Biostimulants World Congress

18 - 21 November 2019
Fairmont Rey Juan Carlos I – Palau de Congressos de Catalunya, Barcelona, Spain

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DAY ONE • MONDAY, 18 NOVEMBER 2019 • PRE-CONFERENCE

10.00 - 17 .00	*Registration for Exhibitors & Posters Authors*
12.00 - 20.00	*Delegate Registration*
14.00 - 18.00	*Posters set-up & Exhibition set-up*
18.00 - 20.00	*Opening Evening Reception*

DAY TWO • TUESDAY, 19 NOVEMBER 2019 • MAIN CONFERENCE

08.00	*Coffee and Registration*	
08.30	**Chairperson Opening Remarks**	
08.40	**OPENING LECTURE: Yield Gap Analysis** **Martin K. van Ittersum,** Professor, **Wageningen University,** *Netherlands*	
	SESSION 1: THE USE OF BIOSTIMULANTS TO IMPROVE YIELD AND ABIOTIC STRESS TOLERANCE	
	Track 1: Biostimulant Science and Technology	**Track 2: Developments and Innovations in Commercial Biostimulants**
09.30	**Chairperson opening remarks** **Dr. Jian -Kang Zhu,** Director of the Shanghai Center for Plant Stress Biology, **Chinese Academy of Sciences**	
09.35	**Drought Stress Response of Plants and PGPRs** **Maximino Manzanera (Keynote),** Researcher to the Water Institute, **University of Granada,** *Spain*	
10.10	**Biostimulant applications and recalcitrant carbon soil amendments affect soil microbial activity, turfgrass establishment, growth and response to acute drought stress** Urban areas are replacing traditional production agriculture lands as the global population continues to expand. The perennial crop of choice in these areas is a covering of turfgrass (e.g. Poa pratensis, Lolium perenne, etc.). The public generally perceives that this urban crop is watered and fed in excess of need and receives prophylactic pesticide applications indiscriminately. Professional turf managers who culture lawns, golf and sports turf are constantly seeking ways to manage turf more efficiently and with fewer resources, especially during stress drought and heat stress. Prior research has demonstrated the benefits of incorporating organic amendments prior to planting (Linde and Hepner, 2005) and exogenous applications of various biostimulants under stress conditions (Zhang and Ervin, 2010; Zhang et al. 2008). The possible enhanced plant response of biostimulants on turf grown in soils amended with newer soil recalcitrant carbon sources like biochar is unclear. Seedling turfgrass was grown under controlled environment conditions on a sand rootzone amended with or without biochar and treated with or without various biostimulants containing kelp extract, humate, Bacillus spp.. Substantial increases in soil microbial activity were measured when biostimulants were combined with biochar and some modest improvements in turf establishment and green color retention when subject to acute drought were measured. These studies demonstrate the positive effects of these possible management inputs for further enhancing sustainable turf management practices. **Dr. Cale Bigelow,** Professor, Department of Horticulture and Landscape Architecture, **Purdue University**	
10.35	*Coffee / Tea Break*	

	Track 1: Biostimulant Science and Technology	Track 2: Developments and Innovations in Commercial Biostimulants
11.15	**The Potential of Biostimulants and Plant Monitoring Tools to Reduce Water and Nutrient Consumption in Horticulture** Bio4safe aims at reducing water and nutrient consumption in horticulture through the use of (seaweed-based) biostimulants in combination with innovative plant sensors. By this, we want to reduce water and fertilizer use by 20 and 10% in the 2 Seas Region, respectively. The project focuses on demonstration trials with various horticultural crops in four countries (NL, FR, UK, BE) for three years. After one trial year, when plants were grown under optimal conditions, first results hint towards a positive effect of the biostimulants to promote plant growth and stress resilience as a better water conservation strategy was observed (leaf clip, LVDT and sap flow sensors, water and nitrogen use efficiency, chlorophyll indices, growth parameters). The trial is repeated in 2019, but the plants are grown under drought stress (reduction of 20% water) and nutrient stress (reduction of 10-20% N). Results of this trial are available by Oct 2019. Data from the trials will be summarized in a general database, completed with data from literature. This will result in a webbased application where growers can search for the most appropriate biostimulant. This project aims further to develop a standardized protocol that accredited laboratories can use to objectively evaluate biostimulants. Project partners: PCS Ornamental Plant Research, Ghent University (BE), NIAB EMR, Dove Associates (UK), Pole Legumes, ISA Lille (FR), Proeftuin Zwaagdijk and North Sea Farm Foundation (NL). This project has received funding from the Interreg 2 Seas programme 2014-2020 co-funded by the European Regional Development Fund under subsidy contract No 2S03-029. **Jarinda Viaene,** Researcher, **Proefcentrum voor Sierteelt**	**Biostimulants: a key input for integrated crop management practices – insight from AlgaEnergy** As agricultural practices advance toward more complete Integrated Crop Management (ICM) programs it is becoming increasingly evident that robust plant-based natural inputs in the form of biostimulants can complement other ICM inputs to create a synergistic and positive impact on the yield and quality of harvests. While biostimulants are often used as an input to optimize crop performance under certain conditions, such as abiotic stress, AlgaEnergy is demonstrating that products derived from different strains of microalgae can provide valuable tools to optimize crop performance throughout all stages of plant growth and development. Unlike commonly used seaweeds, microalgae represent a very large diversity within the plant kingdom and naturally produce the full complement of all amino acids, oils and sugars and other active compounds that provide the ability to create unique nutritional biostimulants and biopesticides. The production of microalgae can be accomplished in highly controlled closed systems using simple inputs and recycling CO2 as a carbon source, thus allowing for the consistent production of very high-quality products from a plant source, not an animal or bacterial source, for use in agriculture. AlgaEnery has perfected the commercial-scale production of novel biostimulant products from unique combinations of microalgae strains using our proprietary UPT® process. The company has designed an 'Integral Biostimulation®' program, a holistic approach to ICM, that enables us to offer to the farmer a biostimulant solution that can be easily integrated into the normal practices of the grower. **Dr. Ry Wagner,** President of International Agribusiness, **AlgaEnergy**
11.40	**Quantification of the Effects of Exogenous Glycinebetaine on Maize under Drought: A New High-Throughput Approach to Test Biostimulant Efficacy** Maize is one of the most cultivated crops worldwide, projected to become the most important crop in the developing world by 2025. The increasing frequency of extreme climatic events, and specifically of drought, is negatively affecting maize yields. While the main approaches to increase drought resistance are genetic modification and plant breeding, biostimulants are emerging as a workable tool to counteract climate-change-related yield and quality reduction. Exogenous application of glycinebetaine, a widely accumulated stress adaptor molecule in plants, has been demonstrated to enhance maize stress tolerance under drought conditions. In this framework the commercial biostimulant Vegetal B60 (ED&F Man, derived from sugar beet molasses) distributed at a rate of 6 kg/ha at V5 stage, was tested. To verify its effects, trials on the drought sensitive maize inbred line B73 were conducted in a greenhouse. Different foliar application timings were tested in order to highlight varying product efficacy in relation to different values of fraction of transpirable soil water (FTSW). Progressive drought-related effects were quantified through a semi-automated whole-canopy multi-chamber system. Photosynthetic efficiency was then correlated to metabolomics profiling. Results showed a higher photosynthetic efficiency of the treated plants, correlated to biostimulant-mediated drought tolerance. Furthermore, metabolomic analyses demonstrated the chemical priming action of the biostimulant. **Giulia Antonucci,** PhD Student, **Catholic University of the Sacred Heart**	**Biostimulants key role in sustainable agriculture and food chain – feedback from Intermag** The principle of agricultural sustainability is that we must meet the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable agriculture frequently encompasses a wide range of production practices, including conventional and organic farming. An integrated system of plant production practices are designed to produce long-term effects such as:-Production of sufficient human food, feed and fiber,-Sustain the economic viability of farm -Protection of the environment Enhancing crop quantity and quality by providing an additional boost to crop outputs. There are many trials proving crop quantity and quality enhancement when biostimulants based on organic form of titanium, vanadium and on bioavailable silicon were used. Trials results from many countries (i.e. Poland, Italy, Great Britain) shows yield increase up to 30%. Increasing crop quality by biostimulants (content of ascorbic acid, lycopene, sugar, mycotoxins reduction, firmness, uniformity of tubers or fruits) were reported in trials on many crops. Improve plant tolerance to stress and help crop assimilate nutrients. Biostimulants based on microorganisms as well as bioavailable silicon are limiting factors for many pests and pathogens, therefore use of pesticides and traditional fertilizers can be lower than in conventional agriculture (Horticulture Institute 2014, Plant Protection Institute). Biostimulants support the development of beneficial soil microorganisms which improves soil health. Biostimulants help plants to more effective nutrients uptake to ensure a higher return on investment for farmers and fewer unintended impacts on the environment. **Wieslaw Ciecierski,** Marketing Director, **INTERMAG sp. z o. o.**
12.05	**Effect on Different Biostimulant Products in Heat Stress Response: Transcriptomic Profile Evaluation** **Daniele Villa,** President, **Agricola 2000**	**Sustainability in agriculture and the use of seaweed extract** **Yimin Qin,** Director State Key Laboratory of Bioactive Seaweed Substances, China, **Qingdao Bright Moon Seaweed Group Co., Ltd**

