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Proceedings of

International E-Conference on

PLANT SCIENCE AND BIOLOGY

May 05, 2021 I Webinar

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NOTE:

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DAY 1

KEYNOTE SPEAKERS

Waleed Fouad Abobatta

Horticulture Research Institute, Agriculture Reasearch Center, Egypt

Adaptation strategies of fruit orchards under climate change conditions

Due to global warming fruit orchards are continuously challenged by abiotic stresses, etc, under harsh climate conditions, there are adverse effects of fruit orchards production particularly in arid and semi-arid regions, a rising temperature associated with drought increase soil salinity which affects negatively on sustaining the productivity of various fruit orchards. So, under abiotic stress conditions trees used different strategies to minimize the adverse effects like decreased stomatal conductance, reduced photosynthesis, and decreased CO2 concentration inside the leaf, also, plants could use different physiological mechanisms such as ion homeostasis, synthesis of more compatible solute, polyamines production, and antioxidant regulation, also, there are different steps required to maintain orchards productivity include using proper management practices that include providing adequate nutrients requirement and maintain soil moisture, using proper rootstocks tolerant for drought and heat stress as well as exogenous application of plant growth substances.

Therefore, adaptation strategies could play a significant role in improving the growth of fruit orchards and increase tolerance for these adverse environmental conditions, in addition to using proper agricultural practice, exogenous applications of plant growth regulators, with tolerant rootstocks, could play a significant role in the sustained production of fruit orchards under harsh climate conditions.

Keywords: Climate change, fruit orchards, temperature, drought, adaptation strategies.

Biography:

Dr. Abobatta is a member of Scientific Committee for Greenhouses Plantation (A.R. C.), he's an Expert of International Society of Citriculture, University of California (UC RIVERSIDE), and a member of Scientific Team for National Campaign for Navel Orange improvement (H. R. I.). Abobatta is a Scientific Committee Member of different international and national conferences, Abobatta is a supervisor of M. Sc. and Ph. D. Thesis in agricultural science. He has edited 2 books and published 5 book chapters and 44 Research paper in various branche of Agricultural science, Abobatta serving as an editorial board member in several respected journals).

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Ivana Sola[a,*], Valerija Vujcic Bok[a], Marija Pinteric[b], Susann Auer[c], Jutta Ludwig-Muller[c], Gordana Rusak[a]

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[b]Division of Molecular Medicine, Ruder Boskovic Institute, Zagreb, Croatia
[c]Institute of Botany, Technische Universitat Dresden, 01062 Dresden, Germany

Improving the phytochemical profile and bioactivity of Chinese cabbage sprouts by interspecies transfer of metabolites

The high demand for healthy food in recent years led to an increasing need for highly bioactive plant materials. One simple method to improve the nutritional properties of plants could be the treatment of plants of known bioactive potential (acceptor) with extracts of different plant species (donors) that contain additional high bioactive compounds, so-called interspecific source-sink phytochemical transfer. The aim of the present study was to evaluate the effect of interspecific transfer of metabolites on plant phenolic and vitamin C profile to improve their gastrointestinal bioavailability, hypoglycemic potential, and antioxidant capacity as well as cytotoxicity. Additionally, it was tested whether there is an effect of phytochemical transfer on the expression of marker genes in phenolic biosynthetic pathways. Chinese cabbage (*Brassica rapa ssp. pekinensis*) sprouts were chosen as a model of plant acceptor, while the inflorescences of St John`s-wort (*Hypericum perforatum*) and chamomile (*Matricaria chamomilla*), leaves of rose (Rosa sp.) and shoots of black bryony (*Tamus communis*) were used as plant donors. Even though the chamomile extract increased the highest number of individually identified compounds in Chinese cabbage sprouts, that was not crucial for the improvement of their bioactivity. Rather, black bryony application induced more biopotential parameters in the sprouts such as significantly improved bioavailability of vitamin C, kaempferol and total phenolics both before and during gastrointestinal digestion of sprouts, increased hypoglycemic activity of sprouts, and their antioxidant capacity during digestion. For an increased cytotoxicity against MCF cells, St. John`s-wort, rose and chamomille extracts could be applied to Chinese cabbage sprouts. The results suggest that interspecific phytochemical transfer could enhance the phytochemical profile and the bioactive properties of the acceptor plant.

Keywords: antidiabetic activity, antioxidant capacity, cytotoxicity, gastrointestinal bioavailability, qRT-PCR; RP-HPLC.

