 and the ISO 7730 standards and applied to the building's second and sixth floors. 132 data sets were collected from 49 subjects whom were office workers. The data is collected continuously for four days (two days for each floor) during working hours using two online questionnaires that concised of background and daily surveys. Findings showed that sweating influenced the subjects' thermal comfort sensation vote quite significantly ($p < 0.05$). Sweating also lead to workers feeling dissatisfied with

the overall thermal environment ($p < 0.01$). In term of location, floor level and office layout had no affect on subjects' sweating occurrence. Workers complained that they sweat more frequently when stationed close to the external glazed wall of the case study building ($p < 0.05$). An even stronger relationship between sweating occurrence and work-station orientation was reported from workers whom were stationed at the West and South facing workstations compared to other workstation orientations ($p < 0.01$). Sweating was affected by the variation in outdoor temperature, ($p < 0.05$). In order, sweated subject preferred increased air speed, adding fans, more fresh air, and open the windows, ($p < .05$), ($p < .01$), ($p < .05$), ($p < .05$). Sweated subjects were more content with the workplace ambient condition associated with radiant cooling system compared to one that used air-conditioning system.

Key words: sweating; radiant cooling; office building; thermal comfort; preferences; Malaysian
tropical climate.

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1. Introduction

This study investigated sweating in a radiantly cooled Malaysian office building whereby sweating is an important indicator of discomfort. Sweating is an essential indicator in calculating TC indices [1]. However, sweating is rarely considered in thermal sensation surveys particularly in the radiant cooling environment. Most of the investigations conducted were performed in climate chambers. Krogstad and Piechnik (2005) [2] investigated the validity of self-evaluation scale of sweating. The study confirmed that subject can provide good estimation of the sweating rate in comparison with current objective methods to quantify evaporation from skin surface. Although, the study was for medical application, the result derived from can be used in the present study. Many studies have been conducted on sweating as a relevant thermal comfort factor. Therefore, the inclusion of sweating in the present study's questionnaire indicates the relative importance of this factor among other factors. Ooka, et al [3] in a subject experements, developed a safety evaluation

approach for hot environment using new sweating model. Maloney and Forbes [4] used sweating as an indicatore to attain heat balance in their study to predict how a warmer future will affect man's thermoregulation in Australian climate. Taniguchi et al [5] in a chamber-base study, on subjects doing sedentary activity, measured the rate of sweat explosion as indicator of central sudomotor activity. These same researchers found that sweating rate differed significantly during summer in females and the sweat function was improved during summer mediated by central sudomotor and sweat gland mechanisms in males and females. Tian et al [6] although built a climate chamber to simulate the extreme hot environment and manual work, the researchers used sweating rate as one of the psychological indices and found that "The heat acclimatization training can improve adaptability of human body to extreme hot environments.". Wijayanto et al [7] who conducted chamber study to comparison of thermoregulatory responses to heat between Malaysian and Japanese males during leg immersion found that the efficiency of Malaysians thermal sweating and thermoregulatory responses were enhanced in dissipating heat loss during heat loading. Another studies [8] [9] found that sweating rate was significantly greater for males than for females. Candas et al [10] found that "The relation of drift in body temperature to skin wittedness changed with the acclimation of the subjects". In the present study, using the subject evaluation of sweating, although is not as selfevaluation scale of Krogstad [2], it can provides good self-evaluation of sweating.

From what were stated above, sweating is essential factor to predict thermal comfort and acclimatisation with the environment. Acclimatised person sweat less than unaclimatised person. Furthermore, Malaysian expected to be acclimatised to their environment and have low sweating rate. Not many international or Malysian studies included sweating in the survey questionnaire of thermal comfort in radiantly cooled office building. Therefore the present study investigates sweating in a Malaysian office building equiped with radiant slab cooling.

2. Method

The method used in the present study was field survey by online questionnaire and included the sweating in the questionnaire. The objective was to investigate the effects of sweating on the thermal

comfort in radiant cooling environment and the relationship with the personal variables, expectations, and preferences. The subjects themselves provide information about the sweating through the questionnaire. The collected data then analyzed using cross tabulation in SPSS program.

The Energy Commission Building (the Diamond Building) in Putrajaya, Malaysia was selected as the case study building for the present study (Figure 1). The structure is a seven-floor office building that was completed 15 March 2010 and has a total area 11473 sqm. The building is cooled by a radiant cooling system through slab cooling and conventional air-cooling.
Respondents were randomly selected office workers at second and sixth floors of the case study building, where the main office sections were located.

Figure 1: Diamond Building in Putrajaya, Malaysia

Two questionnaires were put online for participants to complete, namely background survey and daily survey. The background survey was intended to gather subjects' personal details such as gender, age group, employment period, and whether they were using air conditioning system at home. This survey further includes subjects' expectations with several conditions in while performing their work, namely, the floor temperature, variation in outdoor temperature (i.e.: morning, afternoon and late afternoon air temperatures), the variation in indoor air temperature, and air speed. Subjects were also asked to vote their preferred conditions, whether to increase air speed, fans, fresh air, workplace air conditioners, open window, and having manual control of ambient temperature, the sweating (by time, activity, and location). A question to assess overall thermal environment (OTE) was asked at the end of the questionnaire to prevent any biasness.

The "daily survey" intended to examine the subject experience with their working thermal environment in four days (the available period). The questionnaires were structured in accordance to thermal comfort survey administrated by latest update of ASHRAE 55. The daily survey constructed to a minimum number of three questions to reduce answering time in accordance with the request of the building manager. This survey aimed to collect the respondents' thermal sensation vote (TSV), clo value, and met value.

Measurements were performed at the second and sixth floors. Each floor readings were recorded in accordance to specific zone, office desk orientation, and office layout. The zones were identified within office areas 2m from the glazed wall and 2m distances from the atrium. It was recorded that office desk orientations were facing North, East, South, West, and overlooking the atrium. Moreover, two types of office layouts were identified, namely, open and enclosed.

Temperatures monitoring were collected continuously in four days (two days for each floor). Three Ohm Delta Microclimate instruments were deployed at each floor at specific locations (Figure 2) starting from 8.00 a.m. until 5:00 p.m. The time of the survey was divided into three periods: morning (8:00 - 10:59 a.m.), midday (11:00 - 1:59 p.m.), and afternoon (2:00 - 5:00 p.m.).

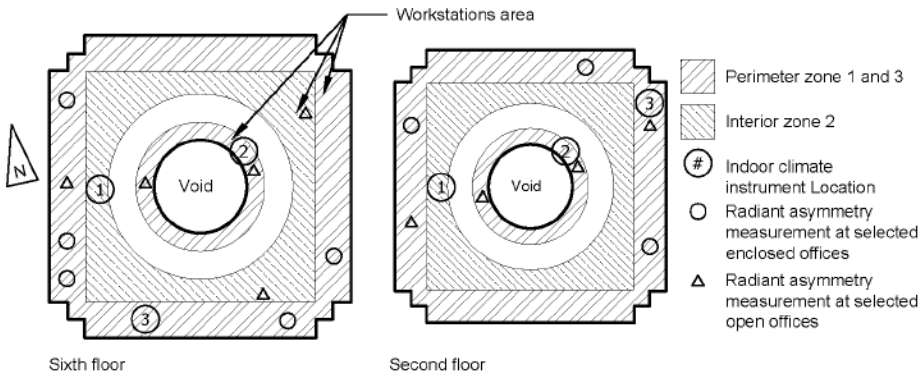

Figure 2. Measurement instruments location

3. Results and discussion

49 valid responses collected from the thermal sensation vote survey. 61% of them were female workers. 94% of the subjects were between 30 to 50 years old. 78% of them have been working for more than one year in the case study building. 55% of the workers did not use an air-conditioning system at home.