	Track 1: Biostimulant Science and Technology	Track 2: Developments and Innovations in Commercial Biostimulants
12.30	**Increased Crop Productivity Using Agrinos Technology Based Arbuscular Mycorrhizal Fungi (AMF) Formulation** In the recent times, bacteria and fungi based bio-fertilizers are gaining greater importance in global agriculture. Among the bio-fertilizers, Arbuscular Mycorrhizal Fungi (AMF) plays a major role in the cultivation of many important crops where Glomus sp. was found to be widely used for the abiotic stress management and crop productivity. Present paper summarizes the scientifically designed replicated field studies to enlighten the potential use of Agrinos AMF for promoting growth and yield benefits in different crops being cultivated in Indian subcontinent. Agrinos AMF developed through in-house technology where more than 90 % endomycorrhizal spores of Glomus sp. loaded in the product to establish root-symbionts which obtain their nutrients from the plant and provide mineral elements like N, P, K, Ca, S and Zn to the host plant through absorption. In this association, the fungus takes over the role of the plant's root hairs and acts as an extension of the root system. The significance of AMF in augmenting crop production has been clearly established through extensive field experimental data. Yield differences between AMF treated and untreated fields were significantly high ((P< 0.05) with fitting cost benefit ratio. The results on different crop experiments (Rice, Vegetables, Sugarcane and fruit crops) showed that the right dose, window and method of application is important for obtaining maximum benefits of the product which has ultimately enabled to develop specific application protocols to support commercial approaches for delivering vast benefits to the farmers. Studies further revealed the capabilities of AMF on improving soil health (aggregation, organic matter, water relation), better withstand of annual/perineal crops during drought and quality enhancement of end produce which has given way for future investigation in Mycorrhizal Technology. **Selvasundaram Rajagopal,** Regional Technology Director - Eastern Europe & Asia Pacific, **Agrinos India Pvt Ltd.**	**Reserved for Lida Plant Health**
12.55	*Lunch and Poster Session*	
	SESSION 2: THE USE OF BIOSTIMULANTS TO IMPROVE YIELD AND ABIOTIC STRESS TOLERANCE	
14.20	**Opening Chair Remarks** **Dr. Jose Maria Garcia,** Professor of Agricultural Chemistry and Director of the Chair, TIMAC AGRO (CMI Roullier),**University of Navarra**	
14.25	**KEYNOTE: Ammonium nutrition and signaling** **Nicolaus von Wirén,** Professor at Dept. Physiology & Cell Biology, **Leibniz-Institute of Plant Genetics & Crop Plant Research,** *Germany*	**A case study from SEIPASA: Developing and commercializing new biostimulant technologies** SEIPASA has been working in order to create new formulations for a more rational, sustainable and technology based agriculture, with direct implications in the design and development of plant biostimulant products. Based on the synergistic effects among different types of raw materials (microbial, a sulfonated random polymer of three aromatic alcohol and reducing sugars), together with independent research partners, SEIPASA generated data and empirical pieces of evidence to support these claim justifications. Through radicular and/or foliar stimulation and the establishment of microbial with a high colonization power, it has been possible to demonstrate interaction between culture and microorganism in various crops. High levels of genetic overexpression were reached in tomato culture. In concerning pepper, the use of the formulated product involved the formation of a biofilm and significant precocity levels, while olive and citrus trees were able to significantly improve the productivity and harvest quality levels. **Javier Nacher,** Chief Technical Officer**, Seipasa**