Biography:

I work in Laboratory for Phytochemistry, my main scientific interest is plant plant specialized metabolism plasticity (e.g., changes in concentration of different metabolites, synthesis of new compounds, genotype and/or phenotype adjustment (ecotype and/or yield, respectively), bioactivity and bioavailability changes), and possibilities like the use of a specialized metabolites profile as an indicator of stress in the environment, boosting of specific metabolites in order to produce a value-added plant food, and screening of specialized metabolism changes for prediction models. I teach and/or hold praktika in plant anatomy, plant bioactive substances, and molecular biology of plants.

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SPEAKER PRESENTATIONS

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Effect of growth regulators and light factor on callus formation and alkaloids production on Vinca rosea plant (Catharanthus roseus L.).

Youssif Mahmoud Ahmed Mohamed
Biotechnology Department, Faculty of Agriculture, Al Azhar University, Cairo, Egypt.

Vinca alkaloids are a subset of drugs obtained from the periwinkle plant, they are naturally extracted from the pink periwinkle plant (Catharanthus roseus), and they have been used to treat diabetes, high blood pressure and have been used as disinfectant, the vinca alkaloids are also important for being Cancer resistant, there are four major vinca alkaloids in clinical use: Vinblastine (VBL), vinorelbine (VRL), vincristine (VCR) and vindesine (VDS), vinca alkaloids are the second- most-used class of cancer drugs and will stay among the original cancer therapies, Catharanthus roseus is still source used for the powerful antitumor drugs(vinblastine and Vincristine) Callus culture had been done on MS-medium, containing Different Concentrations from growth regulators Where the different effects of growth regulators were studied when different parts of the plant have been cultured from leaves and stems, this is to induce callus formation and encourage growth, and the concentrations that were prepared: BA (0,1 – 0,3 – 1 – 2 mg/l) _ NAA (0,1 – 1 mg/l) _ IAA (0,1 mg/l) 2,4-D (0,75 – 1 mg/l) It was obtained the highest weight and best Vitality from the Callus with using of (BA – 2,4-D)

Keywords: Vinca rosea, Temperature, Alkaloids, callus induction, growth regulators.

Biography:

Youssif Mahmoud Ahmed Student at 4th year, Faculty of Agriculture, Biotechnology department, AL Azhar University in Cairo, he holds a training in Basic Protein, Isolation and Purification from City of Scientific Research and Technological Applications (SRTA-City),Training at the Desert Research Center in tissue culture technology, Applications of Bacteriology, Virology, Immunology and Serology National Research Center, Applications of QC & QA in pharmaceutical industry At Zewail City of Science and Technology, Applications of pharmaceutical industry in Memphis for pharmaceutical & chemical industries, Basics of digital marketing from Google, IAB Europe and The Open University, and he attended The Global Entrepreneurship Week at American corner (The American center of the Embassy of the United States of America in Cairo)And in the final stage to publish my first research in a scientific journal.

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Application of ultrasound for corn starch processing by-products pretreatment and enzymatic hydrolysis intensification

Karolina Traskelyte-Rupsiene[1], Grazina Juodeikiene[1], Darius Cernauskas[2], Elena Bartkiene[3], Daiva Zadeike[1], Joana Bendoraitiene[1], Jonas Ignatavicius[4] and Sidona Gudziuniene[4]

[1]Kaunas University of Technology, Kaunas, Lithuania
[2]Food Institute, Kaunas, Lithuania
[3]Lithuanian University of Health Sciences, Kaunas, Lithuania
[4]JSC „Nando“, Kaunas, Lithuania

There is emerging interest in the effective use of renewable sources for development of novel bio-stimulant formulations in order to improve crop yield in sustainable EU agriculture. By-product from starch processing industry, such as corn steep liquor (CSL), is an optimal nitrogen feedstock relevant for the development of new bio-stimulants. This study describes the integration of non-traditional treatment to increase the efficiency of corn steep liquor (CSL) protein hydrolysate's production. Low- and high- frequency ultrasound (US) treatment was applied for the treatment of CSL before enzymatic hydrolysis with industrially produced alkaline protease. Efficiency of US and enzymatic treatment was characterized according to the kinetics of hydrolysis (degree of hydrolysis (DH), hydrolyzed protein (HP) concentration, Michaelis-Menten constant (KM) and apparent break-down rate constant (kA)). Additionally, changes in free amino acid (FAA) profile was characterized. Obtained results show a significant positive effect of 37kHz US pre-treatment for CSL enzymatic hydrolysis. The highest HP concentration (17.5g/L) using lowest enzyme concentration (2.1g/L) and shortest hydrolysis time (60 min) can be achieved with low frequency US pre-treatment. This pre-treatment resulted in 2.3 time higher content of FAA, compared to traditional hydrolysis. The decrease in KM value (on average by 33.5%) reveals that US pre-treatment improves the affinity between enzyme and substrate. Obtained CSL protein hydrolysate's biostimulatory effect was tested on wheat grains seeds germination in vivo. The results confirm that by using a 10% of PH's for wheat grain seeds "priming" germination parameters (root and stem length and biomass) can be improved. These findings indicates that ultrasound treatment is promising technology which can be included to non-traditional methods of by-products valorization to bioactive compounds in the agriculture industry.

