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Αμερικανικής Γεωργικής Σχολής

International Workshop/Conference

"Innovative Olive Production Systems Adapted for Mechanical Harvesting:

Holistic Approaches for Sustainable Management"

12-15 November, 2014

Perrotis College, Thessaloniki, Greece

BOOK OF ABSTRACTS

Editor: Dr. Athanasios Gertsis

Director - Perrotis College- Krinos Olive Center

ISBN 978-618-80868-1-4

BOOK OF PRESENTATIONS

(Available also in .pdf form at web site: http://www.olivecenterafs.com)

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PUBLISHER:

Athanasios Gertsis © (Editor)

Perrotis College-American Farm School©

ΟΜΙΛΟΣ ΜΕΤΑΛΥΚΕΙΑΚΗΣ ΕΚΠΑΙΔΕΥΣΗΣ ΚΑΙ ΚΑΤΑΡΤΙΣΗΣ

ΑΜΕΡΙΚΑΝΙΚΗΣ ΓΕΩΡΓΙΚΗΣ ΣΧΟΛΗΣ©

Welcoming letter by Dr. Panos Kanellis

Dear Participants:

It is our pleasure to welcome you to the International Workshop/Conference **"Innovative Olive Production Systems Adapted for Mechanical Harvesting: Holistic Approaches for Sustainable Management»** at Perrotis College and the American Farm School. We are honored to host this event bringing together eminent scientists, businessmen, farmers, policy makers and students. It promises to be a valuable forum for communicating and disseminating recent research results in the olive production-processing-marketing world.

The Conference will address a number of important topics related to the holistic approach to olive management, ranging from sustainable management in primary olive production systems (for table olives and olive oil), to olive quality and chemistry, to beneficial uses of by-products from various forms of olive processing. The conference intends to address priority issues concerning production activities that impact the environment, the agro-food sector and the olive market.

The presence of **seven world olive experts** as well as other high level speakers will serve as a basis for practical implementations and will provide valuable information to those participants engaged in sustainable *management, profitability and agricultural entrepreneurship* .

Since its founding in 1904, the **American Farm School** has been an innovator in agricultural practices and technology transfer in Greece. The establishment of **Perrotis College** in 1995, now offering BSc (Hons) degree majors in Environmental Systems Management, Food Science and Technology, and International Business, advanced the institution's vision of becoming a regional center of excellence in the areas of agriculture, the environment and related life sciences. The **Perrotis College Krinos Olive Center** is the School's latest initiative in support of this vision. The Center will enhance education, training and applied research opportunities for university students of many nationalities and cultural backgrounds, while also assisting those in the industry to improve the quality and viability of olive products.

I look forward to welcoming you to Greece and to the campus of the American Farm School and Perrotis College.

Sincerely,

Dr. Panos Kanellis

President

American Farm School & Perrotis College

Welcoming letter by the Organizing Committee

Dear participants

We welcome all of you and hope you will further disseminate the materials, opinions, knowledge shared during this event. Information and deliverables will be available in the webpage www.olivecenterafs.com, which will be updated soon and periodically with more information, such as the Book of Abstracts (posted), Book of Presentations, Book of Proceedings and other publications and informational material.

We will do our best for this event to provide a valuable information, incentives and collaborations within the olive world and bring together the various key-players (olive farmers, processors, business, educators, policy makers and also students interested to follow up olive production-processing and marketing.

The new initiative at Perrotis College, KRINOS OLIVE CENTER will present a continuous forum of ideas exchange, collaboration, research, education and exhibition for all aspects of olive production.

Olive tree is historically called the "blessed tree" and there are many good reasons for this and we discover more in recent!

Once again we welcome and wish you to have a fruitful time!

Sincerely

The Organizing Committee

Dr. Athanasios Gertsis (conference Chair)

Ms. Anisa Bellou (Secretariat)

Dr. Evangelos Vergos

Mr. Kostas Rotsios (Financial chair)

Dr. Christos Vasilikiotis

Dr. Kiki ZInoviadou

Mr. Ioannis Gatzolis

Mr. George Kartsiotis (Webpage development)

Acknowledgments

The Organizing Committee expresses their sincere gratitude to the INTERNATIONAL OLIVE OIL COUNCIL (http://www.internationaloliveoil.org) for co-funding this International Workshop & Conference and also the ANASTASOPOULOS NURSERIES (http://www.anastasopoulos-nurseries.com) being the major sponsor of the Research-Education & Demonstration New Olive Grove of Perrotis College.

Also acknowledgments are extended to Mr. George Kalamaras- Director of GAB Hellas for his support and sponsorship to the Conference and research conducted in Perrotis College for olive production systems and other scientific fields.

All other supporters are mentioned in the publication and other materials produced, and our sincere acknowledgments are extended to them.

INVITED SPEAKERS ABSTRACTS

Discrimination of Olive Oil Quality and Health Protecting Properties Based on Specific Phenolics Content

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ABSTRACT

The traditional Mediterranean diet, which is continuously attracting the interest of the scientific community for its health protecting activities, is based on the daily consumption of olive oil as the major source of lipids. One of the most important classes of constituents of olive oil is the secoiridoid phenolic derivatives which present an increasing potential for health protection. The European Union legislation based on the scientific opinion of EFSA has recently permitted specific health claims related to the levels of specific phenolic compounds found in olive oil.

The key compounds that are responsible for the recognized health claim "protection of blood lipids from oxidative stress" are hydroxytyrosol, tyrosol and their derivatives. For this reason the accurate measurement of the levels of those compounds in olive oil is very important. As of today there is no officially adopted method for their measurement because of well known technical difficulties. Hydroxytyrosol (3,4-DHPEA) and tyrosol (p-HPEA) are found in olive oil mainly in the esterified forms of oleacein (3,4-DHPEA–EDA) and oleocanthal (p-HPEA-EDA) and also as the monoaldehydic and dialdehydic form of oleuropein aglycon (3,4-DHPEA-EA), and the monoaldehydic and dialdehydic form of ligstroside aglycon (p-HPEA-EA) which all possess significant biological activities. To overcome the analytical difficulties we have recently developed a validated method for accurate and rapid measurement of all the mentioned key compounds based on qNMR spectroscopy as well as a new cheap colorimetric method.

During the 2010-2014 period, the qNMR method has been applied to >1000 samples from all the major producing countries around the world and all the major varieties. Significant differences among varieties as well as differences related to maturity of olives during harvest have been identified, confirming ancient Greek texts about the increased health protecting activity of the oil coming from unripe olives. The impact of harvest time, milling parameters, olive variety and application of mechanical harvest on the levels of specific phenolics will be discussed.

KEYWORDS: phenolics, health claim, qNMR method, hydroxytyrosol, tyrosol, oleacein, oleocanthal, olIve quality

Obtaining of Bioactive Ingredients: An Interesting Solution for Agro-industrial Wastes Such as Olive Leaves

Carretero, A.S.