3.1 The effects of sweating and office worker's behavior

Subjects were asked to identify if they sweated sometimes or always in the building, where and when they are often sweating. The majority of sample (11 out of 18) who were sweating sometimes was at the current office and two sweated at another office. Four subjects sweated always at the current office and one at another office. There were only five sweated subjects provided information about the time when they always sweating during the time they spend in
the building, in which one was sweating during the past days of employment, whereas four subjects were sweating at every day of the employment. After that, subjects who were sweating sometimes were requested to determine the activity they were doing when the sweating occurs. Six subjects sweated during the sedentary activity, two sweated during standing, and one sweated during physical activity and one sweated when was very active. To conclude, subjects were discomfort during the normal activity in the building.

3.2 Sweating and subjects' location

The cross tabulation analysis in Table 1 showed that the differences in the offices' vertical level did not affect subjects sweating ($p > .05$). However, the differences in the offices' location horizontally showed that subjects in offices at the perimeter zones sweated more than those who are in the interior and void perimeter zones, ($p < .05$). In addition, orientation affects sweating. Subjects who worked in the West and South exposure sweated more than those who worked in the other orientation, ($p < .01$). Office layout did not affect sweating, ($p > .05$).

Table 1. Cross tabulation of sweating and subjects' location

SUBJECT´S LOCATION		SWEATING		
		No	Sometimes	Yes
Floor	Second	11	5	4
	Sixth	20	8	1
Zone	Perimeter zone	13	6	2
	Interior zone	9	3	1
	Void perimeter zone	4	0	2
Orientation	North	1	0	0
	East	11	1	0
	South	3	1	1
	West	7	7	2
	Void West	2	0	1
Office layout	Open	20	5	5
	Enclosed	6	4	0

3.3 Sweating and the personal variables

In general, the personal variables did not affect sweating. However, some of the variables have more statistics power than the others have (Table). The age, employment period, and the use of A/C at home not related to sweating ($p > .05$). There were no significant relationship between males and females, ($p > .05$), which contradicts with Green et al [8] and Hazlehurst et al [9]. This may related to the acclimatization that suggested by Wijayanto et al [7] and the low metabolic rate of Malaysian adults suggested by Ismail et al [11].

Table 2. Cross tabulation of sweating and the personal variables

PERSONAL VARIABLES		SWEATING		
		No	Sometimes	Yes
Gender	Female	17	10	3
	Male	14	3	2
Age	<30	17	4	4
	<50	13	7	1
	<70	1	2	0
Employment period	<2 Months	3	1	0
	<12 Months	25	10	3
	3-6 Months	0	1	1
	7-12 Months	3	1	1
Using A/C* At Home	No	20	5	2
	Yes	11	8	3

*Air-conditioning system

3.4 Sweating and expectation

Shown in Table 2, sweating was independent of satisfaction with floor temperature, ($p > .05$). Subjects who dissatisfied with the variation in outdoor temperature were sweating more than those who satisfied ($p < .05$). However, sweating was less influenced by the variation in indoor air temperature, ($p > .05$). Finally subjects' expectation of air speed did not affect their sweating, ($p > .05$).

Table 2. Cross tabulation of sweating and expectation variables.

EXPECTATION VARIABLES		SWEATING		
DISSATISFACTION WITH		No	Sometimes	Yes
Floor temperature	Don't know	1	1	0
	No	26	11	0
	Yes	4	1	0
Variation in outdoor temperature	No	24	6	3
	Yes	7	7	2
Variation in indoor air temperature	Don't know	1	2	0
	No	22	6	3
	Yes	8	5	2
Unpleasing air speed	Don't know	1	1	0
	No	19	7	3
	Yes	11	5	2

3.5 Sweating and preferences

In Table 3, preference for more air speed was high among sweated subjects, ($p < .05$). Preference for using fans at the workplace was related to the sweating, ($p < .01$). High relationship was found between sweating and fresh air, ($p < .05$). Subjects who sweated also preferred more fresh air. However, sweated subjects did not prefer to use workplace air conditioners, ($p > .05$). In addition, it seems that open window was a preferable option for those who were sweating in the building, ($p < .05$). However, sweated subjects did not prefer to manually control their workplace's air temperature, ($p > .05$).

Table 3. Cross tabulation of sweating and preferences

PREFERENCE VARIABLES		SWEATING		
		No	Sometimes	Yes
Increased air speed	No	13	5	0
	No change	10	1	1
	Yes	8	7	4
Adding fans	No	21	8	2
	No change	9	0	1
	Yes	1	5	2
More fresh air No 10 2 1				
	No change	8	0	0
	Yes	13	11	4
Using workplace A/C*	No	15	4	1
	No change	10	3	1
	Yes	6	6	3
Open window	No	22	13	4
	No change	7	0	0
	Yes	2	0	1
Self-control of workplace temperature	No	16	7	2
	No change	8	1	0
	Yes	7	5	3

*Air-conditioning system

3.6 Sweating and thermal comfort

Cross tabulation test shows a significant relationship between sweating and the warm feel of subjects in the TSV, ($p < .05$), (Table 4), and the dissatisfaction with the overall thermal environment, ($p < .01$), (Table 5). The results suggest that sweating can be used as a thermal comfort indicator, which agreed with Krogstad et al [2].

Table 4. Cross tabulation between sweating and TSV.

		TSV					
		Warm	Slightly warm	Neutral	Slightly cool	Cool	Total
Sweating	No	0	7	11	4	1	23
	Sometimes	0	5	2	3	1	11
	Yes	1	1	2	1	0	5
Total		1	13	15	8	2	39

Table 5. Cross tabulation of sweating and overall thermal environment.

		Overall thermal environment		
		NO	YES	Total
Sweating	No	1	30	31
	Sometimes	4	9	13
	Yes	3	2	5
Total		8	41	49

4. Conclusion

Sweating significantly affects thermal comfort in TSV ($p < .05$) and dissatisfaction with the overall thermal environment ($p < .01$). The differences in the offices' vertical level and office layout did not affect subjects sweating. However, the perimeter zone, the West and South exposure do affect the sweating. The personal variables did not affect sweating. Sweating was affected by the variation in outdoor temperature. Sweated subjects preferred increased air speed, adding fans, more fresh air, and open the windows, and did not prefer using workplace air conditioners.