Keywords: CSL protein hydrolysate's, ultrasound treatment, biostimulants.

Biography:

Bachelor degree in Food Science and Technology and Master degree in Food Product Technology. Working experience in the international food processing company as well as Junior Researcher and Project Engineer experience at the University. Both, industrial and academical knowledge gained through last 10 years provides a possibility to combine science and business in order to develope novel products, enriched with bioactive compounds by valorization of by-products from food industry to ensure a sustainable agrifood chain.

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Lead Induced Modulation in Growth, Chlorophyll Pigment, Nutrient Uptake, Antioxidant Enzyme Regulation, Gene Expression, and Fruit Quality in Two Tomato Cultivars

Iqbal Hussain* , Zarbakht Afzaal , Saima Riaz
Department of Botany, Government College University, Faisalabad-38000, Pakistan

Metal stress is one of the major restrictions for agricultural production. A pot experiment was set-up to appraise modulation in growth, oxidative defense, secondary metabolism and relative gene expression of two tomato cultivars viz. Roma (sensitive) and Nagina (tolerant) at flowering stage in response to different lead (Pb^{2+}) regimes (160, 320, 640 and 1280 µM). The results showed that Pb^{2+} stress (1280 µM Pb) caused a considerable reduction in growth attributes, chlorophyll (Chl.) pigments and ascorbic acid contents, and increase in malondialdehyde (MDA), hydrogen peroxide (H2O2), and total soluble protein (TSP) contents in both cultivars. A significant enhancement in ascorbate peroxidase (APX), peroxidase (POD), catalase (CAT) activities and Cat2 gene expression was documented in Pb^{2+} stressed tomato plants. Fruit quality of Nagina was better than Roma cultivar. In this context, higher fruit ash contents, protein contents, fructose and glucose contents were observed in Nagina, while Roma was inferior in this regard when under Pb^{2+} stress. Furthermore, Pb^{2+} reduced the fresh and dry biomass, moisture, fiber content and mineral (Na+, K^{+} and Ca^{2+}) uptake in tomato fruits of both cultivars. The results indicated that significant amount of Pb^{2+} accumulates in the root compared with its concentration in shoot and leaves while only a small amount of Pb2+ reaches the fruit. The exposure to Pb^{2+} caused significant changes in Cat2 gene transcripts indicating the contribution of this gene in Pb^{2+} tolerance. The sensitive cultivar exhibited higher oxidative damage, decreases in the concentration of essential nutrients, poor oxidative defense system, and thus had low quality of fruit.

Keywords: Enzyme activity; Gene expression; Lead regimes; Oxidative stress; Tomato

Biography:

He has been working as Tenured Associate Professor in the Department of Botany, Government College University, Faisalabad-38000, Pakistan Since 17-12-2017 to date. Earlier to it, he has served this university as Assistant Professor (TTS) from 02-12-2011 to 16-12-2017 and Assistant Professor under HEC's Interim Placement of Fresh PhDs Program (IPFP) from 04-01-2011 to 01-12-2011.

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Acclimatization of in vitro cultured plants for in vivo condition

B N Hazarika
Central Agricultural University, College of Horticulture and Forestry, Pasighat -7911102, Arunachal Pradesh, India

The benefit of any *in vitro* propagation only be fully realized if there is successful transfer of plantlets from tissue-culture vessels to ex vitro conditions. A substantial number of micro propagated plants do not survive on transfer from *in vitro* conditions to greenhouse or field environment as plantlets developed within the culture vessels under low level of light, aseptic conditions contribute a culture-induced phenotype that cannot survive the environmental conditions when directly placed in a greenhouse or field. Plantlets or shoots that have grown in vitro have been continuously exposed to a unique microenvironment that has been selected to provide minimal stress and optimum conditions for plant multiplication. The culture conditions that promote rapid growth and multiplication of shoots often results in the formation of structurally and physiologically abnormal plants. Many a times they are characterized by poor photosynthetic efficiency, malfunctioning of stomata and a marked decrease in epicuticular wax. Understanding these abnormalities is a prerequisite to develop efficient transplantation protocols. The major abnormalities in in vitro culture of plants and the current and developing methods for acclimatization of in vitro cultured plantlets will be discussed.