ABSTRACT

The revalorization of agro-industrial wastes is an interesting alternative way and solutions. In general, the wastes are usually rich in bioactive compounds. The olive leaves particularly are very rich in polyphenols with very anticancer properties.

Our Center CIDAF is a technological Center specialized in the characterization, isolation, purification of bioactive compounds for functional food, nutraceuticals and cosmaceutical. In this aspect, we have developed several researches using olive leaves and we have extracted, characterized and purified extract with very important anticancer properties.

KEYWORDS: olive leaves, polyphenols, anticancer properties, CIDAF, bioactive compounds

Implementation of Polyphenols and Dietary Fibers From Olive Mill Wastewater in Food Products

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ABSTRACT

Olive mill wastewater is a rich source of polyphenols and other valuable compounds, while their commercial implementation is nowadays a reality. Galanakis Laboratories pioneer to this direction by co-founding a company for the recovery of polyphenols from olive mill wastewater and contributing to their research and development efforts. Phenoliv owns a patented methodology for the physicochemical separation of polyphenols and dietary fibers in two different products: (a) an extract rich in polyphenols (Lundolive) and (b) an insoluble residue rich in pectin (Pectinolive). Pectinolive can replace fat in meat or other food products. Lundolive has strong antioxidant activity and contains hydroxytyrosol, a substance approved by the European Food Safety Authority for maintaining healthy LDL-cholesterol level and protecting lipids against oxidation. Lundolive is already being used as an additive by a Swedish chocolate manufacturer, while its implementation in vegetable oils, bakery products and cosmetics (i.e. sunscreens, sun protection factor-booster) is today investigated within a research program funded by General Secretary of Research and Technology. Moreover, Lundolive will be added as a natural preservative of omega-3 fatty acids in smoothies that will be available in the Scandinavian market in the next years. Other suggested applications include carbonated beverages, chips and natural preservation of meat products.

KEYWORDS: polyphenols, Lundolive, hydroxytyrosol, Phenoliv, European Food Safety Authority, Olive mill wastewater

Good Olive Oil Quality May Prevent Oxidative stress

*Kiritsakis, A., 1 Gerasopoulos D. 2,, Iorio E.L. 3,. and Kiritsakis, K. 4

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ABSTRACT

The formation of the oil quality starts in the orchard and is affected by several factors such as: cultivar, environment, insects and fungi infestation, fruit maturation, olive processing conditions, oil storage, etc. These factors, affect oil acidity and peroxidation, antioxidant composition (phenols and polyphenols), pigments composition, oil aroma and flavour and other quality characteristics. The aroma and the flavour compounds of olive oil, as well as the chlorophyll and pheophytin pigments, increase the stomach secretion and facilitate the absorption of the polyphenol antioxidants, which furthermore protect the body tissues from oxidation. The olive processing systems (Pressure or Centrifugation) and the conditions applied during processing affect significantly the quality of olive oil and its composition. Thus, the addition of high amount of water (with temperature higher than 27 ^{o}C) in the olive oil mill results in a considerable decrease of the hydro soluble (polyphenols) and in a partial decrease in the lipid soluble (chlorophylls and tocopherols) compounds. Deterioration of olive oil quality during storage is favored by factors such as temperature, presence of metals, light, moisture and others. A strong linear correlation between the polyphenol content and the induction period of the oil has been observed.

Oxidation has been noticed since antiquity as a serious deterioration of fatty substances. The reactive oxygen species (ROS) – free radicals needed for the oxidation mechanism are generated not only from auto-oxidation of lipids during storage but also from many cellular oxidative pathways in the body. An imbalance between free radicals and antioxidants present in our body can cause oxidative stress in which excess free radicals attack and damage all biomolecules (including DNA) in the cells, leading to serious chronic diseases and cell death.

This presentation will focus in the factors affecting olive oil quality from the fruit to the table and will emphasize the effect of good quality on the prevention of oxidative stress.

KEYWORDS: Olive oil, quality, aroma compounds, free radicals, oxidative stress, tocopherols, chlorophylls, polyphenols

Phytopathological Problems of Olive Tree that Could Be Enhanced by the Intensive Management of Olive Plants

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ABSTRACT

High density orsuper-high density cultivation of olive plants foresee the adoption of specific and intensive management practices with particular regards to pruning, irrigation and harvesting.Such practices, together with the reduced spacing of plants, may have a key impact on the spread of certain plant pathogens.Mechanized cultural practices can promote the development of olive knot, a bacterial disease caused by Pseudomanssavastanoipv. savastanoi. The characteristic symptom of infection is the development of galls, or "knots," at infection sites thatcan girdle and kill affected twigs. The disease affects fruit size and quality and the death of infected shoots directly reduces yield. The pathogen can infect the plant through natural openings that occur when the tree drops its leaves, flowers, or fruit, through wounds resulting from natural events such as frost injury or hail damage or by wounds caused by cultural practices such as pruning and harvesting. The impact of the disease on yield, fruit size, and quality render olive knot of economic importance to both commercial table olive growers and growers of olives for oil.

Quick decline of olive tree ("complesso del disseccamentorapidodell'olivo") is a disease recently observed in Southern Italy (Autumn 2013) caused by a complex of pests among which Xylellafastidiosa (a xylem-limited fastidious bacterium included on the EPPO A1 List since 1981). The bacterium is transmitted by numerous species of Cicadellidae and Cercopidae (Insecta: Hemiptera).Among the EPPO countries, Italy is the only one where the disease was observed so far and where it is actually under eradication. X. fastidiosa represents a very serious threat for the EPPO region due to its very rapid spread and the serious damages it can cause in olive orchards.High density or super-high density cultivation might limit the effectiveness of preventive and eradication control measures.Key information about the disease are provided in order to raise awareness in neighbouring countries.

KEYWORDS: Olive knot, pruning, *Xylella fastidiosa*, Southern Italy, bacterium, olive disease

Antioxidant Activity of Phenolic Fractions from Extra Virgin Olive Oils From Croatian Autochthonous Cultivars

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ABSTRACT

The aim of this study was to evaluate the antioxidant activity of phenolic fractions extracted from extra virgin olive oils from four Croatian autochthonous cultivars (Drobnica, Krvavica, Levantinka, and Oblica). Total phenolic amount was determined using quantitative spectrophotometric methods with Folin Ciocalteu reagens, while phenolic profile was analyzed by chromatographic (UPLC) and spectroscopic (NMR) techniques. The antioxidant activity of phenolic fractions was determined using three different antioxidative methods: DPPH radical scavenging test, FRAP assay and copper-induced oxidation of human LDL (low density lipoprotein) method. The amount of total phenolics was the highest in extra virgin olive oil from Drobnica cultivar (439.71 mg/L GAE) in comparison with extra virgin olive oils from Lastovka (383.48 mg/L GAE), Oblica (236.85 mg/L GAE) and Krvavica (153.17 mg/L GAE) cultivars. NMR analyses showed that extra virgin olive oil from Drobnica cultivar contained the highest concentration oleacein (338 mg/kg), oleocanthal (182 mg/kg), oleuropein aglycon (139 mg/kg) and ligstroside aglycon (52 mg/kg) in comparison with oils from other cultivars. The highest radical scavenging activity using DPPH method was achieved by Lastovka phenolic fraction (72.37%) at the concentration of 5% (w/w). Drobnica phenolic fraction showed the highest ferric reducing capability of phenolic fractions determined by FRAP assay (249 µM Fe(II)/g) as well as the highest ability to prevent LDL oxidation (the prolongation of the lag phase of LDL oxidation was 127 min).