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I grew up in the city of Kamischly in the north of Syria. As I prefer the village life to the city I used to spend my holidays in the village where my family is from. After I finished secondary school in Al orouba I studied agricultural engineering in Aleppo and at Tishreen University in lattakia city, where I obtained a Master´s degree in 2010. From 2010 to 2014 I was working on my Ph.D. Unfortunately I could not finish my studies because of the war. The situation in Syria became very difficult and dangerous. It was my dream to be a professor in the Syrian agricultural faculty. Therefore I am trying to complete my degree in Austria. During my master and Ph.D. (from 2007 until 2014) I worked in a silo as chief of the apartment responsible for the quality control of the cereals (wheat, barely) in Kamischly city. I was also member of a committee responsible to purchase the necessary devices to repair the machinery and cars. I received a permission to work full time in Austria and worked one month at PASSEK GesmbH. I speak English fluently and recently completed an A2 course in the German language. I have a very professional working attitude and am determined to finish my PhD study in Austria.

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EFFECT OF LASER GUIDED LAND LEVELING, TILLAGE SYSTEMS AND AMOUNTS OF IRRIGATION WATER ON THE YIELD AND THE TECHNOLOGICAL PROPERTIES OF COTTON (C.V ALEPPO-90).

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SUMMARY

The research work was carried out during the growing seasons of 2011 and 2012 in Syrian Arab republic - Al Hasaka – Amoda ğğ Taleek village, to study effect of laser guided land leveling, three tillage depths, viz. 10, 25 and 35 cm and three irrigation intervals, viz., 7 , 8 , and 9 days along with interactive effect between them on productivity and technological properties of cotton (C.V ALEPPO-90) and Feasibility, The experiment was laid out in split – split – plot design (SSPD) by using three replications, the importance of these research is considered as a new research in the region of study which is main resources of cotton productivity and irrigated crops, the study concern to reduces the pressure on water resources, increasing yield and reduces costs, the factors of researches are correlated by each others, and finally affected in the irrigation who affects seed cotton yield and Feasibility, the study showed that laser guided land leveling significantly economize the amount of water irrigation by (2212) M3/HA, significantly increased the water use efficiency (WUE) from 0.51 to 0.68 KG/M3/HA, significantly increased the seed cotton yield by (404) KG / HA, and made an early maturity by (6.33) days, compared to no- laser guided land leveling, through two seasons, laser guided land leveling, increasing the depth of tillage and reducing the intervals achieved an significantly improvement in the morphology and productivity properties (plant height, number of the reproductive branches, leave area index, leave index, number and weight of ball, seed cotton yield, Feasibility) and a dissimilar significant improvement in the rest of the productivity and technological properties (harvest index,

crop index, seed index, ginning percentage, length , strength /stelometer , softness , elongation and uniformity ratio, strength /presly), leveling increasing WUE and improves the spreading of irrigation water and fertilizers vertical and horizontal in the field, the deepest tillage at 35 cm improves the root growth, the shortest interval at 7 days provide the plant s requirement of water for growing and transpiration, we can increasing efficiency of irrigation, reducing costs, irrigation time, increasing yield, and increasing the positive effective of increasing the tillage depth and reducing intervals, generally laser guided land leveling and tillage at 35 cm and irrigation by interval 7 days give the best results, even though the technological properties of fiber have not been improved significantly by the research factors but these improvements are very important and useful for trading and manufacturing of cotton textiles.

Key words: leveling, laser, depth, interval, efficiency, properties, economize, Feasibility.

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Introduction

Cotton is considered as the white gold and one of the most important fiber and trade crop in the world, although of the big competition of the industrial fibers , cotton stays the most important recourses for the textile industries, also the cotton textile is more healthy than the industrial textile (Kairon et al., 2002), cotton is planted in wide range of Climatic conditions , soils and different agricultural conditions, in general cotton planting is in the tropics and there are 5 species of cotton that are planted in the world: (G. arboreum L. , G. herbaceum , G. barbadense L. , G.tricospidatieum and G.hirsutum L.) , and the specie (G.hirsutum L.) forms 90 % of the global production (ğSilver-tooth . 2008), according to (Gupta . 2008) laser guided land leveling is

an important technique to face Water scarcity and insurance the food , social and economic stability, The plowing is considered as the basic elements of the traditional farming system and in a broader sense is : the mechanical process that we do to the soil and the residue of the plant to prepare the appropriate cradle for crop seeds (Anil et al. 2006), tillage dose many benefits such as the dismantlement the soil and reduce the soil compaction and allow the plant to obtain the largest amount of nutrients and regulate the cycle between water and air into the soil (Ozpinar and Isik . 2004), researching for 5 years showed that the no-tillage reduces the cotton production (10%) compared to the conventional tillage (Burmester. 1993), (Ahmed. 1993) showed that the cotton production is reduced by reducing the tillage s depth, (Ertek and Kanber, 2003) showed A positive linear correlation between increasing irrigation rate and the yield components of the cotton crop, While the excessive increase in the irrigation water caused prolonging vegetative growth period and reduce production and on the other hand, the lack of irrigation water caused increasing the losing rate of the fruits (balls) (Onder, et al, 2009).

REFERENCE STUDY

First- Effect of laser guided land leveling on productivity and technological properties of cotton:

(Misra and Ahmed, 1993) confirm that The importance of land preparation before planting such as leveling the surface of the soil by laser guided land leveling and give the correct tendency to decline irrigation lines so that the water flowing comfortable, also the laser guided land leveling of the most important ways to reduce water consumption and natural preservation and development of agriculture and increase production, (Ahmedjanov, 1984; Balabanov, 1984) pointed out That the application of laser guided land leveling in Central Asia on the cultivation of cotton has made provision in the amount of irrigation water by 1500 m3 / h, (Khorst et al. 2001) found out that laser guided land leveling is working to increase the percentage of germination and crop production and reduce the time needed to work and irrigation, In a study of three seasons (2004 - 2006) that the laser guided land leveling increased cotton productivity by 26% and reduced the amount of wasted water leak and the lekage by 24% and increased the efficiency of irrigation water use by 32% and

the economic feasibility higher by 22% and reduced the time needed for irrigation for 21 hours or 6% and reduced the work necessary for irrigation machines to 29% as compared to the control (Abdullayev , et al . 2007), In an experiment carried out in the Syrian Arab Republic on cotton production with irrigation lines with length 100 - 150 meters after the laser guided land leveling at a flow rate of 0.75 - 1.5 (l / s) shows the laser guided land leveling Outweigh the control on the provision of irrigation water with amount of 3834 m3 / h , also achieved increased production estimated at 18% and increase water use efficiency (WUE) from 0.23 to 0.37 kg / ha, and compared to surface traditional irrigation the irrigation lines under the laser guided land leveling increase the efficiency of irrigation water use from 45% to 60% , concluded that the expected results from the application of laser guided land leveling the entire area planted with cotton in Syria compared to conventional agriculture are: reduce the amount of irrigation water that is used in agriculture from 3.5 billion m3 to 2.5 billion m3, and therefore as a result of the savings we can increase the area of irrigated land up to 94,000 hectares , and increase total production up to 376,000 tons (Kaisi, A. et al, 2004).