Biography:

Prof. B N Hazarika, PhD presently working as Dean, College of Horticulture and Forestry, CAU, Pasighat, Arunachal Pradesh. Prof. B N Hazarika guided a number of PG &Ph D students, handled several externally funded research projects and organized 90 trainings. He has published 80 research papers, published 20 books, 25 conference papers and book chapter, 11 practical manual, 25 Bulletins, edited 13 souvenir and 245 popular articles. He contributed significantly in collection, morphological and molecular characterization of diverse genotype of various fruit crops, standardized good agricultural practices for some major fruit crops; introduced new fruit crops in the region;

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Plant Growth Promoting Rhizobacteria and Chemical Fertilizers: Impact on Soil Health and Productivity of Capsicum (*Capsicum annuum L.*)

Shweta Gupta*, Rajesh Kaushal[2], Gaurav Sood[3] and Shweta Sharma
(*Dr Yashwant Singh Parmar University of Horticulture and Forestry, Solan, Himachal Pradesh, India.*)

There is no commercial agent which could act as biofertilizer, bio-control and bio- stimulant for enhanced capsicum productivity in North-Himalayan Western Region. Therefore, indigenous plant growth promoting rhizobacteria were isolated from rhizosphere and root samples of capsicum. All thirty-four morphological distinct isolates were P-solubilizes, nitrogen fixers, siderophore producers, 18 isolates were indole acetic-acid producers, 19 isolates were ACC- deaminase producers, 12 isolates were ammonia producers and only 5 isolates were HCN producer. All the tested isolates possesses antagonism against one or more test pathogens i.e. *Fusarium solani, Rhizoctonia solani, Pythium spp., Ralstonia solanacearum, Phytophthora capsici* and *Colletotrichum capsici*.. The application of isolated indigenous PGPR Providencia sp. (ROH6) reduced the disease incidence of bacterial wilt (Ralstonia solanacearum) by 70% as compared to pathogen inoculated control. The conjoint application of PGPR isolate (JHA6 and ROH14) along with 80 per cent NP (N80 and P61 kg/ha) brought a significant increase in yield by 8.93%, increased available N and P contents by 8.64 and 20.73 per cent, over recommended doses (N100 and P76 kg/ha) besides saving of 20 per cent chemical fertilizers. Further, the application of indigenous plant growth promoting strains (JHA6 and ROH14) at varied levels of drought stress induce drought tolerance by increasing the antioxidant enzymes (SOD, CAT and POD) activities. Thus, the application of PGPR isolates has good prospects to be used as biofertilizer, biocontrol and bio-stimulant agents not only for enhanced growth and yield of capsicum but also to sustain soil health.

Biography:

I was INSPIRE scholar during my Ph.D. in microbiology, which I have completed from Dr. Yashwant Singh Parmar University of Horticulture and Forestry, Solan, INDIA. I have 2.5 years of working experience with plant growth promoting bacteria. Till now, have published 12 research papers, 4 research articles and three review articles. I have participated in 10 National conferences/ seminar and 3 International conferences. I am ICAR SRF and NET qualified, and have been awarded with best poster presentation award in National and International conferences. Currently I am working as Subject matter expert in Biology, with Chegg, Inc., an American education technology company.

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Efficacy of clove oil- a plant product in enhancing shelf life of food/seeds of pigeon pea

Narendra Kumar[1], SM Paul Khurana[2] and Vashist. N. Pandey[3]

[1,2]Amity Institute of Biotechnology, Amity University Haryana, Gurgaon Manesar-122413,Haryana, India

[3]Experimental Botany and Nutraceutical Lab, Department of Botany, DDU Gorakhpur University, Gorakhpur-273009(U.P.).