KEYWORDS: Extra virgin olive oil, phenolics, NMR, antioxidative activity, DPPH, FRAP, LDL oxidation, Croatian autochthonous olive cultivars, oleocanthal, oleacein

New Trends in Olive Orchard Design for Mechanical Harvesting

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ABSTRACT

The productivity of the traditional olive orchards is relatively low and the crop costs are very high (harvesting, pruning, etc.). Since the 70s, the increase of the olive surface has been associated to an intensification of the orchards and several authors recommend to use higher densities (HD), about 200-500 trees/ha, with drip irrigation, designed for harvesting with trunk shakers, and with higher yields and low-medium production costs. Finally, at the beginning of the 90s, a new type of olive orchards (super-high density hedgerow, SHD) appeared in Catalonia (NE of Spain), with densities ranging between 1,500 and 2,500 trees/ha. Later they were introduced into other Spanish regions (Andalusia, Aragon, etc) and other countries (Portugal, Chile, California, etc.). This system facilitates the use of continuous mechanical straddle harvesters and the achievement of higher yields within a few years after planting. To improve the efficiency of the harvester, vigour must be managed to limit tree size while maintaining high productivity. However, there are few cultivars adapted to this system and their management is more difficult than the intensive models. A comparative studies on the economic viability of high and super-high density olive orchards in Spain, indicate that HD economic ratios are more profitable than the SHD ratios. However, the latter could be the most sustainable option in large orchards with short term investments, mainly due to the full harvest mechanization and reduced labor requirements. Finally, the planting model choice in each region depends on different factors, such as ecological conditions, orchard size, manpower availability and the economic life investment.

KEYWORDS: high planting densities (HD), super-high planting density (SHD), mechanical olive harvesting

PARTICIPATING LECTURERS ABSTRACTS

Presentation of the PERROTIS COLLEGE - KRINOS OLIVE CENTER

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ABSTRACT

The Perrotis College-Krinos Olive Center was recently (2013) established as a forum of collaboration from various departments at Perrotis College and divisions of the American Farm School, and outside collaborators from the educational, business and farming world related to all aspects of olive, olive oil and by-products.

It aims to cover the needs and to support activities in the overall area of olive and olive oil production in Greece. It acts in parallel with the evolutions in rural economy, specially in developments of innovative technologies (mechanical olive harvesting) for the agro-food sector Evaluates the International trends affecting the production of one of the main agricultural products of Greece

The main targets of this center are: To promote research in sustainable practices both in the conventional but mainly in the new olive production systems, with the use of cutting-edge technology To exploit and utilize the by-products (wastes) from the total production of olive oil and olives, for beneficial uses . To increase the added-value of the olive oil, table olives and secondary by-products . To collaborate and support export efforts of businesses in the overall sector of olive production and processing

Main characteristics of the holistic approach followed by the KRINOS OLIVE CENTER and the collaborating persons and Institutions, are: Significant reduction in the total production cost -using mechanical harvesting, etc. Improving olive oil quality –by faster harvesting and transportation to oil press, minimal exhibition to adverse soil and weather conditions, temporal storage etc. Utilization of olive cake(solid waste from oil press), pruned branches, as soil improving materials, animal feed and fuel. Estimation of Carbon Footprint (using Life Cycle Assessment) and sensory characteristics, to add value to the product. Evaluation and use of phenols (in the liquid and solid extract) for pharmaceutical and cosmetic uses. Extensive market research for promotion and marketing of olive oil and olive. Education-Research-Exhibition (Demonstration) for our students and olive producers. Integrated Production Management System - Certified activities, traceability.

KEYWORDS: Perrotis College, KRINOS OLIVE CENTER, holistic approach, olive by-products, mechanical olive harvesting

Perrotis College
Krinos Olive Center
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Perrotis College
Κέντρο Ελιάς Krinos
ΑΜΕΡΙΚΑΝΙΚΗΣ ΓΕΩΡΓΙΚΗΣ ΣΧΟΛΗΣ ΘΕΣΣΑΛΟΝΙΚΗΣ

✓ A new initiative of the AFS President- Started in Fall 2013

✓Aiming to cover the needs and to support activities in the overall area of olive and olive oil production in Greece.

✓It acts in parallel with the evolutions in rural economy, specially in developments of innovative technologies for the agro-food sector

Characteristics of the holistic approach by the

1.Significant reduction in the total production cost -using mechanical harvesting, etc.

2. Improving olive oil quality –by faster harvesting and transportation to oil press, minimal exhibition to adverse soil and weather conditions, temporal storage etc.

3. Utilization of olive cake(solid waste from oil press), pruned branches, as soil improving materials, animal feed and fuel.

4. Estimation of Carbon Footprint (using Life Cycle Assessment) and sensory characteristics, to add value to the product

5. Evaluation and use of phenols (in the liquid and solid extract) for pharmaceutical and cosmetic uses.

6. Extensive market research for promotion and marketing of olive oil and olive

Main targets of the KRINOS OLIVE CENTER

❑To promote research in sustainable practices both in the conventional but mainly in the new olive production systems, with the use of cutting-edge technology

❑To exploit and utilize the by-products (wastes) from the total production of olive oil and olives, for beneficial uses

❑To increase the added-value of the olive oil, table olives and secondary by-products

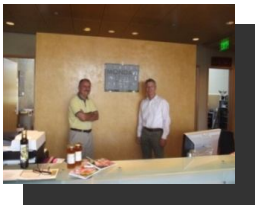
❑To collaborate and support export efforts of businesses in the overall sector of olive production and processing

The cold press olive oil equipment

E-mail for information:
olivecenter@afs.edu.gr

COLLABORATINGS DEPARTMENTS & LABORATORIES

New Research-Education-Demonstration	Old olive groves in AFS
Laboratory of Life Sciences	Sensory analysis
Precision Agriculture	External Expert s & collaborators
Small scale olive cold press and the new bottling facility under development	Center for Agricultural



Dan Flynn- Executive Director of UC Davis OLIVE CENTER & Dr. Athanasios Gertsis Director of