	Track 1: Biostimulant Science and Technology	Track 2: Developments and Innovations in Commercial Biostimulants
15.00	**Do Biostimulants have common mode of action on a molecular level? Comprehensive analysis of diverse types of biostimulants and their effects on gene expression of critical metabolic processes.** Biostimulants promote root and shoot growth, flowering, fruit set, yield and quality of crops. These beneficial effects can be attributed to enhanced nutrient use efficiency and increased tolerance to abiotic stress, triggered by physical and chemical challenges including foliar nutrient application. In this study we investigated the effect of five categories of commercially available biostimulants including seaweed extracts (SE), protein hydrolysates (PH), synthetic formula containing antioxidant properties (SF), plant growth regulators (PGR) and fermentation metabolite-based (FM) products. Each class of biostimulants was evaluated either alone or in combination with nutrients. Treatments were applied twice to the foliage of six-week-old Arabidopsis thaliana plants. Leaf tissue was collected 24 hours after the second application. Specific metabolic pathways were identified using microarray and gene expression was confirmed with qPCR. In this study we evaluated upregulation of genes involved in these pathways. Compared to control, all tested biostimulants showed different degrees of gene upregulation in stress response, nutrient transport and homeostasis, reactive oxygen species control and signaling. The strongest response was observed with the FM biostimulant followed by SE, while PGR, PH and SB showed lower or no gene upregulation. Application of biostimulants with nutrients generally enhanced gene upregulation over biostimulants alone, while nutrient treatment on its own resulted in low or no gene upregulation. In summary, we detected similarities in biostimulant effects on these metabolic pathways with unique differences in efficiencies of their performance and propose a common mode of action on a molecular level. **Adam Blaszczak,** R&D Director / Molecular Biology and Microbiology, **Cytozyme Laboratories**	**Acadian Plant Health: Identifying and differentiating the composition and consistency of algal-based biostimulant products available in the global marketplace.** Biostimulants are a diverse group of agricultural inputs that, when applied to plants or growing media, promote natural plant processes beyond the value of their nutrient content. They are commonly used with the goal of improving nutrient use efficiency, abiotic stress tolerance, and crop quality and yield. Biostimulants are most often derived from natural materials, and include algal extracts, humic acids, protein hydrolysates, and microbial products. Marine algal extracts, particularly those derived from Ascophyllum nodosum, have been used in commercial agriculture for over a half-century. One of the challenges in global regulatory environments is identifying the components of a complex marine algal extract to demonstrate and support its composition and authenticity. In this study, we outline work that has been conducted to characterize Acadian Seaplants' Ascophyllum nodosum-based biostimulants using natural products isolation techniques along with modern analytical tools and NMR metabolomic analysis. Focusing on the natural compounds that are known to be present in this alga (such as mannitol, alginic acid and laminarin), we have developed HPLC-based analytical methods for the detection and quantification of these key marker compounds in both fresh Ascophyllum nodosum and various aqueous extracts manufactured from it, with NMR-based metabolomic profiling also used to confirm their presence. Using these tools, we have demonstrated the consistency of Acadian Seaplants' biostimulants and established the levels of select marker compounds in these products, as well as shown differences with other experimental and commercial algal-based biostimulants available in the global marketplace. **David Hiltz,** Director of Analytical Services, **Acadian Plant Health**
15:25	**Pseudomonas simiae and a nonpathogenic strain of Fusarium oxysporum improve the induction of iron deficiency responses in cucumber and tomato plants** In calcareous soils, high pH contributes to the low solubility of Fe (iron) and, consequently, to the poor availability of this element. To solve this problem, dicot plants induce physiological and morphological responses in their roots aimed to facilitate Fe mobilization and uptake. Some key genes related to these responses are FRO, encoding a ferric reductase that reduces Fe3+ to Fe2+; IRT1, encoding a Fe transporter that transports Fe2+ into the root cells; and HA, encoding a H+-ATPase that releases protons to the rhizosphere. Several hormones and signaling substances, like ethylene and nitric oxide, participate in the regulation of these Fe acquisition genes. ISR (Induced Systemic Resistance), triggered by beneficial rhizosphere microorganisms, is also regulated by similar hormones and signaling substances, in such a way that ISR-eliciting microorganisms can promote the induction of Fe acquisition genes (Romera et al. 2019). The objective of this work was to study the capacity of Pseudomonas simiae and of a nonpathogenic strain of Fusarium oxysporum (both elicit ISR) to induce Fe deficiency responses, to improve the growth of plants and to alleviate the effects of high pH caused by bicarbonate in cucumber (Cucumis sativus L.) and tomato (Solanum lycopersicon Mill.) plants. The results obtained showed a greater induction of the Fe acquisition genes FRO, IRT1 and HA, and enhanced growth, a higher capacity to acidify the medium in presence of bicarbonate, and an enhancement of the ferric reductase activity some days after inoculation, in cucumber and/or tomato plants inoculated with these microorganisms. **Francisco Javier Romera,** Professor, **Universidad de Cordoba**	**A case study from Bioiberica: Developing quality biostimulant products** During the past two decades the presence of amino acid based biostimulants in the market has shown a steep growth. Many products have become available but, for many of them, a through analytical characterization of their composition has remained elusive. The obtention method as well as the source of protein are key factors for the quality of the finished product. For instance, while an enzymatic hydrolysis process leads towards a preservation of the biologically active forms, L-form of amino acids, chemical hydrolysis tends to leave residues as sodium, sulphates and chlorides and produce racemization. Both, residues and D-amino acids, can have undesired side effects for crops. Method of obtention and protein origin are independent factors although often chemical hydrolysis and animal origin as well as enzymatic hydrolysis and vegetal origin have been wrongly associated. Four globally present amino acid-based products claimed as vegetal in the biostimulant market have been characterized through HPLC-UV, PCR and EC-MS/MS to determine their amino acidic profile, molecular weight distribution and chiral purity and thus identify its origin and, tentatively, their obtention method. These results were compared to Terra-Sorb® Foliar, an animal based commercial product obtained through enzymatic hydrolysis. Furthermore, to assess their efficacy, agronomic as well as physiological assays were performed for the five products **Nuria Sierras,** Head of Research and Early development, **Bioiberica, S.A.U**
15.50	*Coffee / Tea Break*	