Pigeon pea [Cajanus cajan (L.) Millsp.] in India due to improper storage have a lot of deterioration. This is due to fungal and insect infestations. For its storage farmers use salphos that have carcinogenic and teratogenic effects. So plant based essential oils were investigated for its antifungal and insect repellent potential for storage of food/seeds of pigeon pea because of having least negative effects. Therefore fungal investigations on stored food/seeds of Pigeon pea were carried out by agar plate as well as blotter paper methods on 25 samples from grocery stores of Gurgaon and Gorakhpur. This revealed occurrence of 16 fungal species. Out of these fungal species Aspergillus flavus, A. niger was found to be dominant on the basis of % occurrence. Insect pest analysis of food seed revealed the presence of Callosobruchus chinensis infestations in all 25 samples of this region.The Essential oils were extracted separately from 100 plants. MIC, nature, spectrum were decided.The efficacy of most active-clove oil was evaluated which revealed absolute toxicity (100%) against dominantly present Aspergillus flavus, Aspergillus niger at concentration of 300 ppm and fungicidal at 400 ppm. At 400 ppm inhibited 10 fungi and at 600 ppm concentration it checked growth of all 16 fungal species. The clove essential oils showed 100% insect repellent activity against Callosobruchus chinensis at 0.01 ml dose and found insecticidal cidal at 0.02ml dose. There was no adverse effect of physical variants on oil. In vivo investigation on colve oil and synthetic pesticide-Salphos revealed that clove oil preserved food/seeds of pigeon pea up to 120 days very well from fungus and insect infestation in comparison to Salphos.There was no changes in organoleptic behaviour of food seeds after storage. GC-MS investigations of clove oil revealed 75.63 % eugenol as a major component. It revealed that clove essential oil have more fungitoxic and insect repellent efficacy in comparison to synthetic pesticide-Salphos.

Keywords: Pigeon pea, clove oil, biodeterioration, Aspergillus flavus, A. niger, synthetic pesticide,Salphos

Biography:

Dr.Narendra Kumar earned his Ph.D. in 2002 from Gorakhpur University(Subject-BOTANY). Since then he is doing research and teaching UG/PG students. Presently working as an Associate Professor, Amity Institute of Biotechnology at Amity University-Haryana, Gurgaon(India). He has attended and presented a large number of papers in several National and International conferences and was the recipient of Young Scientist and also the Best Paper awards for his research work. So far two PhDs have been awarded and some more students doing research work under his guidance; published four books, and has More than 140 research papers to his credit in reputed Journals.

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Geoenviromental assessment for the development of rainfed agriculture : A case study from Pulivendula tehsil, Kadapa district, Andhra Pradesh, India

B.P.Bhaskar*, Rajendra Hegde, S.Srinivas, V.Ramamurthy and Sunil Maske
V.Ramamurthy and Sunil Maske ICAR-NBSS&LUP, Regional Centre, Hebbal, Bangalore-560024

The geoenviromental assessment is utmost important for designing and reviving rainfed agriculture through appraisal of land resources of scientific surveys. The drought prone Pulvendula tehsil (128609 hectares), in Rayalseema plateau of Andhra Pradesh, experiences serious loss of the rainfed groundnut yields with mean productivity of 623.57 ± 294.94kg/ha. With canal irrigation, bore well explorations and subsidies on drip system from the government, the farmers are encouraged to expand area under banana in place of groundnut. The land resource inventory on 1:25000 scale was carriedout to derive soil map with 43 mapping units. The soils were classified upto subgroup level in the orders of inceptisols (46% of total area), vertisols (13%), alfisols (5%) and entisols (4%). These soils are slightly to moderately alkaline with high (48%) to very high cation exchange capacity (24%), low organic carbon content and mean CaCO3 content of 87.62 ± 46.57g/kg. Using soil loss equation, the soil erosion risk zones were delineated and arranged in ascending order as : high-medum (31.16%) and high (22.05%). The land evaluation (FAO method) for groundnut showed that 43% of total area is highly suitable with limitations of available nitrogen (93%), phosphorus (47%) and deficiency of DTPA extractable Fe(57%) and Zn(51%). The economic analysis showed that the deep sodic black soils are uneconomical and concentrated in north central zones (18.29% of total area) with benefit cost ratio of 1:1.6. The results of banana suitability analysis showed that 31.78% of area in interhill basins are rated as suitable under drip irrigation. The present scientific analysis was mainly focused on sustainable intensification and climate smart agriculture to provide livelihood for small farm holders in the region.

Keywords: Aridity index, Land evaluation, Land Resource Inventory, Rayalseema

Biography:

Born in Chillamattur mandal of Hindupur tehsil, Andhra Pradesh. Graduated from Sree Venkateshwara Agriucltural College, Tirupathi, Post graduated in Soil science & Agricultural Chemistry from College of Agriculture, Bapatla and PhD from College of Agriculture, Rajendra Nagar, Hyderabad. Qualified Aricultural Research Service exam and joined as scientist in soil survey and land use planning during 1990 at NBSS&LUP, Nagpur. Engaged in soil survey projects of Andhra Pradesh, Maharashtra, Kerala, Tamil Nadu and North eastern parts of country. Published over 150 research articles. One book.12 survey reports. presented over 40 articles in various seminars. Served as reviewer to various journals.