Mechanical harvesting by Gregoire 122 Bv the ANASTASOPOULOS NURSERIES

New Research-Educational-Demonstration Olive grove at PERROTIS COLLEGE

Remote Sensing as a Tool for Identifying the Early Stages of Verticillium Wilt in Olive Orchards

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ABSTRACT

Some diseases do not present any particular symptoms before they cause a serious damage to plants. Thus, the symptoms appear when it is too late to act. *Verticillium dahliae* is an example of this type of pathogens. At the initial stages of stress by Verticillium wilt, olive trees present a light green discoloration of the canopy. This change can be represented by differences in the acquired spectral reflectance by a remote sensor. In addition, since the fungus interrupts the water movement in the conducting tissues of olive trees, it causes stomatal closure and finally reduction in the transpiration rate. This consequently causes reduced evaporative cooling of the affected tissue and, thus, increased canopy temperature can be detected. High-resolution thermal imagery from UAV can make possible the retrieval of canopy temperature from olive orchards. Verticillium wilt constitutes the most important fungal disease of olive, since it is responsible for plant losses and soil degradation. This is because it renders soils unsuitable for olive growing for many years. Eleagro is now offering a new methodology for the detection of the disease , along with a new management method, in order to eliminate the symptoms of the infected trees and bring them back in full productivity.

KEYWORDS: verticillium, remote sensing, Eleagro, olive disease, UAV

Olive "DocumenTales"

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ABSTRACT

My favorite job ever. To tell tales with pictures and sound. And my favorite topic? The Olive Tree and the Olive Oil. Why? Because they represent the best nutrition for mankind. This documentary (a sequence of three stories- and more to come soon) presents you a few tales from personal experience in making a documentary about the olive oil and you will appreciate it like never before.

From the ragged land of Crete to the oil mills of Messenia, up to Macedonia and around Greece, we traveled struggling to collect the pictures and sounds that bring you the beauty of the olive tree and its fruit.

Who knows better than Aristotle? *"Ether is the soul, the element connecting, combining and composing everything around us."* That exactly is the olive oil; the ether of the tastiest, healthiest and most complete food for man.

The video can be used for education, training, promotion and advertisement of the olive production and its products.

KEYWORDS: olive video, olive tales, health, olive history

What do Consumers Think About Green Olive Oil Products?

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ABSTRACT

It is important for olive-oil producers in Greece to know how to behave to today's green consumers. This will lead to significant opportunities so as to grow their sales and increase their market share, while promoting aspects of sustainable development. Most research initiatives regarding green products have been concentrated to analyze the factors which influence the desire of consumers to buy them. This study presents and analyses the results of an empirical survey that aims to estimate the level of acceptance of the green and environmentally friendly products by the olive oil consumers in the Northern Greece. The main objective of this survey is to identify the key aspects in the acceptance and selection of the green olive-oil products in order to sketch the environmental friendly behavior of the consumers.

KEYWORDS: olive consumers, olive oil

Spatio-temporal Modeling of the Evolution of Organic Olive Groves in Greece Through the Use of Geographic Information Systems (GIS)

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ABSTRACT

Organic Agriculture has shown significant advancements in different agricultural cultivations, throughout the Greek territory, during the latest two decades. Olive groves constitute a common landscape characteristic of the Mediterranean region for thousands of years having a substantial impact on the agroenvironmental and the socioeconomic frameworks too.

However, it was the advent of the 2092/91 Directive of the European Union on the principles of Organic Farming that stimulated a systematic and integrative approach as regards the cultivation of organic olive trees (*Olea europaea* L.) in the country, succeeding in establishing the largest, most extended, and sustainable, operational sector among others in the Greek peninsula. Its organic products of high quality, in different kinds and shapes (organic olive oil, organic olive grapes, etc.) have succeeded in obtaining significant recognition at the international market and the preference by consumers.

Geographic information System (GIS) constitutes a sophisticated, advanced infrastructure of Information Technology (IT) that enables, through its applications, to collect, manage, analyze and visualize geospatial data.

In this paper, there is going to be for the first time a spatiotemporal approach -through GIS modelling and mapping - of the evolution of Organic Olive Cultivations in Greece, examining aspects of their significance as regards their contribution on the agroenvironmental sustainability, the socioeconomic prosperity and the protection of the Wildlife (Flora and Fauna) in the country.

KEYWORDS: organic olive groves, organic agriculture, Geographic Information Systems (GIS), Information Technology (IT)

An Innovative Approach of the Olive Pomace Extraction Plant for the Beneficial Use of the Olive Biomass

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ABSTRACT

It is a fact that the olive oil industry, has been one of the most important activities of agroindustrial sector in our country with a signficant contribution to the Greek economy. However, the processing of the olives for the production of the olive oil in olive mills, have a lot of harmfull effects on the environment due to the intense harvesting combined with the phytotoxicity of the olive mill waste water (OMWW).

In order to minimize the environmental impact of the olive oil production, the pomace extraction plants come in to play by treating wet pomace and OMWW in a self contained process. The initial treatement by rotary dryers is followed by solvent extraction of the pomace oil and the final byproduct of the extracted cake, being of high calorific value, it is one of the most important alternative solid fuels available for energy needs (heating, power production, etc).

By employing an innovative cogeneration process in our extraction plant based on pyrolitic treatment of the extracted cake, we manage to produce biochar of high fixed carbon value. The use of geoengineering regarding the application of the biochar potentially improves olive grove productivity by increased soil fertility.

Additionally biochar for carbon sequestration in the soil is a carbon- negative process i.e. more CO2 is removed from the atmosphere than released, thus enabling long term sequestration following a valid claim as a carbon neutral footprint regarding the production of the olive oil.

KEYWORDS: Olive pomace, Extraction plant, Extracted cake, Biochar, Carbon sequestration

Genomic approaches as a novel tool for olive (*Olea europaea* L) and olive oil authentication and traceability

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ABSTRACT

The need for accurate and reliable methods for plant species identification in nature and in food products has steadily increased during past decades, particularly with the recent food scares and the development of trade and technological progress in food production. Moreover, the development of high added value products based on plants has raised concerns about adulteration. Thus, reliable methods to protect the producer, the company and the customer are needed. Fresh food products without any processing are suitable for many types of analytical or molecular analyses. But as most of foodstuff samples are processed to some extent, DNA is usually altered and fragmented into small fragments. However, extensive research has been performed and DNA based methods, for food authenticity, are becoming the methods of choice. *Olea europaea* L. has been cultivated in the Mediterranean region for thousands of years and is of major economic importance. The origin of olive cultivars remains as complex to trace as their identification. Thus, their molecular characterization and discrimination will enable olive germplasm management. In addition, it would be a useful tool for authentication of olive products. High-resolution melting (HRM) analysis, coupled with either DNA barcoding regions or microsatellite markers, was integrated to facilitate molecular identification and characterization of main *O. europaea* cultivars collected from the National Olive Tree Germplasm Collection established n Chania, Greece, discriminate and authenticate oils from different species and monovarietal olive oil. The assay developed provided a flexible, cost-effective and closed-tube microsatellite genotyping method well suited for molecular characterization and authentication and trace olive cultivars, and olive oils.