	Track 1: Biostimulant Science and Technology	Track 2: Developments and Innovations in Commercial Biostimulants
16.20	**Postharvest Fruit Quality as A New Target for Biostimulants: Challenges, Opportunities and Some Case Studies** Upon harvest, fruit are commonly stored at low temperatures and modified atmospheres with or without additional postharvest treatments aiming to slow down ripening and extend the produce life. Nonetheless, such conditions are known to be stressful and can induce the accumulation of oxidative damage as well as trigger an array of metabolic shifts/reactions within the fruit leading to the appearance of numerous physiological disorders. Thus said, the application of both targeted and untargeted transcriptomic or metabolomics studies has allowed to elucidate, to some extent, the etiology of many physiological disorders. Changes in specific metabolites levels as well as a disruption of the fruit redox homeostasis or an alteration of the fruit ripening-related machinery are common denominators for most of the relevant physiological disorders affecting fruit during storage. Consequently, the question now arises on whether the application of certain substances pre-harvest, such as biostimulants, can be employed to tackle postharvest physiological disorders. Research done over the past three years with a commercially available phospholipid enriched food-grade formulate that supplements the cuticle of the plant, has shown that pre-harvest treated peaches retained better firmness and owned increased shelf-life showing lower incidence of chilling injury disorders upon storage. Investigations on the putative mode of action of this product, have revealed that such positive effects were associated to changes in the fruit ethylene metabolism as well as by favouring the accumulation and utilization of sugars (sucrose) and acids (citrate), respectively, within the fruit yet without affecting the fruit maturity or quality at the time of commercial harvest. Overall, the results from this research are discussed on the context of developing new biostimulant products especially targeted to improve postharvest fruit quality and shelf-life. **Jordi Gine-Bordonaba,** Researcher, I**RTA**	**Discovering innovative Biostimulant products developed by Atlantica Agricola** Abiotic stresses such as soil salinity, drought and high temperatures severely affects crops establishment, growth and yield, leading to substantial economic losses. Biostimulants of Atlantica Agricola are formulated with different components such as seaweed extracts, amino acids, macro and microelements with the aim to improves plant growth and development and cope with the negative effects of abiotic stresses. The aim of this work was to evaluate soil and foliar applications of different formulations of biostimulants and their effects on tolerance to salt stresses of different crops. Photosynthesis (rate of net CO2 assimilation ACO2 and stomatal conductance gs), vegetative growth, organic solutes (proline and reducing sugars), and oxidative damage (MDA) were quantified. Additionally, the expression patterns of different genes involved in photosynthesis, oxidation-reduction processes, and several transcription factors were evaluated and confirmed by qRT-PCR. With this data it was concluded that application of biostimulants increased salt tolerance of tomato and Arabidopsis plants. These plants had a larger vegetative growth due to a better functioning of physiological processes, and enhancing of antioxidant stress. qRT-PCR study reports that Biostimulant application regulated genes expression related with salt tolerance in plants, and this regulation was only observed in salinized plants receiving biostimulant application. **Dr. Ernesto Alejandro Zavala,** Head Researcher, **Atlantica Agricola**
16:45	**How can a biostimulant influence next year's harvest?** In grapes, bud cluster formation takes place over two consecutive years. In the first year, inflorescences start to form (inflorescence primordia or IP) in the bud. This phase determines the potential fertility of the latent buds. Thus, the quality of the inflorescences formed in the first year is a crucial factor in the final yield of the following year. Regulation of the bud formation stages as defined by ISVV involves a set of genes which regulate the phases of cell proliferation, differentiation of vegetative meristems into floral meristems and acquisition of definitive characteristics. Biochemical and genetic analyses highlight the importance of hormones for promoting communication between cells and tissues ensuring harmonious and defined bud development. ISVV and UPL collaborated on a study to evaluate the effects of Vivaflor®, containing GA142, Ascophyllum nodosum filtrate on latent bud fertility. The multidisciplinary approach highlighted the positive effect of Vivaflor® (GoActiv) on the expression of the genes involved in these mechanisms, and also on the hormonal regulation mechanisms and metabolism of sugars favouring the formation of IP in the latent buds of vines. Acting at three complementary levels, it promotes IP branching stages by stimulating cellular differentiation and carbohydrate metabolism. Lastly, Vivaflor® triggered an increase in ABA content at the start of dormancy onset leading to a greater accumulation of sucrose and starch for improved storage of insoluble sugars. This led to better distribution and use of soluble sugars the following spring, with a cumulative effect. **Aude Bernardon Méry,** Global Biostimulant and Innovative Nutrition Development Manager, **Arysta**	**Insight from Stoller on improving resistance of crops to high temperature in a warming world** **Ron Salzman,** Director of Research, **Stoller**
17.10	**Biostimulants for producing high-quality fruits and vegetables** The world's agricultural systems face a great balancing act between two needs: (1) rise the supply of food produced on the available farmland since the global population will increase to over 9.3 billion by 2050, and (2) reduce agriculture's impact on the environment and human health. Meeting these two targets present a major sustainability challenge to scientists and producers, which might be fostered by using natural products known as plant biostimulants. Plant biostimulants, when applied to seeds, leaves, or the soil, can enhance nutrient uptake and assimilation, photosynthesis and crop tolerance to environmental stresses. Vegetal-derived biostimulants and endophytic fungi Rhizoglomus irregulare BEG72, Funneliformis mosseae BEG 234, and Trichoderma atroviride MUCL 45632 are gaining a lot of interest due to the high agronomic effectiveness and the lack of limitations in their use in organic farming systems. Several agronomic trials showed that vegetal-derived biostimulants and endophytic fungi differently modulate quality of fruits and vegetables. Vegetal-derived protein hydrolysate enhanced fruit size, mineral profile, nutritional and functional quality of several product (e.g. tomato, kiwi, cherry) while tropical-plant extract reduced nitrate content in leafy vegetables (e.g. spinach). Moreover, application of endophytic fungi enhanced soluble solids, phytochemical and especially mineral content of several product (e.g.cucumber, zucchini) Biostimulant activity have been associated with changes of endogenous hormonal balance, increase of nutrient uptake, activation of antioxidant defense system, and stimulation of primary and secondary metabolism. Several examples will be presented and discussed to show the potential benefits of using plant biostimulants in horticultural crops. **Mariateresa Cardarelli,** Researcher, **Council for Agricultural Research and Agricultural Economy Analysis (CREA),** *Italy*	**Microbiome innovation from Grupo Agrotecnologi¬a: Understanding how microbial-based biostimulants affect the microbiome of different agricultural soil types** Microbial-based biostimulants constitute a new group of products with high potential in agriculture, however, not much data about their impact in agricultural ecosystems or their mechanisms of action are available. In the efforts to elucidate the mechanism of action of Agrotecnología's products, the main objective of this study was to understand how one of our microbial-based biostimulants affects rhizospheric soil microbiome. The effects of the biostimulant were studied in four different soil typologies (acidic, basic, sandy and clay). Microbiome soil evolution was assessed from the last treatment with the product until harvesting points. Metagenomic studies were performed by analyzing the prokaryotic 16S ribosomal RNA gene. The product effects on bacterial biodiversity resulted soil type dependent, however, in none of the cases treatments showed negative effects on bacterial biodiversity. In acidic and clay soils, a short-term significant accelerated colonization of rhizospheric soil by bacterial species, previously described as plant growth promoter rhizobacterias (PGPRs), Arthrobacter and Hyphomicrobium respectively, was observed due to the biostimulant action. Similarly, a significant increase in another PGPR belonging to Sphingomonas genus was found at medium-term in the basic soil. Nevertheless, Bacillus subtilis, the microbial species included in the product, was not detected as majoritarian in any of the studied soils. This study gives the first insight into the impact of the microbial-based biostimulant in rizhospheric soil microbiome. Additionally, the results give a possible mechanism of action of the product. Thus, the ability of the biostimulant to recruit certain PGPR species may contribute to the successful performance of the product in the field. **Noemi Herrero,** R&D Manager, **Grupo Agrotecnologia,** *Spain*