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A Strategic Study on Novel Technological Approaches for Transforming Agriculture and Industrial Bio-wastes into Bio-products in Egypt

Magdy M. Mohamed[1]; Kari Tiilikkala[2]; Oiva Niemeläinen[2]; Deiaaeldin A. Ahmed[1] and Eslam M. Abbas[1]

[1]Field Crops Research Institute, Agriculture Research Center; Egypt.
[2]Natural Resources Institute, LUKE; Finland.

Where, agricultural and industrial bio-wastes are often insufficiently exploited in Egypt despite being a potential feedstock for value-added products with local applications. At the same time, these bio-wastes are caused many problems for human and animal healths and the environment. Where, these wastes caused spreading of Snakes, Scorpions, Rats, Mosquitoes and Flies; especially, Stable fly (Stomoxys calcitrans) which bleed the skin of human and animals in many places in Egypt. Therefore, the objective of the study was to develop biotechnological processes for converting two types of biodegradable wastes, i.e. agricultural and industrial bio-wastes into useful bio-products for different applications, e.g. animal feed, bio-char for soil properties amendment, fertilizers, bio- pesticides and bio-fuels. Numerous methods exist for this type of conversion processes. In this regard, some of these available methods are quite sophisticated, but, others could be adapted to the local conditions found in Egypt. Mainly, the sources of agriculture and industrial wastes (about: 55.000.000 ton/Y; 2020) are: A) Seasonal pruning of trees. B) Vegetable crops-wastes C) Field crops-wastes. D) Industrial bio-wastes. Therefore; the main objective of this study are: A) Assess biotechnological methods adapted to the socio-economic and environmental conditions in Egypt for the conversion of bio-wastes such as Pyrolysis Systems (cost benefit analysis of the new techniques). B) Development goals by improving the management of bio-wastes in Egypt and thus reducing their potential adverse impacts of human and animal healthy, the environment and the economy. C) Impact of use of bio-char as soil properties amendment; especially, in sand soils with aim to enhance and/or increasing water and fertilizer use efficiency. In this regard; the water requirements of many crops were reduced by 30% to 45% depending on the nature of the crop and its root system.

Keywords: Bio-wastes, Pyrolysis System, Bio-char, Bio-pesticides

Biography:

Magdy Mohamed completed his PhD. In Institute of Plant Breeding and Acclimatization, Radzików, Warsaw, Poland. He is Editor in the following International Journals:

1. De-Witty Journal of Agricultural Sciences (DJAS).
2. International Journal of Research-GRANTHAALAYAH (Scopus).
3. International Journal of Applied Agricultural Research. (IJAAR).

He got the: World's Best Teacher and World's Best Boss; In: Bio-char Systems for Africa International Workshop. World Agro-forestry Centre; Nairobi; Kenya; 01-03.03.2016. He is major participant in the varieties invention of some forage crops (Varieties Invention).

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Effects of Phosphate Solubilizing Microorganisms on Wheat Yield and Alkaline Phosphatase Activity

Rawia O. Shams El-Deen[1] and Samy A. M. Abd El-Azeem[2]

[1]Soils, Water and Environmental Research Institute, Agriculture Research Center; Egypt.

[2]Soil and Water Department, Faculty of Agriculture, Suez Canal University; Egypt.

The phosphorus represents the second limiting nutrient after nitrogen and most of Egyptian soils are rich in P but more than 80% of it becomes immobile and rapidly convert into unavailable to plant uptake through precipitation processes and less than 10% of soil P go in the plant-animal cycle. MPS-Microbial Phosphate Solubilizes is being used as one of the most promising biotechnological practices to improve soil fertility, crop production, and quality with low input of chemical fertilizers and costs. The manner of phosphate solubilization by Pseudomonas fluorescence, Bacillus megaterium, Serratia marcescens, and Bacillus subtilis as PSB were assessed in NBRIP broth medium for their capacity to solubilize inorganic P in the form of rock phosphate (RP) (hydroxyapatite). A greenhouse pot experiment was conducted to evaluate the synergistic influence of RP application (0 and 31 P2O5 kg/fed.), BPS strains and arbuscular mycorrhizal fungi (AMF) on soil available P content, pH values, alkaline phosphatase activity, wheat (Triticum aestivum Gemeza-9) growth, yield, and nutrient uptake. The amount of P solubilized from RP by the tested PSB are increased and the pH values of the cultures were reduced up to 4.04 and 6.62. The maximum amount P solubilized of RP and the minimum pH values of the medium reached 14 days after inoculation with B. subtilis. In RP-amended soil combined inoculation with PSB and AMF inoculations, B. subtilis and P. fluorescence were more effective in increasing NPK uptake of wheat straw, grain, biological yields, grain/straw ratio, soil P content, and alkaline phosphatase activity compared with S. marcescens and B. megaterium, the non-inoculated or individually inoculated soil and this increase was much higher after 69 days compared with those after 130 days. Therefore, one of the requirements of this study is to implement it in field experiments to confirm these results