KEYWORDS: DNA, Genomic approaches, olive oil authentication, olive oil traceability

Improvement of Redox Status in Pig Tissues (Pancreas – Stomach- Liver) in Ablactation Period, Treated with Polyphenolic Additivies from Olive Mill Wastewaters (OMWW)

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ABSTRACT

The aim of the present work was to raise young pigs with feed containing polyphenolic additives, from processed olive mill waste waters (OMWW), in order to examine the effect on their antioxidant status in blood and tissues, using oxidative stress biomarkers. For this reason, 26 young pigs were divided into two groups. The control group receiving the basic diet throughout the experiment, while the other group was received special feed with polyphenolic additives.I n the initial stages of the experiment, silage was prepared by adding OMWW, which was then added to the feed ration of pigs. Piglets were reared for 50 days, and during this period samples from 3 tissues (liver, stomach and pancreas) and blood were taken (2, 20, 35 and 50 days after birth). Afterwards, oxidative stress biomarkers were measured in order to assess the redox status of the piglets. The oxidative stress biomarkers were the reduced glutathione levels (GSH), the activity of catalase enzyme (CAT), the total antioxidant capacity (TAC), the thiobarbituric acid reactive substances(TBARS) and protein carbonyl levels (CARB). The results showed that GSH, the most important endogenous antioxidant, at the age of 50 days had higher levels in the polyphenolic group compared to the control group by 27,71% in RBCL, 26,73% in liver, 49,49% in pancreas and 35,67% in stomach. Similarly, catalase activity in the polyphenolic group is higher than the control group by 23,15% in RBCL, 19,19% in liver, 7,69% in pancreas and 16,77% in stomach. In addition, TACin the polyphenolic group was higher compared with the control group by 15,67% in plasma, 4,5% in liver, 11,72% in pancreas and 16,79% in stomach. Moreover, the polyphenolic group showedless TBARS levels compared with the control by 23,13% in plasma, 19,49% in liver, 34,35% in pancreas and 44,12% in stomach. Finally, CARB levels was less in the polyphenolic group than the control group by 30,73% plasma, 24,01% liver, 36,59% in pancreas and 39,21% in stomach. In conclusion, the results showed that all five biomarkers of oxidative stress were significantly improved in blood and tissues. Thus, polyphenol additives from processed OMWW enhanced the antioxidant capacity of piglets.

KEYWORDS: polyphenolic group, pigs, polyphenolic additives, animal feeds, biomarkers, oxidative stress

New Analytical Methods for the Quality Control and Authentication of Olive Oil

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ABSTRACT

The sensory, nutritional and pharmacological value of olive oil (OO) is scientifically documented and highly acknowledged [1-2]. The beneficial effects of OO are attributed mainly to monounsaturated fatty acids but also to biophenols. Indeed, in 2011, the European Food Safety Authority (EFSA) published a scientific opinion approving the correlation of certain OO polyphenols (hydroxytyrosol and its derivatives) and protection of LDL from oxidative damage [3]. However, OO comprises a versatile and mutable mixture since its composition is strongly associated to multiple factors such as production procedure, olive origin, variety, collection season etc. Moreover, many constituents are still unknown and most of them commercially unavailable. Thus, the main goal of the current study is the development of efficient LC-PDA and LC-HRMSn methodologies for authentication and quality control of OO [4]. Several constituents were isolated and identified while special attention was given to the chromatographic and spectrometric behavior of secoiridoids such as oleocanthal and oleacein which are major compounds in OO but highly unstable. Different platforms such as UPLC, PR-HPLC, NP-HPLC, SFC-UV and stationary phases (RP, NP, chiral) as well as diverse sample preparation procedures have been employed for the development of specific and reproducible methods for the qualitative and quantitative analysis of OO.

KEYWORDS: Olive oil, quality, authentication, LC-MS, oleacein, oleocanthal, authentication of Olive Oil, secoiridoids, polyphenols, hydroxytyrosol,

Valorization of Olive Industry By-Products for Tracing and Extraction of Hydroxytyrosol Using Various Green Extractions Technologies

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ABSTRACT

Studies have demonstrated that olive oil phenolic compounds have positive effects on certain physiological parameters, such as plasma lipoproteins, oxidative damage, inflammation, platelet and cellular function, antimicrobial activity and bone health [1]. The purpose of this work was to exploit by-products of the olive industry for the production of extracts with high percentage in olive phenols, focusing mostly on the hydroxytyrosol (HT) content. Three by-products were obtained, table olive processing wastewater (TOPW), olive paste (OP) and rinse water (RW) from two specific processes: Olive oil two-phase cold extraction and table olive natural debittering process. The final goal was to design an efficient extraction/fractionation procedure, leading to a final product rich in HT, destined for the market of nutraceuticals [2].

The samples were submitted to various extraction processes, with respect to the nature of each material, aiming to the recovery of the total amount of HT. A wide array of green as well as conventional techniques was used: Supercritical CO2 extraction with and without the use of ethanol as co-solvent, maceration with aqueous/alcoholic mixtures, pressurized liquid extraction with aqueous/alcoholic mixtures, subcritical water extraction, ultrasound assisted extraction (UAE) with methanol followed by microwave-assisted extraction (MAE) and, finally, adsorptive resin technology (ART) with the use of ethanol. The initial treatment of the raw material was also studied with the application of lyophilization.

Analysis with HPLC of the produced extracts showed that the TOPW contained 1 mg/ml of HT, while OP had a content of 0.8 mg/g and RW 0.02 mg/ml. The most efficient recovery method for the HT was achieved with treatment of the TOPW with ART, which resulted in an extract with 11.41% of HT. OP with UAE/MAE afforded an extract with 0.87% HT and RW with ART provided an extract with 1.97% HT.

KEYWORDS: hydroxytyrosol, olive by-products, extraction processes**,** lyophilisation, HPLC,

Perspectives and Potential of Olive Bioactives

Vougogiannopoulou, K., Halabanaki, M., Argyropoulou, A., Termentzi, A., Abatis, D., Xynos, N., Lemonakis, N., Papaeustathiou, G., Angelis, A., Angelis, A., Gikas, V., Aligiannis, N., and Skaltsounis, A.