	Track 1: Biostimulant Science and Technology	Track 2: Developments and Innovations in Commercial Biostimulants
17.35	**Harpin αβ for improved citrus quality - the importance of cell wall calcium** Harpin αβ peptides are produced by gram-negative bacteria. When applied as a foliar spray, Harpin αβ binds to plant receptors, initiating jasmonic acid and ethylene dependent pathways. The harpin- induced response is characterised by elevated levels of reactive oxygen species, potassium efflux and calcium influx. The extent to which Harpin αβ (ProAct®) influences calcium influx and how this affects fruit quality has received significant attention in recent years, including a 4-year study on citrus at the Instituto Valenciano de Investigaciones Agrarias (IVIA), Spain. IVIA reported an increase in calcium pectate (cell wall calcium) and firmer fruits following application of Harpin αβ. Across the 4 years, the level of 'creasing' in Harpin αβ treatments was reduced by an average of 47% (range 20-75%), with application timing having a significant effect. The IVIA results mirror that achieved in 46 grower trials (2015-2018), where Harpin αβ increased cell wall calcium by 21%. Yield increase across a range of citrus varieties and cultivars was 15%. The benefits of Harpin αβ can thus be broadly categorised as: improvements to fruit quality, increased yield, and better market opportunities, for example where harvesting of later varieties (e.g. Queen Mandarin) can be delayed. Assuming baseline yields of 50 MT/Ha, the yield improvement delivered by ProAct® equates to 10-15 times ROI (over $2,500 per Ha). Where the product is applied to late harvesting varieties returns are even higher, as growers can charge a premium of at least 10% if harvest is delayed by just two weeks. **Aoife Dillon,** Technical Director, **EMEA, PLANT HEALTH CARE ESPANA, S.A.**	**Novel technology: the SAS NOBA technology platform: Synergistic biostimulatory effect of codasil®: enhancing crop resilience to abiotic stress** Abiotic stress has become an emerging threat to global food security due to the constant changes of climate conditions and deterioration of environment as a result of human activities. Plants are continuously exposed to multiple abiotic stresses during their life cycle and their management is one of the biggest challenges facing agriculture. codasil® is a biostimulant composed of potentially bioactive form of silicon, oligo/polypeptides and free amino acids powered by SAS NOBA technology platform. Silicon is considered a 'quasi-essential' nutrient due to its role in providing benefits to the plant on growth, quality and yield, particularly under abiotic and/or biotic stress conditions. Oligo/polypeptides and amino acids have similar biostimulatory effects. This research project aimed to design a robust formulation and unravel the role of synergistic effects among silicon, oligo/polypeptides and amino acids contained in codasil® in improving plant resilience to abiotic stress at physiological, biochemical and molecular level. Several trials were carried out to evaluate the impact of soil-applied codasil® on different cultivars under drought, salinity and metal/metalloid toxicity. Our results revealed silicon-fortified plants achieving high nutrient use efficiency and high crop yield. Data suggested that the beneficial effects of codasil® on improving abiotic stress tolerance were attributed to an increase of photosynthetic activity, an enhanced water use efficiency, a contribution to osmotic adjustment, a reduction of metal/metalloid uptake and translocation, a protection against oxidative damage, an improvement of structural stability and a regulation of silicon transporter genes. Hence, codasil® represents a sustainable solution to improve crop abiotic stress tolerance. **Gemma Arjo,** Researcher, **Sustainable Agro Solutions (SAS), S.A.**
18:00	*Poster Session*	

08.00 *Coffee and Registration*

SESSION 4: MARKET TRENDS AND GOOD PRACTICES

09:00 **Plant biostimulants under the new EU fertilising products regulation**
Dr. Theodora Nikolakoupoulou, EU Commission

09:35 **How the Standardization Can Support the Global Market of Biostimulants?**
Benoit Planques, Global Regulatory Management, **italpollina**