Second- Effect of tillage system on productivity and technological properties of cotton:

at the beginning of man existence he depended on hunting and harvesting wild crops to secure food and clothes then turned to planting crops and domesticated it about 10,000 years BC, he used the stick to split Agriculture Lines And still this method is used in some countries of Latin America and later up to a year 6000 BC Sumerians and the Egyptians replaced the manpower with oxen to drag the plow which is developed in the form of wooden dowel with a claw iron end to prepare the appropriate cradle for seeds, and in 3500 BC the Europeans developed a blade plow to take the form of moldboard plow which can soil cutting and overthrow the upper layer of soil according to (David and John, 2008), deep tillage works to provide a better spread of the roots system in the soil compared with the shallower tillage (Martino, 1998), Increasing the depth of tillage from 20 cm to 35 cm then 55 cm has achieved a steady increase in the length of the cotton plant and the production of cotton due to "improve the physical properties of the soil and this improvement of production under the deeper tillage due to the reduction of bulk density values in the plowed soil sector" (Borghei et al., 2008), by increasing the depth

of tillage achieves reducing in the value of the bulk density which increases the spread of the roots system and the plant's ability to feed and lead to increase in crop productivity while by reducing the depth of tillage the opposite happens (Gantzer and Blake ,1978 ; Ogbodo, 2005), (Acharya and Sharma, 1994) reached to lower agricultural crop productivity by reducing the deep of tillage, deep tillage in cotton is working to that the root system can arrive to the accumulated nutrients in the lower layers also working to reduce the number of tillage that are needed to provide not compaction soil and protect cotton from grass seeds and toxic accumulated salts in the surface layer and facilitates the movement of water through layers of soil (Doerge et al., 1991), The bulk density and soil compaction are ones of the most important physical properties of the soil that affect crop productivity and the physical results that happen by soil compaction are increasing soil density and low porosity and increase soil resistance to the spread of root system (Lipiec et al., 1991).

Third - Effect of amount of the irrigation water on productivity and technological properties of cotton:

The world's population is steadily increasing and at the same time steadily reducing in the water resources that used for irrigation with high irrigation costs due to climate change, rising temperatures, pollution in the environment and the increased reliance on these resources by industry and urban areas, which increases the concern of governments on how to secure food and clothing for the growing numbers of people resort to import these materials with high price, According to the FAO, the approximately 1.8 billion live in areas characterized by water scarcity, and two-thirds of the world's population will be at risk of drought by 2025, and it is difficult to continue the practices of the current irrigation in arid and semi-arid areas so it has to reduce the amount of water irrigation with an effective irrigation programs and efficient use of irrigation water, especially in the planting of cotton because of the large consumption of water of this plant, the hot and dray summer is one of the most important factors that limit the growth and development of the cotton crop (Bakhsh et al., 2008; Massaci et al., 2008; Unlu et al., 2011; Comlekcioglu and Simsek, 2011), Should be taking into account a lot of things to manage the irrigation process properly, including the ability of soil to retain moisture, the ideal cotton production is achieved when the

soil is irrigated until we achieve 50-60% of its overall capacity to retain water According to (Doorenbos and Kassam, 1979), Irrigated treatment by 50% of the needed root zone outperforms the treatment that received 30% of the irrigation water in the production of cotton (Hunsaker et al, 1998), pointed (Ertek and Kanber, 2003) to an increase in the number of balls / plant and the proportion of flowering and cotton productivity beloved linearly with the increase in the amount of irrigation water in surface irrigation, In a study of (Hussein et al.,2011) come to outweigh the section, which received the biggest amount of irrigation water and surpassed in all of the moisture of the soil, plant height and number of balls and production of cotton during the two seasonal search and from another hand, excelled transactions that received a minimal amount of irrigation water in the early flowering and maturity during the seasonal search and added that the harvest index (seed cotton yield / weight of the plant above the surface with balls) increased while reducing the amount of irrigation water.

RESEARCH MATERIALS AND METHODS

1-Experimental material :

Cotton class (Aleppo 90) has been planted, who belongs to the type (G. hirsutum L) and it is a Syrian hybrid, the result of hybridization between the Soviet Class (Tashkent 3) and American Class (Delta Pine 70) , and has been adopted to plant in (Al- Hasaka state) in the year 1997.

2-Location search :

Research was carried out in a village, which lies 60 km north of Al-Hasaka province during the growing seasons (2011-2012).

3-Experience Design :

The experiment was designed in a way (split plot twice) , where laser guided land leveling occupied the main plots and the tillage depth and frequency of irrigation occupied split plot and under the split plot with main two plots:

1. laser guided land leveling technique the soil surface with a slope of 0.4% off irrigation lines on 3000 m2 space.

2. Not leveling the land and maintaining the topographic situation of the land.
3. Three deep tillage, are : (10, 25.35) cm.
4. Three interval irrigation periods, are : (7, 8, 9) days.

And also we will study the interaction between these factors, at the rate of three replicates per treatment shall be the number of plots (54) experimental pieces (2 x 3 x 3 x 3 = 54), pieces experimental length (33 m) and width (3.5) m, contain (4) lines in a plot and 12 line per treatment, the distance between the line and the line (75) cm and the distance between the plant and the plant (20 cm), so the overall experience space (6237 m 2) t, and adopted two middle lines of each plot to take readings through the choice of 20 plants randomly marked cards, and in order to avoid experimental error resulting from increased food area of the plants located in the peripheral lines, estimated production of cotton by harvesting each plot alone and all transactions and repeaters, it has a handy Agriculture in accordance with the distances listed above and has agriculture in the month of April during the seasons 2011 - 2012. It statistical analysis was performed using GENSTST7 program at confidence limit at the 5% level, and the interaction between the laser guided land leveling, tillage depth and frequency of irrigation.

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PRODUCTION OF BIOGAS ANAEROBIC DIGESTION PROCESS FROM SOYA BEAN AND SUGAR BEAT SUBSTRATE

SUMMARY

Anaerobic digestion (AD) is a safe and environmental friendly technology for production Biogas. Soya bean contains high amount of nutrient and protein. Suger beat contains a high concentration of sucrose. The research was conducted in order to investigate the Biogas production in an anaerobic digestion system. Soya bean and Sugar beat were mixed 80:20 ratio at a concentration of 2.5 g VS/L reactor volume and day. The hydraulic retention time was about 22days (Cal:-05). The Results showed that (Tab.-01), the Biogas production on 4th day was 2.978 L/day, which was higher then the other days. But from the Cal.02 expected Biogas production was 3.22 L/day. From the Volatile Fatty Acids (VFA) analysis (table-03) it was observed that acetic acid fluctuate between 37.2 and 78.7 mM and propionic acid between 0.82 and 12.02 mM. From the Fig-03 it was observed that the pH fluctuate between 7.18 and 8.11.Finally from Cal.-04 expected methane 1.56 L / day and methane yield 55.51 %.