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ABSTRACT

The olive tree, closely connected to the Mediterranean region has provided a wealth of goods. The main products of the olive tree, olive oil and table olives as well as by-products such as leaves, paste, mill wastes, table olive wastewater have been used as sources for the recovery of valuable secondary metabolites. Over the years a multidisciplinary team has been established in NKUA with strong expertise in all aspects of olive investigation and exploitation. The aim of this communication is to present our holistic research strategy towards the multifaceted exploitation of the olive tree including activities such as extraction, fractionation, isolation, analysis of olive tree products as well as investigation of processes related to olive industry. Isolation of promising lead compounds with emphasis to olive polyphenols, oleuropein, hydroxytyrosol & tyrosol, oleacein & oleocanthal and secoiridoids, has been achieved and a unique library of extracts, enriched fractions, and compounds has been created. Advanced analytical techniques and methodologies (UPLC/HPLC-DAD, HPLC-DAD-HR/MSn, HPTLC) have been developed and applied for the qualitative and quantitative determination of secondary metabolites in all materials. [4] The biological profile and the therapeutic potential of olive extracts and compounds is explored and supported by several in vitro and in vivo studies while their possible application as nutraceuticals, dietary supplements, cosmeceuticals and cosmetics is also investigated. Our efforts continue to expand in the direction of an integrated and holistic approach of research and exploitation.

Acknowledgements: *The present work was funded by SYNERGASIA 2009 PROGRAMME. This Programme is co-funded by the European Regional Development Fund and National Resources (Project code: 09SYN-21-1003).*

KEYWORDS: Olive Bioactives**,** polyphenols, oleuropein, nutraceuticals, dietary supplements, cosmeceuticals, hydroxytyrosol, tyrosol, oleacein, oleocanthal, secoiridoids

NMR Screening of Greek Olive Oils

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ABSTRACT

Olive oil, obtained from the fruit of *Olea europaea*, is a highly valuable foodstuff. It constitutes a key agricultural product of the EU market, in particular for the Mediterranean Basin. Olive oil enjoys global recognition for its nutritional value and health-beneficial effects. Therefore appropriate quality control is of major importance. Instrumental analysis plays an important role in the assessment of food authenticity and quality. Particularly, NMR spectroscopy has been used for screening of food and beverages like fruit juices, wine, milk, honey, edible oils, for the identification of impurities and/or biomarkers. In the present study, 273 Greek olive oil samples, originating from two different years of harvest, and several olive varieties from various geographical origins were collected, under standardized conditions, and analyzed with a 400 MHz NMR spectrometer. Standardized conditions were used for sample preparation, which involved the addition of standard amount of solvent and no further pre-treatment. The one-dimensional (1D) NMR spectrum, using multiple suppression plus 13C-decoupling, in combination with suitable statistical analysis enabled a classification of olive oils, based on harvest year and variety. In addition, this approach enabled an accurate quantification of characteristic NMR signals. Targeted analysis aiming at the detection of specific marker compounds, belonging mainly to the phenolic fraction, was successfully applied.

KEYWORDS: olive oil, NMR screening, harvest year, variety, phenolics

A New Era for Innovative Olive Fly Control

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ABSTRACT

The olive fruit fly, *Bactrocera oleae*, is the major pest of the olive tree. The female fly leaves its eggs in the olive fruit and the resulting larvae destroy the fruit by feeding on its sap. Currently, their control is based on chemical insecticides. In several insect pests, the Sterile Insect Technique (SIT) has been proven an effective environmentally friendly alternative. The SIT is based on the mass production and release of sterile insects into field populations. Past efforts to apply the SIT in the olive fly were unsuccessful, mainly due to the low competitiveness of the mass-reared flies. Several years of experience have shown that efficient SIT protocols rely on the availability of fundamental genetic and molecular information and the development of modern transgenic tools. In recent times, molecular and genetic studies in the olive fly have focused on genetic analyses of natural populations, cytogenetics, isolation and characterization of a few genes that control important biological processes, as well as the identification and mapping of several microsatellite loci. Just a few years ago, *B. oleae* was successfully transformed, an achievement that gave new perspective towards the efficient use of the SIT. Lately, this is being coupled with genomics studies and transcriptomics analyses of various important systems (i.e., reproductive and olfactory), as well as efforts in advancing olive fly mass-rearing, that are setting the ground for the application of modern control approaches through the genetic manipulation of the insect.

KEYWORDS: Olive fruit fly control**,** genomics, transcriptomics, cytogenetics, *Bactrocera oleae,* Sterile Insect Technique (SIT)

Insecticide Resistance in the Olive Fly

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ABSTRACT

For the last 40 years, the management of the most destructive olive pest, the olive fruit fly *Bactrocera oleae*, has been based on the use of organophosphate insecticides. More recently, pyrethroids and the naturaly tespinosad have been added in the arsenal against it. However, the extensive use of any insecticide inevitably leads to the development of resistance. More than 60-fold resistance ratios to organophosphates (OP) have been observed in olive fly populations in Crete. Acetylcholinesterase (AChE) is the principal target of OPs and, consequently, its gene is the most likely locus where resistance mutations appear. In fact, two point mutations in the catalytic site of the enzyme have been implicated in resistance development. In addition, a small deletion in the carboxyl terminal of AChE has indicated an entirely novel mechanism of OP resistance. Furthermore, over 50-fold resistance to alpha-cypermethrin has also been documented, even though no resistance-associated mutations have been identified thus far. Finally, incipient spinosad resistance has been demonstrated in flies caught in California, where the drug is the only insecticide used for the control of the fly. In Drosophila, the α6 subunit of the nicotine acetylcholine receptor (nAChR) has been implicated in spinosad resistance. On the contrary, the α6 subunit of the nAChR does not seem to be spinosad's target in *Musca domestica*. Sequence analysis of the olive fly α6 nAChR subunit from a laboratory sensitive and a spinosad-selected resistant line did not advocate for the involvement of receptor mutations in spinosad resistance. Instead, whole transcriptome comparison between the two lines indicated that several immune system loci as well as elevated energy requirements of the resistant flies might be necessary to lever the detoxification process.

KEYWORDS: olive fruit fly, *Bactrocera oleae,* cypermethrin, spinosad, *Musca domestica,* transcriptome, tespinosad, organophosphate insecticides, pyrethroids

Factors Affecting Olive Oil Quality During Cultivation, Harvest and Transport to the Oil Mill

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ABSTRACT

In olive oil production the use of good agricultural practices is one way road, it is neither left nor right. The goal is maximum capacity, quality and environmental sensitivity. Anyone who is involved in the industry should be both farmer and meteorologist and environmentalist and agriculturist and entrepreneur and economist, but above all must be optimist.
With sufficient technical services, science can help the producer more than experience for better and stable performance, but also better for the environment in the long term.
The Ideal Olive Grove has features that do not change, features that are changing difficult and features that can be changed relatively easily.
The factors affecting the quality of olive oil are Agronomic: (Variety, Ecological Environment and Climate, Soil, Cultivation Techniques, Hygienic Conditions of the olives, Harvesting) and Procedural: (Removal of Leaves, Transport of the olives, Storage of the olive oil, Washing, Crushing, Separation of the olive oil.
Improving production and quality is a matter of care and not expensive inputs. Having identified the characteristics of the Ideal Olive Grove, the success in production and quality is a combination of all agronomic factors and processes required until the final product. In order to achieve all those, an appropriate way it is needed: Willingness for Knowledge, organized operation, cooperation at all levels. It is needed a harmonized system that can be applied and adapted in each olive grove according to its needs and environment.