09:55 **Justifying Plant Biostimulants Claims: Boundaries and Credibility**
There is an emerging global consensus around a definition of plant biostimulants that focuses on the key functions they provide: improving nutrient use efficiency, plant tolerance to abiotic stress and crop quality. Biostimulants are not the only agricultural inputs that affect these characteristics, and biostimulants may share some ingredients with products with different functions, such as fertilizers or plant protection products. Separating the effect of biostimulants out from other inputs is complicated by the fact that the mode of action of biostimulant products is not always fully understood or may be difficult to isolate when a product is complex and contains many ingredients. How then, can we distinguish biostimulant effects from those of other agricultural inputs?
This paper bridges between research and regulation by providing an overview of EBIC's guidelines on demonstrating the proof-of-concept for biostimulant products in the context of the forthcoming EU Fertilising Products Regulation, which specifies that a plant biostimulant "shall have the effects that are claimed on the label for the plants specified thereon". Consequently, the justification of the agronomic claim of a given plant biostimulant will be an important element to allow it to be placed on the European market once this new regulation is applied. EBIC's guidelines for justifying claims include topics such as adapting trial protocols to differentiate biostimulant effects from nutrient or plant protection functions and how use cases can help define boundaries between product categories when it is not possible to rely on a specific, isolated active ingredient to simplify categorization
Manuele Ricci, Past chair of **EBIC's Agriculture Committee at European Biostimulants Industry Council (EBIC)**

10:15 **Regulatory Q&A with the audience**

10:40 *Coffee / Tea Break*

	Track 1: Biostimulant Science and Technology	Track 2: Developments and Innovations in Commercial Biostimulants
11.15	**Opening Chair Remarks**	
11:20	**Climate Change: Is It Part of Your Marketing Plan?** Is Climate Change too political to be in your marketing plans? If it is growing more extreme, what strategies will be needed and will your tactics change? Do you have a vision for this future? Data from field trials and growth chamber studies conducted at Universities in North Carolina and Florida in the U.S. and at Rothamsted Centre for Research & Enterprise in the UK identified enhanced assisted migration of maize and cotton seed using Biostimulants. Surveys and interviews conducted in 2018 and 2019 with specific grower/producer segments in these regions yielded surprising data supporting a growing acceptance of Climate Change and a concern for information on input management necessary to combat what may become extreme environmental stresses. **Scott Gibson,** Executive Director, **JAKL, Inc**	**The Van Iperen approach on biostimulants and our developments**
11.45	**The market potential of seaweed biostimulants: a roadmap towards success** The Bio4safe project aims to develop a solution to reduce water and nutrient consumption of the agricultural sector through the use of, primarily seaweed-based, biostimulants. These seaweed-based biostimulants increase the nutrient and water use efficiency, increase the tolerance against abiotic stress and/or the quality of crops and flowers. By combining the application of these biostimulants with innovative plant sensors the project aims to demonstrate to farmers that this approach works and the results of water and fertilizer reduction by 20% and 10% respectively are being achieved. addition, the project will make a market study on the potential of biostimulants based on local seaweed, in order to create economic opportunities for seaweed producers in the 2 Seas Region. For successful collaboration a roadmap will be developed in close collaboration with a variety of stakeholders. The preliminary results of the roadmap will be presented to showcase the ongoing social & technical challenges and opportunities in the (seaweed) biostimulant industry. Further, the project focuses on demonstration trials with various horticultural crops in four countries (NL, FR, UK, BE). A database with all relevant information about biostimulants in horticulture. This database will further result in a webbased application for growers to choose the most suitable biostimulant for their crop. At last, this project aims to develop a standardized protocol that accredited laboratories can use to objectively evaluate biostimulants. By 2020 the EU will develop a common European framework for the marketing of biostimulants, but it remains unclear how positive effects of biostimulants on nutrient and water use can be quantified. This project has received funding from the Interreg 2 Seas programme 2014-2020 co-funded by the European Regional Development Fund under subsidy contract No 2S03-029. **Marlies Draisma,** Markets & Applications Manager, **North Sea Farm Foundation**	**Biostimulant Product development – insight from Yara** Yara's motivation for a global agronomy program on biostimulants is to sustain farmers profitability beyond conventional plant nutrition and improve plant health and quality by alleviating crop stress and to use biostimulants as a tool to adapt to climate change. The objective of the current research program is to understand the influence of Ascophyllum based seaweeds on yield in different crop groups; cereals, pulses, oilseeds, fibre crops and vegetables. We evaluated YaraVita BIOTRAC and F3580 at different rates and frequency of applications for their effect on crop yield in collaboration with various institutions in 2018 cropping season. F3580 application in soybeans at V2 growth stage and 13 days later @ 3 l ha-1 resulted in 12% significant higher bean yield than untreated control. Similarly, in cotton, Biotrac and F3580 applications resulted in 14 and 11 % higher seed cotton yield respectively over untreated control across two tested locations over different rates and timing of applications. In cabbage, Biotrac application @ 3 l ha-1, thrice (21, 33 & 45 DAP) resulted in 16% significant higher yield than untreated control. In potato, Biotrac application resulted in 7% numerical yield advantage at tested rates. Results confirmed the beneficial effect of biostimulants for yield especially in soybeans, cotton, potato and cabbage. Further evaluation of various biostimulants through rate response studies across different crops and agroecological climate zones is necessary for further understanding of biostimulant' s crop performance. **Kiran Pavuluri,** Research & Development Manager, **Yara UK Ltd.**

	Track 1: Biostimulant Science and Technology	Track 2: Developments and Innovations in Commercial Biostimulants
12.10	**Phenotypic Variation of Microbial Biostimulants for Consideration to Improve Product Efficacy** **Rebecca Williams-Wagner,** Principal Scientist, **3Bar Biologics, Inc**	**Developing biostimulants at SICIT: Exploring methodological approaches to study the mechanism of action of different components of protein hydrolysates produced by SICIT2000** Protein hydrolysates exert biostimulant effects on crops either adding to the soil or using as foliar spray. Protein hydrolysates are produced by chemical or enzymatic hydrolysis of animal- or plant-derived organic matter and normally consist of a mixture of free amino acids and peptides of different length. To optimize the efficacy of these products, we deemed important to investigate their mechanisms of action and dissect the effects of distinct components (free amino acids and different class of peptides). Indeed, single peptides and amino acids can have specific signaling activity on plant metabolism. We have applied several methodological approaches to study the mechanism of action of different components of a protein hydrolysates produced by SICIT2000. In our experimental model, we tested the effects of the biostimulant on roots of plants grown in diluted nutrient solution supplied with the protein hydrolysate or fractions of the hydrolysate. The phenotypical analysis was associated with ionomic and transcriptomic studies that enabled us to focus on specific effects of the product on the plant response to drought and hypoxic stress. In parallel, we exploited various methods to separate different classes of peptides on the basis of their molecular weight and to identify the most abundant peptides in the mixture in order to test the biostimulant efficacy of individual components **Tiziana Pandolfini,** Associate Professor, **University of Verona**
12:35	*Lunch and poster session*	
	SESSION 5: MECHANISMS OF BIOSTIMULATION AND STRUCTURE-FUNCTION RELATIONSHIPS	
14:05	**Opening Chair Remarks** **Dr. Patrick Brown,** Professor of Plant Sciences in the Department of Plant Sciences, **University of California, Davis**	
14.10	**KEYNOTE: Proposed topic Plants - microbiota interactions at the root - soil interface as drivers of mineral dynamics in soil** **Davide Bulgarelli,** Principal Investigator at the Division of Plant Sciences, **University of Dundee,** *UK*	**Innovative strategies to improve crop growth**
		(14:35) **Reserved for Futureco Bioscience**
14.45	**How biostimulants work? A case study of VdAL (Verticillium dahliae secreted Asp f2-like protein).**	
		(15:00) **Reserved for Tervalis**
15.35	*Coffee / Tea Break*	