Keywords: Anaerobic digestion, Volatile Fatty Acids, pH, Biogas

INTRODUCTION

Biogas: Biogas is the mixture of gas produced by methanogenic organism while acting upon biodegradable materials under anaerobic conditions (Reith, 2006). Anaerobic microbiological decomposition is a process in which micro-organisms derive energy and grow by metabolising organic material in an oxygen-free environment resulting in the production of methane. This process can be subdivided into four phase's hydrolysis, acidogenesis, acetogenesis, methanogenesis (Reith, 2006). Biogas is mainly composed of 50 to 70 percent methane, 30 to 40 percent carbon dioxide and low amount of other gases (Reith, 2006). Biogas is about 20 percent lighter than air and has an ignition temperature in the range of 650ğC to 750ğC.

Biogas is a mixture of methane and carbon dioxide. The production of biogas in lab scale reactors with different proportion of substrate is the

main objective of my experiments. The anaerobic digestion process and production of methane is divided into three stages: hydrolysis, acid formation and methanogenesis. In the hydrolysis stage insoluble compound such as particulate and colloidal wastes undergo hydrolysis to soluble organic compounds. In the acid formation stage soluble compounds are degraded by a large diversity of facultative anaerobes and anaerobes through fermentative processes. The degradation of these compounds result in the production of carbon dioxide, hydrogen gas, alcohols, organic acids, some organic-nitrogen compounds, and some organic sulphur compounds. The acetate is the principal organic acid or volatile acid used as a substrate by methanogenes, in this stage acetate and carbon dioxide plus hydrogen is converted to methane gas. Other product such as NH3, H2S, CO2, foam & scum could be expected in methane production process. I measured pH, TS % (Total Solid, part of the substrate that remain after heating at 105°C for four hours), VS % (Volatile Solid, part of the substrate that is combusted in 550°C for four hours) VFA (Volatile Fatty Acids), and Methane analysis. For methane production those parameters are very important and related to each other. To monitor the efficiency of the process of biogas production those parameters are very important. If any disturbance happens in the process then adjustment is needed for controlling those parameters.

MATERIALS AND METHODS

The experiment was carried out using one reactor (CSTR, 2L). It was a continuously stirred tank reactor which was stirred in 15 min intervals to ensure complete mixing of the reactor contents. Once a day from Monday to Friday 100ml of reactor liquid was withdrawn and 100ml substrate was added. The substrate was a mix of Soya bean and sugar beat (80:20) at a concentration of 2.5 g VS/L reactor volume and day. It was inoculated with anaerobic microbiological consortia using material from local municipal biogasplant. The working volume of the reactor was 1600 ml (1L inoculum and 600 ml water). The hydraulic retention time was about 22days (Cal:-05). One Gas Meter (K = 56.7 ml / beat) was used for measuring the total amount of gas produced from biogas reactor based on the principal of water displacement. Gas chromatograph(GC-FID) with flame ionisation detection, in the experiment was used for analysis of methane and volatile fatty acids. PH meter, sometubs, stoppers were used also. On Wednesday 22.03.2006 experiment was started. The temperature of the incubator was 37°C. During the week-

day feeding was done to the reactor in order to check pH, gas meter reading (beat), TS %, VS %, and twice a week methane production as well as twice a week VFA.

RESULTS AND DISCUSSION

From the methane production data Table-01 it was observed that in the starting stage dated 27.03.06 methane production was 2.9 L / day and gradually it was decreasing (Fig-01). From the table-01 it showed that the produced methane concentration very low, it should be between 30% and 70%. When it was added 1.6 g sugar on 24.04.06 that day the methane production was 1.21 L / day and again gradually decreased (Fig-01). However, from the 1.6g sugar added calculation (Cal:-02) expected methane production should be 3.22 L/day. From the Fig-03 it was observed that the pH fluctuate between 7.18 and 8.11 during 01st to 29th days, but after added sugar at 32nd day then the pH gradually decreased. From the VFA analysis (table-03) it was observed that acetic acid fluctuate between 37.2 and 78.7 mM and propionic acid between 0.82 and 12.02 mM. In the reactor isobutaric acid quantity was between 0.53 mM and 3.18 mM but butaric acid was found very low because of soybean as high protein substrate. Iso capronic acid, n-capronic acid, heptaonic acids were not found in the reactor. From TS% and VS% over time (table-04) it was observed that TS% decreased gradually from 4.6 to 1.52 and VS % fluctuated between 68.32 % and 83.82 % approximately. Finally calculated expected methane 1.56 L / day and methane yield 55.51 % (Cal:-04). Alkanity result was, for pH (5.75) = 0.11 milliM and for pH (4.5) = 0.17 milliM (Cal:-03). C, O, H, N were the major bioelements for microorganisms grow up. Soya bean contains high amount of nutrients and high amount of protein, so for better alkalinity and produce ammonia which copes with the increasing acid. The pH of an anaerobic system was significantly affected by the CO2 content of the biogas. It observed, if it was not high methane production then the acetic acid could be high. When it was added 1.6g sugar means increase organic load. If mathanogenic archaea fail to degrade organic acid to methane then accumulation of organic acid happen, and as a result alkanity decrease. When acetic acid and propionic acid increases it affect pH and methane concentration also. Lime (CaCO3), bicarbonate or carbonate salts can be used to increase the pH to optimum level. Propionic acid increase means the reactor was not working well as the H2 levels were too high, to degrade propionic acid in the biogas process H2 concentration need

to be very low. When the pH decrease due to adding organic load the organic load should be reduced again and then increased more gradually. Methanogens initially cope with the organic load but rapidly inactive as acid increased.

CONCLUSIONS

The study clearly indicates that anaerobic digestion is the most effective biological processes to handling a wide variety of solid products. The Methane production from the beginning was higher, it was observed from the Table-01 2.978 L/day. However, gradually it was decreasing (fig-01). During the experiment washed out organisms and needed an adaption time to this specific feedstock. The Biogas production in digester was depend on hydraulic retention time also. In order to higher production of Biogas PH and temperature should be controlled.

TABLES AND DIAGRAMS

Table: 01(Methane production)

Total Methane Production

Date	Day	Avarage Area	PH	No of Beat	Volume of total gas	%CH4 in Dilution Bottle	CH4 in Reactor (%Dilu*27)	CH4 production L / day
2006-03-24	1		7,77	27	1530,9			
2006-03-27	4	41822,9	7,85	124	2343,6	1,568816	42,358032	2,978
2006-03-28	5		7,89	36	2041,2			
2006-03-29	6		7,82	60	3402			
2006-03-30	7	31435,83	7,78	75	4252,5	1,1533332	31,1399964	1,32
2006-03-31	8		7,76	70	3969			
2006-04-03	11	14773,66	8,11	159	3005,1	0,4868464	13,1448528	1,35
2006-04-04	12		7,91	35	1984,5			
2006-04-05	13		7,85	32	1814,4			
2006-04-06	14	32112,2	7,82	60	3402	1,180388	31,870476	1,08
2006-04-07	15		7,81	11	623,7			
2006-04-10	18	32558,96	8,04	0		1,1982584	32,3529768	
2006-04-11	19		7,77	10	567			
2006-04-12	20		7,5	29	1644,3			
2006-04-13	21	22526,5	7,58	44	2494,8	0,79696	21,51792	0,536
2006-04-14	22			49	2778,3			
2006-04-17	25			70	3969			
2006-04-18	26		7,82	60	3402			
2006-04-19	27		7,86	64	3628,8			
2006-04-20	28	32150,63	7,63	49	2778,3	1,1819252	31,9119804	0,886
2006-04-21	29		7,67	41	2324,7			
2006-04-24	32	30125,6	7,97	72	1360,6	1,100924	29,724948	1,21
2006-04-25	33		7,7	33	1871,1			
2006-04-26	34		7,6	49	2778,3			
2006-04-27	35	24786,63	7,4	61	3458,7	0,8873652	23,9588604	0,828
2006-05-01	39			123	2324,7			
2006-05-02	40	42989,23	7,7	46	354,2	1,6154692	43,6176684	0,154
2006-05-03	41		7,51	13	737,1			
2006-05-04	42	34318,1	7,54	28	1587,6	1,268624	34,252848	0,543
2006-05-05	43		7,18	53	3005,1			
2006-05-08	46		7,51	96	1814,3			
2006-05-09	47		7,39	14	793,8			