KEYWORDS: Ideal Grove, Olive Oil Quality, olive harvesting, olive milling

Abstract in GREEK: Περίληψη στα Ελληνικά

Η τηλεπισκόπηση ως εργαλείο για την ταυτοποίηση των πρώιμων σταδίων της βερτισιλλίωσης σε ελαιώνες

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Περίληψη

Ορισμένες ασθένειες δεν παρουσιάζουν ιδιαίτερα συμπτώματα πριν προκαλέσουν μια σοβαρή ζημιά στα φυτά. Έτσι, τα συμπτώματα εμφανίζονται όταν είναι πολύ αργά για να επέμβουμε. Το Verticillium dahliae είναι ένα παράδειγμα αυτού του τύπου των παθογόνων. Στα αρχικά στάδια του στρες από βερτισιλλίωση τα ελαιόδεντρα παρουσιάζουν ένα ελαφρύ αποχρωματισμό της κόμης. Αυτή η αλλαγή μπορεί να ανιχνευθεί από τις διαφορές στην φασματική ανάκλαση που γίνονται αντιληπτές από ένα απομακρυσμένο δέκτη. Επιπρόσθετα, αφού ο μύκητας προκαλεί διακοπή στην κίνηση του νερού στο αγγειακό σύστημα των ελαιοδέντρων, προκαλεί κλείσιμο των στοματίων και τελικά μείωση στο ρυθμό της διαπνοής. Αυτό συνεπώς προκαλεί μειωμένη ψύξη λόγω διαπνοής των προσβεβλημένων ιστών και τελικά μπορεί να ανιχνευθεί αυξημένη θερμοκρασία της κόμης του δέντρου. Μια υψηλής ανάλυσης θερμική κάμερα από UAV μπορεί να κάνει εφικτή την ανάκτηση της θερμοκρασίας της κόμης από τον ελαιώνα. Η βερτισιλλίωση αποτελεί την πιο σημαντική μυκητολογική ασθένεια της ελιάς, αφού είναι υπεύθυνη για απώλειες στο φυτικό κεφάλαιο και την υποβάθμιση των εδαφών. Αυτό οφείλεται στο γεγονός ότι καθιστά τα εδάφη ακατάλληλα για καλλιέργεια για πολλά χρόνια. Η Eleagro τώρα προσφέρει μια νέα μεθοδολογία για την ανίχνευση της ασθένειας, μαζί με μια νέα μεθοδολογία διαχείρισης, ώστε να περιορίσει τα συμπτώματα των προσβεβλημένων δέντρων και να τα επαναφέρει σε πλήρη παραγωγικότητα.

The effect of two-phase olive mill waste (TP-OMW) on the population growth of the earthworm *Eisenia fetida* and the quality of the produced vermicompost as organic fertilizer and soil amendment

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ABSTRACT

Olive oil is a very valuable commodity both culturally and economically, however the disposal of the associated olive mill waste from its production presents a serious soil and water pollution threat to the environment in the Mediterranean region. If properly treated, two-phase olive mill waste (TP-OMW) can be recycled as a soil amendment and help increase soil quality, especially on Mediterranean soils, which have very low soil organic matter. A number of methods have been proposed to treat olive mill waste, one of which is the use of earthworms. Earthworms can process organic wastes and convert them to vermicompost, a high quality soil amendment and organic fertilizer. *Eisenia fetida* is the most common composting earthworm. Recent work in our laboratory has shown that it can efficiently process food waste and raw dairy manure (RDM) without the need for any previous treatment. Various mixtures of TP-OMW with RDM and wheat straw were used to evaluate their ability to provide the optimum substrate for the growth of the earthworm *Eisenia fetida*. An equal number of earthworms were added to small vermicomposting reactors containing composted dairy manure as a bedding material. Different mixtures of TP-OMW and RDM were fed monthly to the reactors. The earthworm population dynamics was monitored for a period of 6 weeks. The population growth was found to be slower in the TP-OMW fed reactors, doubling in the 6-week period, while population in the RDM fed reactors increased 9-fold. The total earthworm biomass was higher in the TP-OMW reactors than the RDM reactors. The produced vermicompost from each feeding mixture was also tested for phytotoxicity and its effect on the germination and growth of lettuce (*Lactuca sativa)* by incubating seeds with 25% and 50% extracts from each vermicompost. Germination rates were higher than 90% for most vermicompost extracts. Seedling stem growth was more than 60% higher in all vermicompost extracts compared to the control. Root growth was also found to be higher in most vermicompost extracts. Overall, earthworms were found to process TP-OMW efficiently, producing a vermicompost with no phytotoxicity, which was able to stimulate seedling growth in lettuce plants.

KEYWORDS: vermicomposting, olive mill waste, *Eisenia fetida*

Effect of olive oil processing variables on olive oil quality

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ABSTRACT

This work presents new experimental data on the effect of process parameters on olive oil processing. For the experiments a small industrial scale (500 kg olives/hr) olive oil production plant was used. The industrial scale of the experimental plant makes the experimental results to be applicable to the olive oil process without any need of scale-up. The plant offers the possibility to accurately control and vary processing variables and therefore is suitable for experimental studies. All steps of olive oil extraction were examined: crushing, malaxation and olive oil separation in the decanter and centrifuge. Two crushing methods were examined: disc crusher and disc crusher combined with depitter. Furthermore, the effect of malaxation time and temperature were examined. In addition the feeding rate from the malaxer to the decanter was examined. Finally, special focus was given on the effect of water flow rate and water temperature added in the two-phase decanter and disc centrifuge. The olive oil quality characteristics examined were: acidity, peroxide value, K232, K270, ΔK, total phenol concentration. Moreover, the olive oil fatty acid profile was determined using gas chromatography, and olive oil sensory attributes were determined. Finally, a discussion is made on improving olive oil quality via processing.