SESSION 5: MECHANISMS OF BIOSTIMULATION AND STRUCTURE-FUNCTION RELATIONSHIPS

	Track 1: Biostimulant Science and Technology	Track 2: Developments and Innovations in Commercial Biostimulants
16.05	**Towards the development of more effective protein hydrolysate biostimulants: an approach combining molecular fractionation and metabolomics** The biostimulant activity of protein hydrolysates has been traditionally related to different compounds, that can be grouped into small molecules (including secondary metabolites and amino acids) and peptides. In this work, a protein hydrolysate was fractionated using dialysis membranes having different molecular weight cut-off, and fractions separately tested for hormone-like activity using in vitro bioassays.The most promising fractions, together with the non-fractionated protein hydrolysate, were then applied either basally or via spraying onto leaves, using tomato as model crop and indole-3-butyric acid as positive control. Growth and morphological parameters were recorded. Thereafter, leaf samples were harvested at 7 days after treatment and then analyzed through an UHPLC-ESI/QTOF-MS metabolomic approach to shed light onto the molecular bases of biostimulant activity. With this regard, pathways and biological processes modulation was inferred using the pathway tool of Plant Metabolic Network. Interestingly, hierarchical clustering allowed highlighting distinct metabolomic signatures as a function of the combination between the mode of application and the fraction considered. The supervised OPLS-DA multivariate analysis pointed out that the smaller fraction, when applied foliarly, modulated metabolic changes in a way very close to indole-3-butyric acid, thus strengthening the outcome of hormone-like activity bioassays. The processes involved included the biosynthesis of secondary metabolites, amines and amino acids, cofactors as well as the tuning of phytohormone profile. Our results suggest that the approach used might be useful to properly design biostimulants, starting from manufacturing process up to the definition of the best application strategies in the field. **Luigi Lucini,** Professor, **Universita Cattolica del Sacro Cuore**	**Brief product showcase and business development round tables** During this session 3 leading companies will give brief product showcase presentations, detailing the following: • Novel biostimulant products that have been developed • Field trial results will be displayed This will provide a quick insight into what products are being commercialized.
16:30	**Advanced characterization of humic-based biostimulants using size-exclusion chromatography with simultaneous UV and fluorescence detection** • Improving the efficacy of biostimulants: understanding the mechanisms of action and structure-function relationships. • Developing new biostimulants: new targets, sources and screening tools. **Alexey Ignatev,** Postdoctoral Researcher, **University of Jyvaskyla**	**Roundtable Discussions** Spaces for round table sessions are limited (10 per table) and will be allocated on a first come first served basis. Round table 1: **Market access in Latin America** Round table 2: **Are you in the box? How mindset impacts communication and conflicts** Round table 3: **Market access in India** Round table 4: **Biostimulant training courses to boost your skillset**
16.55	**Humic acids and seaweed extracts as plant growth biostimulants: use of Arabidopsis mutants affected in hormone signalling to go insight the mechanism of action.** The use of plant mutants with altered hormones pathway is used as an interesting tool to support a proposed mechanism of action of different biostimulants. The plant growth promoting effect of some organic compounds as humic acids and seaweed extracts is well known. In this study the phenotypic effect of these compounds is detected optimising the conditions of dose applied, plant stage at the moment of treating, and length of the application. Once the effect is expressed in wild type arabidopsis, it is compared, in the same conditions, with mutants treated with the biostimulants. If the observed effect in the wild type plants is not maintained, it can be concluded that the hormones affected in the mutants tested play a role in the mechanism of action of the biostimulants applied.This is the case of citokinins and auxins that seem to be essential in the action of both humic acid and seaweed extract. The mutants affected in these hormones do not keep the growth increase in shoot, whereas presented a similar pattern of root decrease as the wild type. Therefore, these hormones are involved in the action of these biostimulant in aerial part. However the action in roots occurs through other paths **Javier Erro,** Researcher, **Universidad de Navarra**	
17.20	**A Brassinosteroid-based Biostimulant Improves Plant Growth, Soil Health, and Tolerance to Glyphosate Stress** Biostimulants with multi-functional are effective management tools to enhance plant growth and improve soil health for optimum crop productivity while maintaining sustainable agroecosystems. Research indicating effects of biostimulants on soil health or on their ability to suppress glyphosate herbicide effects on crop and soil health is lacking. A biostimulant consisting of multiple brassinosteroids, 1-tricontanol, and B vitamins offers several modes of action to enhance crop growth. Field trials conducted during 2014-2017 on the biostimulant effects on key soil health indicators and response of glyphosate-resistant maize and soybean to glyphosate. Soil health indicators - soil microbial biomass, diversity and biological activity - improved under both crops receiving biostimulant. Beneficial fluorescent pseudomonads, Mn-reducing and indole acetic acid (auxin) producing rhizobacteria, and root biomass in glyphosate-treated maize and soybean were significantly increased ($P<0.05$). Root infection by Fusarium was significantly reduced while mycorrhizae were increased on soybean suggesting the biostimulant overcame suppressive effects of glyphosate. The biostimulant may offset glyphosate soil residual concentrations (≥1000 µg/kg soil), increasing microbial activity compared with soils without biostimulant. Results suggest the biostimulant reduces glyphosate stress on rhizosphere biological function due to brassinosteroids ability to reduce pesticide absorption and metabolism by plants, affecting glyphosate release into the rhizosphere. Increased photosynthesis by tricontanol likely results in more carbon released into the rhizosphere to sustain beneficial microbial function and diversity. Biostimulants serve a fundamental role in mediating stress in transgenic crops by overcoming detrimental effects of glyphosate used in crop production systems while enhancing beneficial microbial activity and soil health. **Manjula Nathan,** Extension Associate Professor, **University of Missouri**	
17.45	*Poster Session*	