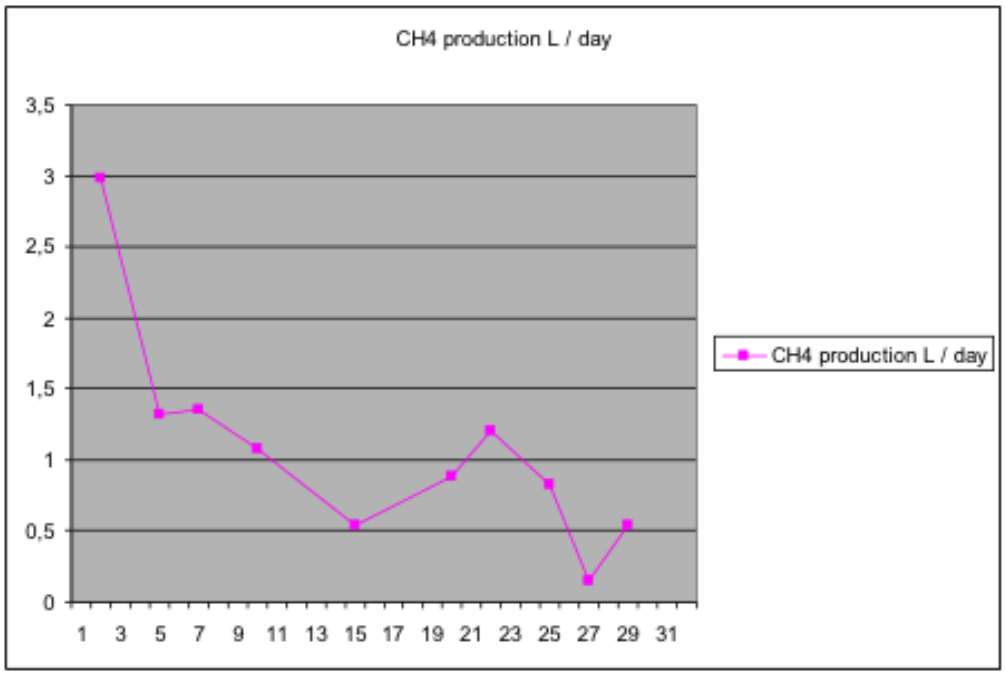

Fig: 01 (Methane production L/day))

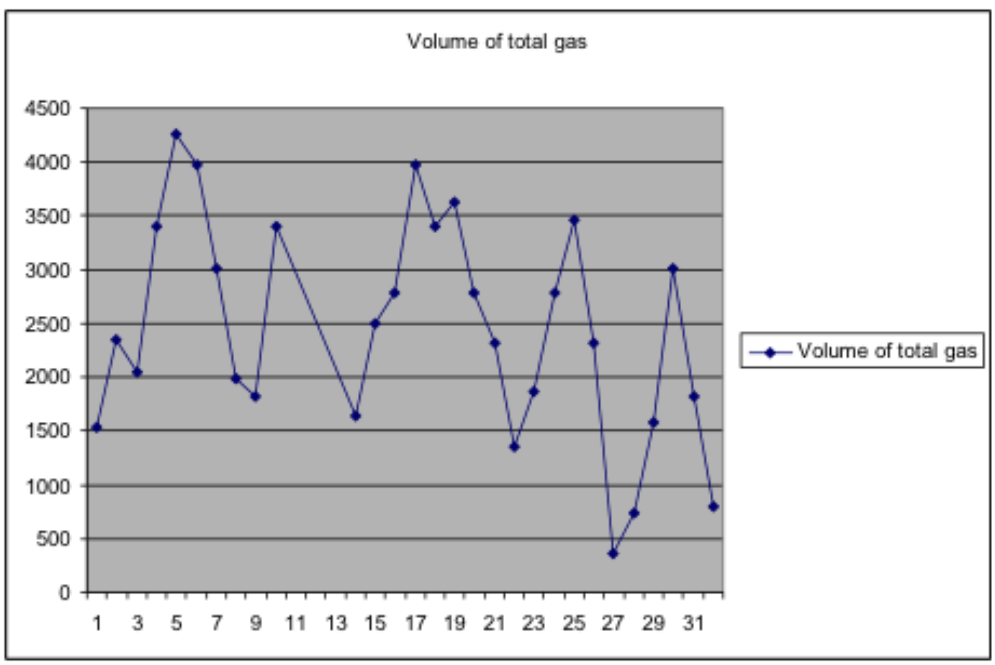

Fig: 02(volume of total gas)

Table: 02 (pH and Day)

pH and Day Diagram

Day	PH
1	7,77
4	7,85
5	7,89
6	7,82
7	7,78
8	7,76
11	8,11
12	7,91
13	7,85
14	7,82
15	7,81
18	8,04
19	7,77
20	7,5
21	7,58
22	
25	
26	7,82
27	7,86
28	7,63
29	7,67
32	7,97
33	7,7
34	7,6
35	7,4
39	
40	7,7
41	7,51
42	7,54
43	7,18
46	7,51
47	7,39