Keywords: Phosphate Solubilizing Bacteria, Phosphatase, wheat, AM fungi

Biography:

Experienced Research Assistant with a demonstrated history of working in the research industry. Skilled in Microsoft Excel, Microsoft Word, Microsoft Power Point, Soil Science, Soil Microbiology, and Research. Strong researcher professional with a Master's degree focused in Soil Microbiology from Soils, Water and Environmental Research Institute and Suez Canal University, Egypt; 2019. Rawia Shams El-deen got the Appreciation Certificate for her Bachelor's Degree in Soil Science with Very Good with Honors; Soil and Water Dep., Faculty of Agriculture, Suez Canal University, Egypt; 2011.

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Unearthing the potentials of underutilized legumes for food and nutrition security: A case study of African yam bean (Sphenostylis stenocarpa)

Omena Bernard OJUEDERIE
Department of Biological Sciences, Kings University, Ode-Omu, Nigeria

Poverty, malnutrition and food insecurity are burning issues affecting the developing world especially in sub Saharan Africa where most of the populace cannot afford a square meal a day. Overdependence on a few staple crops have led to the near extinction of other crops which though with great potentials for food, protein, and nutrition security, remain neglected and underutilized. Climate change is drastically reducing the yield of most staple crops due to their inability to withstand the continuous environmental changes as a result of global warming such as droughts and extreme temperatures. Underutilized legumes are climate-resilient crops with much economic benefits but have received little or no research focus. Some underutilized legumes produce both edible seeds and tubers with immense essential minerals and amino acids and rich cultural values. African yam bean is one of such crops. Despite its rich nutritional content, it has not received the much needed attention for its genetic improvement and wide-scale cultivation and utilization. Most of the genetic resources of this noble legume remains in the hands of resource poor farmers who cultivate them for sustenance of their families especially during the lean periods of the year. The hidden potentials in this dual food crop is discussed as well as the challenges facing its cultivation and future prospects suggested for its better acceptance and utilization using advanced technologies.

Keywords: climate change, food security, omic technologies, speed breeding, sphenostylis stenocarpa, underutilized legume

Biography:

Dr. Omena Ojuederie is a Senior Lecturer in the Department of Biological Sciences, at Kings University, Nigeria, an extraordinary Senior Lecturer of the Food Security and Safety Niche Area of the North-West University South Africa and a Part-Time Lecturer at the Pan African University Institute of Life Sciences, including Health and Agriculture, Ibadan. He holds a B.Sc. Hons in Microbiology from the University of Benin Nigeria, while his M.Sc. in Environmental Biology and Ph.D. in Plant genetics were obtained from the University of Ibadan. He is a recipient of the International Foundation for Science (IFS)

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DAY 1

POSTER PRESENTATIONS

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Integration of Machine Learning and Deep Neural Network Approaches intro a Process-based Crop Model for Prediction of Crop Growth

Jonghan Ko*, Taehwan Shin, Jiwoo Kang
Chonnam National Univ., 77 Yongbong-ro, Buk-gu, Gwangju 61186, ROK, South korea

Deep neural network (DNN) and machine learning (ML) techniques can be promising tools to advance a mathematical crop modeling methodology based on integrating these schemes into a process-based crop model to predict crop growth. This study proposes developing an innovative hybrid approach of weather data prediction and leaf area index (LAI) estimation for rice, employing DNN and ML models. We investigated suitable DNN models for the weather data prediction and explored the LAI estimation of rice based on the relationship between LAI and weather factors using ML regression models. Our preliminary investigation outcome shows that the XGBoost regression model is the most effective for the LAI estimation out of the ML regressors explored. We will report the detailed analysis outcomes and the on-going study findings on integrating the DNN and ML advances into a process-based crop model. We assume that the current working practice's advancement can enhance crop growth and productivity monitoring methodologies based on integrating a crop model with DNN and ML schemes.