KEYWORDS: malaxation, olive oil quality, olive oil processing, sensory attributes

Water deficit and status of Soil nutrients in olive groves of Crete island, Greece

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ABSTRACT

Irrigation of olive trees is recommended in Crete and the appropriate irrigation demands were defined in this investigation, taking into account the amount of rainfall during the irrigation period, the water requirements of olive trees and climate conditions. Mean nitrates content in irrigation water samples of Peza was higher (19.3 mg l^{-1}) in comparison to the respective content in the area of Merambelou (7.7 mg l^{-1}), due to increased quantities of nitrogenous fertilizer applied to olive groves. However, maximum nitrates concentration in Peza was 62.75 mg l^{-1} and this means that a farmer who irrigates olive trees with water rich in nitrates, has to decrease the applied N fertilization.Surface soils were selected from two areas cultivated with olive trees located in Peza (Prefecture of Heraklion) and Merambelou (Prefecture of Lassithi) in Crete island. A total number of 400 surface soil samples were selected and analysed for the main properties, from the studied areas. Field survey indicated that soils in the lowlands of Crete consist of alluvial deposits and the dominant parent materials of the hilly soils are mainly Neogene marls.

Soils in Peza have a mean $CaCO_3$ content 38.3% and the respective value for Merambelou is 3.1%, while soils of Merablelou have higher soil organic matter (SOM) and total nitrogen (N). However, mean pH is > 7.0 for both areas and can be atributed mainly to the presence of $CaCO_3$.Minor content for micronutrients was observed in the following decreasing order in Peza Fe>Mn>Cu>Zn>B, while in Merambelou the order of trace elements was Mn>Fe>Cu>Zn>B.High variation of calcium carbonates and plant available P can be attributed to erosion, fertilization practices, inputs of nutrients by irrigation water and climate conditions. The studied soils cultivated with olive trees are characterized by medium or low fertility. A close relationship was found between SOM and total soil N, indicating that nitrogen is mainly bound in the SOM.

Due to water scarcity during spring and summer, drip irrigation is suggested to increase the water efficiency in olive groves. A set of agricultural practices are suggested depending on physico chemical soil properties and climatic conditions.

KEYWORDS: nutrients,water deficit, soil properties, climate, olive grove, Peza, Merambelou

Replacement of water in three phase decanter system by olive mill waste water enhances the quality of olive oil

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ABSTRACT

'Chondrolia Chalkidikis' olives harvested at mature stage from the university farm were used to produce olive oil in an olive mill equipped with a line which included a three phase decanter. The water:paste ratio added to the decanter was 1:2. Olive mill waste water (OMWW) was used to replace the added water at a rate of 50 or 100%. Following the final separation, the obtained oil was collected and used for chemical analysis and sensory evaluation. All oils had similar acidity, peroxide, K_{232}, K_{270} and ΔK values. OMWW treated olive oils presented higher total phenolic content, higher antioxidant capacity based on DPPH test and lower chlorophyll & carotenoids content. However, there was no significant difference between the 50 and 100% replacement. Oven test confirmed the higher oxidative stability of OMWW treated oils. Phenolic profile analyzed with NMR revealed more than two fold oleocanthal and oleacin, as well as oleuropein and ligstroside aglycon contents than the control. Sensory evaluation showed an enhancement of fruity, bitter and pungent attributes of treated oils compared to the control.

KEYWORDS: Chondrolia Chalkidikis, Olive mill waste water (OMWW), Phenolic profile, K_{232}, K_{270} , ΔK, oleocanthal, oleacin

Use of ifarma AS MANAGEMENT AND DECISION SUPPORT TOOL FOR OLIVE ORCHARDS

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Abstract

Farm management is the science of optimizing the use of resources in the farm business in relation to specified objectives. This implies obtaining maximum possible net benefit over time from the operation of farm business. Maximization of net benefit implies efficient use of available resources and opportunities. In recent years, the farm management information systems have steadily increased in their level of sophistication as they have included new technologies with internet connectivity being the latest. In addition, the agriculture sector has become increasingly information-dependent, requiring a wide range of scientific and technical information for effective decision-making by farming community. ICTs have great potential to transform an agricultural system, including smallholder farming, into a profitable farm business. Modern ICTs—such as the internet and mobile devices, have the ability to deliver relevant and timely information that facilitates making informed decisions to use resources in the most productive and profitable way.

A farm management application, named 'ifarma' (Intelligent Farm Management), which was designed and developed by Agricultural Information Systems Ltd (Agrostis), was used as farm management tool for Olive orchards of American Farm School (MFS). The application was designed as native application for mobile devises in order to exploit capabilities that modern mobile devices offer and to operate offline. Data are stored both in internal device memory and in cloud. All the agricultural practices involved in the on-going management of the established olive orchard was recorder by using the 'ifarma'. The practices concern soil cultivation, olive tree pruning, use of fertilizers, irrigation, weed and pest control, nematode control, frost protection and harvesting. The 'ifarma' was used for planning and monitoring the cultivation practices and the management decisions were taken by a virtual agronomist – crop manager using the 'ifarma cloud' (web version of 'ifarma'). The cultivation practices (tasks) were realized in practice by different workers. By doing so, the efficiency of production factors and resources used, was calculated and a financial analysis was performed. Using the scenario analysis tool integrated in 'ifarma', it was possible to investigate the potential impact of modification the input factors to net financial result. The 'ifarma' was proven to be a very useful tool for planning and implementing the cultivation practices and for communication between crop – manager and workers. In addition, the financial and scenario analysis modules make the 'ifarma' a powerful decision support tool. The technological progress made in telecommunications and mobile devices suggests that new research and applications that are presently unthinkable will be available in the future. The commercial version of 'ifarma', is currently available in Greek and English language.

KEYWORDS: precision agriculture, ifarma, agrostis, olive orchards, farm management, tablets & smartphones, ICT

Hydrocolloids and from olive waste and from other by-products of the food industry

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ABSTRACT

This paper discusses the recent progress of the Food Physical Chemistry group of the Department of Food Technology, ATEI of Thessaloniki in obtaining thickeners, gelling agents and emulsifiers from food processing waste materials of negative cost (materials for which the buyer is paid rather than paying to obtain/remove). The group's progress in the extraction, isolation, purification and characterization of hydrocolloids from solid olive processing waste is presented as a case study. A synopsis of the investigation on their composition, structure and function is given, with a special focus on their capacity to act as high added value naturally-derived additives in food, pharmaceutical and cosmetic formulations. The direct gains to the local economy (adding value to an otherwise unwanted waste), and to the environment (returning to the market significant part of the waste itself) are discussed.

The state of the art/progress of this group in relation to other food industry by-products (including winery waste, rejected okra, fruit seed, orchid root) is also presented, along with the its current progress in understanding the thermodynamic principles of their digestion in the gastrointestinal system.

KEYWORDS: Hydrocolloids, from olive waste, olive by-products, food industry

ACKNOWLEDGMENTS: This research has been co-Financed by the European Union and the Greek State Program EPAN-II (OPC-II)/ ESPA (NSRF): 'SYNERGASIA II', Project (OliGraGum) "Recovery, Characterization and Practical Applications of Food-Grade Hydrocolloids from Olive and Grape by-Products" (11SYN-1701-2).

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ISBN 978-618-80868-1-4