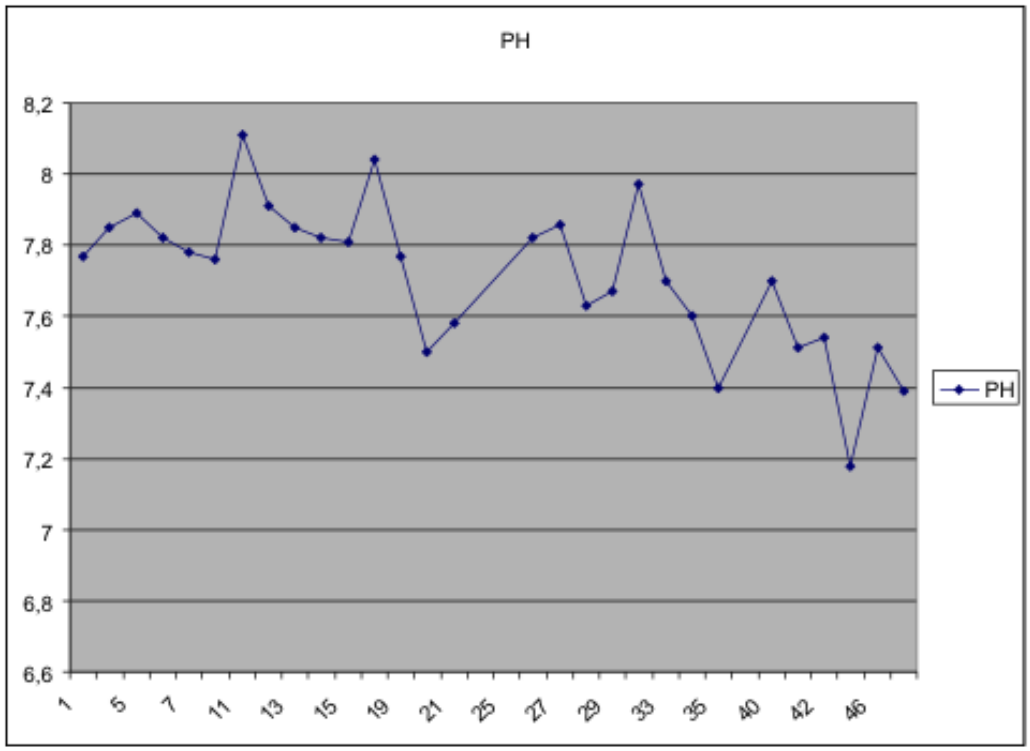

Fig: 03 (pH)

Table: 03 (VFA Analysis)
VFA Analysis

Date	Day	Acetic Acid	Propionic Acid	Isobutaric Acid	Butaric Acid	Isovaleric Acid	n-Valeric Acid	Iso Capronic Acid	n-capronic Acid	Heptaonic Acid
0	0	5,3647	0,8225	0,0837	0,0774	n.a	n.a.	n.a.	n.a.	n.a.
28,03,06	2	37,232	5,1772	1,0291	0,6322	0,8922	0,8922	n.a.	n.a.	n.a.
07,04,06	12	45,166	4,8968	0,7744	n.a.	0,4607	0,4607	n.a.	n.a.	n.a.
14,04,06	19	78,758	12,3026	2,3211	n.a.	2,3666	2,3666	n.a.	n.a.	n.a.
21,04,06	26	26,709	4,7774	0,5394	0,2635	0,4969	0,4969	n.a.	n.a.	0,0743
28,04,06	33	17,068	12,0239	1,5954	0,1391	1,3988	n.a.	n.a.	n.a.	n.a.
02,05,06	37	21,435	19,03	2,597	0,428	1,921	n.a.	n.a.	n.a.	n.a.
09,05,06	44	26,469	32,151	3,181	n.a.	3,899	0,834	n.a.	1,01	n.a.

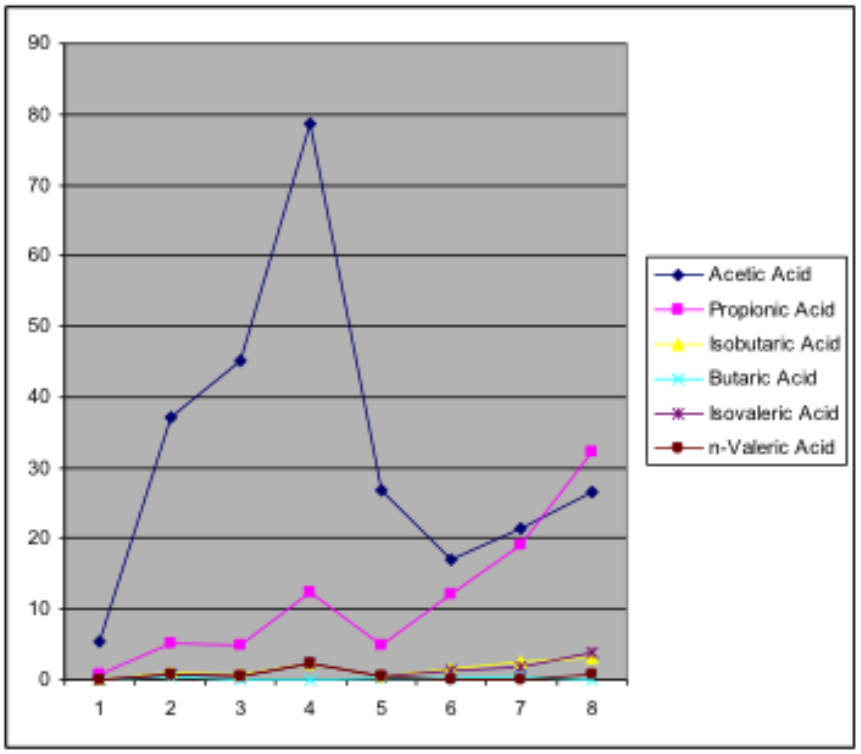

Fig: 04 (VFA Analysis)

Table: 04 (TS% and VS% over time)
TS and VS over Time

Date	TS%	VS%	Soya bean		Sugar Beat	
24,03,06	4,6	68,32	TSin	VSin	TSin	VSin
29,03,06	3,01	71,64	3,474	94%	4,21	98%
05,04,06	2,62	68,84				
12,04.06	1,86	70				
19,04,06	1,74	72,41				
26,04,06	1,87	83,82				
03,05,06	1,8	82,69				
09,05,06	1,52	75,77				

Total TSin=0,8*3,474+0,2*4,21=3,622
Total VSin=0,8*0,94+0,2*0,98=0,948
Reduction VS calculated in 19,04,06 was:1-(0,0174*0,7241)/(0,0362*0,948)=0,63 that is 63%

Methane Expected=(2,6*0,8+2*0,2)=2,48L/day
Expected CH4 production=Exp.Methane*0,63=2,48*0,63=1,56L/day
Methane Yield= (Actual CH4 production on 20,04,06/Expected CH4)*100
Methane Yield=(0,886/1,56)*100=55,51%

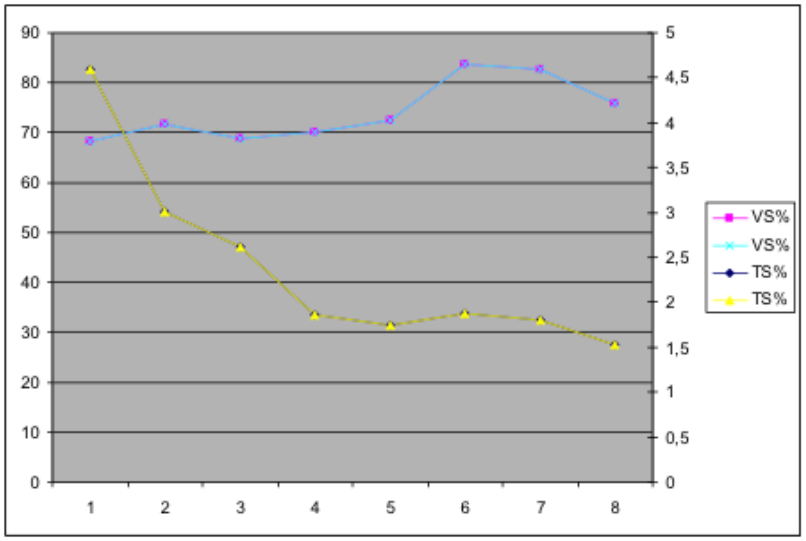

Fig: 05 (TS% and VS)