Keywords: Crop model, deep learning, DNN, integration, machine learning, prediction

Biography:

Dr. Jonghan Ko is an ecological agronomy researcher serving as a professor at Chonnam National University, Gwangju, South Korea. His research focuses on agricultural remote sensing and crop modeling to develop and deliver efficient crop growth and productivity monitoring practices for various aspects and scenarios and different geographical regions.

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Investigation of the protein interaction of Selenium-binding Protein 1 (SBP1) with a papainlike protease (RD19c) in *Arabidopsis thaliana.*

Irene Dervisi, Andreas Roussis
University of Athens, Faculty of Biology, Athens, Greece.

In our lab we investigate the protein-protein interactions of Selenium-binding Protein 1 (SBP1) in order to understand the protein network in which it participates. SBP1 is an intriguing protein because of its extended conservation in all life kingdoms and its involvement in sensing stress. The papain-like protease (RD19c) hydrolyzes peptide bonds, plays a crucial role in the fate of proteins and belongs to the family of Papain-like cysteine proteases. Moreover, it has been proposed that RD19c participates in another development through programmed cell death. In our study we studied the tissue specific expression of RD19c and its differential expression under Se treatment. Furthermore, we defined the sub-cellular localization in a protoplast system of RD19c and we investigated the aforementioned interaction in a yeast two-hybrid system followed by BiFC protoplast system experiments. RD19c is expressed in hydathodes, stomata, main root and lateral roots, that is, tissues similar with those SBP1 is expressed in. SBP1 is localized in the cytocol and the nucleus whereas RD19c was detected probably in vesicle structures. Despite their different subcellular localization, we detected interaction between them in the cytosol. We suggest that this interaction takes place in response to different stresses leading probably to programmed cell death.

Keywords: SBP1, RD19c, PLCPs, stress response

Biography:

Studied Biology in University of Athens from which she graduated in 2017. Since then she is a PhD candidate in Molecular Plant Physiology in the same department, funded by the State Scholarships Foundation (I.K.Y.) and has published 2 papers.

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Metabolic Profiling, and Anti-cancer, Anti-inflammatory screening for Wild Plants Growing in Egypt

Ahlam Elwekeel*†, Dalia El Amir Mohamed*†, Mohamed A. Zaki*, Marwa H. A. Hassan*
*Pharmacognosy Department- Faculty of Pharmacy- Beni Suef University

Egypt is considered as an important country for plant diversity, it contains about 38.8% of the threatened plant species of North Africa. Hence this study aims to investigate some wild plants grown in Egypt deserts. Metabolomic profiling of the ethanolic extracts of three wild desert plants collected from Egypt dereplicated 28 compounds from *Volutaria lippi*, 20 from *Trigonella stellate* and 15 from *Fagonia cretica* using LC–HRESIMS technique. The identified metabolites belong to different chemical classes as alkaloids, flavonoids, phenolic and sterols as well as fatty acids. Additionally, the three plants were assessed for their cytotoxic, anti-inflammatory and antioxidant activities. Anti-cancer activity was tested against three cell lines human liver carcinoma (HEPG2), human breast carcinoma (MCF7) and human colon carcinoma (CACO2). In vitro anti-inflammatory activity was carried out against cyclooxygenase enzymes (COX-1 and COX-2) and Nitrous oxide (NO). Total phenolic and flavonoid contents were determined by Folin-Ciocalteu and aluminium chloride reagents respectively, while 2, 2-diphenyl-1-picrylhydrazyl (DPPH) was used for anti-oxidant assay. Concerning anti-cancer activity; only *Fagonia cretica* showed significant anti-cancer activity against the tested cell lines. Anti-inflammatory results revealed that *Volutaria lippi, Fagonia cretica,* and *Trigonella stellate* have anti-inflammatory activity against cyclooxygenase enzymes.

Keywords: *Volutaria lippi, Fagonia cretica, Trigonella stellate*, anti-cancer, anti-inflammatory, LC–HRESIMS

Biography:

Ahlam ElWekeel, worked as lecturer of pharmacognosy and natural products scince 2017 at Faulty of Pharmacy, Beni-Suef University, Egypt. Have been teaching pharmacognosy for undergraduate students. Research work is in the field of natural products isolation and structural elucidation. Also, part of my work was on plant tissue culture and natural products analysis using HPLC. Currently i am intersted in screening for bioactive seconadry metabolites for cancer treatment and antibiotic resistant bacteria

NOTE:

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