Table: 05 (Standard CH4 Concentration)
Standard CH4 Concentration

Standard CH4 Concentration.	Area
3,8	81621,03
2,4	63795,66
1,2	29230
0,4	9371,76

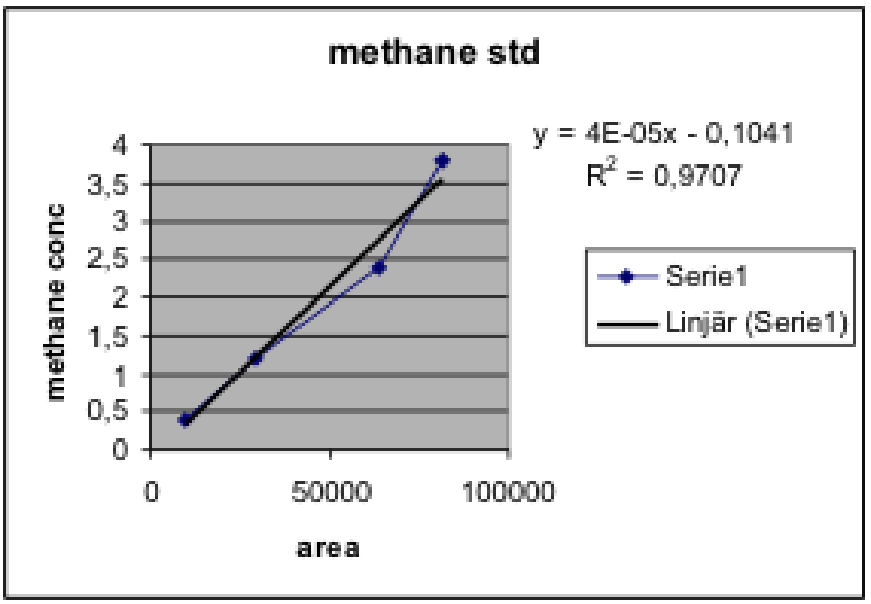

Fig: 06 (Methane Std.)

Calculation:

Soya bean: Sugar beat = 80: 20
Sugar beat = (4g VS/0.19) = 21 gm. (Sugar beat 19% TS and 98%VS of TS)
(21 gm/0.98)=21.50 add each day
100ml prepare substrate 81 % water so, (0.81*21.50) = 17.4 gm water
(100-17.4) = 82.6 ml water

Soya bean = (4 g VS / 0.92) = 4.3 gm (Soya bean 92% TS and 94%VS

of TS)
(4.3 gm / 0.94) = 4.6 gm to add 100 ml water
(0.08*4.6) = 0.4 ml water.

Cal:-01. Expected methane production
Soybean
100g Soybean contain (100%VS)
34g protein = 0.40 = 40%
18g Fat = 0.21 = 21%
19g Carbohydrates = 0.22 = 22%
15g Fibber = 0.17 = 17%
Total=86g
Each Day 4g VS / Reactor / day
1.6g Protein = 0.013 mol*2.75 = 0.036 mol CH4
0.8g Fat = 0.0009 mol*390 = 0.035 mol CH4
0.9 g Carbohydrate = 0.006 mol*3.00 = 0.018 mol CH4
0.79g Fiber = 0.004 mol*3.00 = 0.012 mol CH4
So, 4g VS total = 0.101 mol CH4
(Mol weight of protein = 119.4 or 119.5 g / mol, Mol weight of Fat = 860.6 g / mol, Mol weight of carbohydrates = 162.1 g / mol)
PV= nRT
V= nRT/P
V=(0.101*8.314*310)/10130 (T=273+37 K, R=8.314 j mol-1 K-1
V=2.6*10-3m3
V=2.6 L P=1.01300*105pa)

Sugar beat
Each Day 4g VS / Reactor / day
0.24 g Protein = 0.002 mol*2.75 = 5.5*10-3 mol CH4
Fat = sugar beat contains no fat.
1.28 g Carbohydrate = 0.008 mol*3.00 = 0.024 mol CH4
2.52 Fibber = 0.016 mol*3.00 = 0.048 mol CH4
So, 4g VS total = 0.0775 mol CH4
V= (0.0775*8.314*310) / 101300
V=1.97*10-3m3
V=2.0 L
Now Total expected methane = (2.6*80%+2*20%) = 2.48 L / day

Cal:-02. 1.6g Sugar Add expected methane calculation
Mol weight of carbohydrates = 162.1g/mol

1.6g sugar=0.0098 mol*3.00=0.0294 mol CH4
V= (0.0294*8.314*310) / 101300
V=0.7378*10-3 m3
V=0.7378 L
After 1.6g sugar adding total expected methane
= 2.48 L/day+0.7378 L/day = 3.22 L/day

Cal:-03. Alkalinity
HCO3+HCl=H2CO3+Cl
Here 0.1Mol/L HCl = 100milliM/L
I added for pH 5.75 = 1.1ml HCl = 0.0011L = 0.0011*100 = 0.11milliM
I added for pH 4.5 = 1.7ml HCl = 0.0017L = 0.0017*100 = 0.17milliM

Cal:-04. Methane Yield
Total TSin = 0,8*3,474+0,2*4,21 = 3,622
Total VSin = 0,8*0,94+0,2*0,98 = 0,948
Reduction VS calculated at dated 19.04.06 was: 1-(0,0174*0,7241 / (0,0362*0,948) = 0,63 that is 63%
Methane Expected = (2,6*0,8+2*0,2) = 2,48 L/day
Expected CH4 production = Exp.Methane*0,63 = 2,48*0,63 = 1,56 L / day
Methane Yield = (Actual CH4 production on 20,04,06 / Expected CH4)*100
Methane Yield = (0,886/1,56)*100=55,51%

Cal:-05. HRT (Hydraulic Retention Time)
100ml feed for 5 days = 500 ml which continues for 7days (01 week)
Each day feed add to reactor = 500/7 = 71.43 ml.
HRT (Hydraulic retention time) = Volume of the liquid in the reactor / Each day feed add =1600ml/71.43 ml = 22.39 days.

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The “Science in Asylum” (SiA) project supports refugee scientists and academics to gain a foothold in Austria. Building on the capacities and skills available, the project motivates and trains refugees to look for adequate jobs, continue their education, or to create own businesses in science and research.

The first SiA seminar, which took place in 2016, in Vienna offered essential information and networking possibilities to a group of 25 refugees and supported them in writing and publishing a scientific paper. This booklet documents the activities of the project and presents the papers which were reviewed by Austrian scientists.

Authors and the titles of their papers:

Alsaelm, Mouhannnad:
The Effects of Land Leveling by Laser, Tillage Systems and Amounts of Irriagation Water on the Yiels and the Technological Properties of Cotton

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