SESSION 6: DEVELOPING NEW BIOSTIMULANTS: NEW SOURCES AND SCREENING TOOLS

08.00	*Coffee and Registration*
08.55	**Opening Chair Remarks** **Prof. Patrick du Jardin,** Professor and Head of the Plant Biology Laboratory, **Gembloux Agro-Bio Tech - University of Liège**
09.00	**KEYNOTE: Root phenotyping and root ideotypes** **Xavier Draye,** Professor at the Faculty of Bioengineering, **UCLouvain,** *Belgium*
09.35	**High-throughput automated phenotyping as a shortcut to more effective biostimulants: from seeds to crops** **Mirella Sorrentino,** PhD Student, **PSI (Photon Systems Instruments)**
10.00	**Development of new biostimulant formulations for row crops by means of transcriptomics and high efficiency plant phenotyping** Row/industrial crops such as soybean, corn, wheat, rice, rapeseed, sunflower, and cotton represent the most important crops in terms of global cultivated area. Row-crops agriculture is generally an intensive system of farming used to obtain high yields by employing elevated quantities of organic and mineral fertilizers. This is inconsistent with a vision of eco-compatible agricultural activity. Considering this, and the decrease in area of arable land, it becomes crucial to ensure high yield and quality using alternative strategies, such as the use of plant biostimulants (PBS). This study highlights the use of high-throughput/efficiency plant phenotyping (phenomics) together with Next Generation Sequencing (NGS) to investigate the effectiveness and mechanism of action of new biostimulant formulations specifically conceived as foliar applications to increase yield of row crops. Phenomic-based measurements of digital biovolume, Greener Area, and Stress Index allowed us to select the most effective prototype among the ones tested. Subsequently, we used NGS for a deep characterization of the molecular mechanisms by which the selected biostimulant exerts its positive effect. In conclusion, the results showed in this work support the integration of multiple "omics" as robust and objective tools in the discovery, evaluation, and development of innovative, sustainable, and targeted solutions to meet the emerging needs of row-crops agriculture. **Giovanni Povero,** Plant Science Coordinator, **Valagro SpA**
10.25	*Coffee / Tea Break*
11.00	**In planta selection of rhizosphere competent biostimulant microorganisms through an automated plant phenomics platform** Driven by ecological awareness on excessive use of chemical fertilizers, research and industry are aiming to develop biostimulant inoculants harboring plant growth-promoting bacteria (PGPR). However, most adopted selection procedures for PGPR consist of the initial exclusive in vitro isolation and selection of bacterial strains, which are only subsequently assayed in the host plant rhizosphere. As rhizospheric competence and activity are not accounted for in the initial in vitro selection, promising candidates often fail to perform in planta. In order to obtain superior candidates for biostimulant products, we developed an in planta enrichment platform with simultaneous selection for the biostimulant trait and rhizosphere competence. The platform was implemented to select for phosphate solubilizing bacteria (PSB) on maize (Zea mays L.). As maize exhibits phosphorous deficiency through the accumulation of anthocyanin, a phenotyping platform encompassing a multispectral camera was used to capture anthocyanin accumulation to monitor the plant's phosphorous status in a nondestructive manner. Through a cyclic approach in which plants were consecutively exposed to insoluble phosphorous, we succeeded to enrich the rhizosphere for a PSB consortium by the third enrichment cycle. Inoculated maize grown under phosphorous limitation showed a significant improvement over non-inoculated maize and harbored comparable phenotypes and phosphorous contents to maize grown on full nutrient solution. This platform has shown the potential to generate efficient in planta consortia, from which now individual strains could be isolated for further assessment. Furthermore, the platform can be implemented for other plant growth promoting traits such as nitrogen use efficiency and iron uptake. **Noemie De Zutter,** PhD Researcher, **Ghent University**
11.25	**Assessment of biostimulant effects under natural in-field conditions** Biostimulants are used in agriculture either as seed coating, foliar or soil application to enhance/benefit nutrient uptake and efficiency, abiotic stress tolerance and crop quality. The effects of biostimulants are often studied in controlled laboratory conditions during the screening phase to isolate and test for specific parameters/effects. Testing biostimulants in the field under natural conditions is challenging as the effect is dependent on the natural - in field - conditions. How can biostimulants be tested in field under natural conditions to achieve valid and reliable data on the effects of the biostimulants? Field trials have shown that standard small plot field testing does not fully account for the complexity of natural conditions, which impact the usefulness of the efficacy data on the biostimulants. New technologies are needed to fully investigate the effect and potential of biostimulants under natural conditions. The OnFarmPlus trial concept have shown to provide useful and valid data is large scale field plots in combination with a selection of georeferenced sensor data and specialized measurements such as root development. This method provides several layers of data with high resolution and can be customized to test for a specific effect or parameter under natural conditions. Furthermore, OnFarmPlus trials provide a better to understanding of the interaction between biostimulants, crops and natural environments. **Kim Wendelboe,** Consultant, **Danish Technological Institute**
11.50	**Field Screening Approaches for Monitoring Whole-Plant Response Modulated By Biostimulants** Biostimulants are the most rapidly growing segment of the Agricultural Chemicals industry, nevertheless, considerable uncertainty exists with regard to application rates, timings, crop responses, and mode of action. Skepticism among consumers and regulators as to the role of these products in modern agriculture further hampers adoption. To address this issue there is a need to develop university managed, rapid screening protocols that are independent, statistically robust, and low cost. The UC Davis Biostimulant Field Screening Trial is an investigation of physiological parameters related to biomass accumulation and energy balance of Lycopersicon esculentum Mil in order to characterize whole-plant response of biostimulant treated plants to multiple-stressors in commercial fields. This trial utilized the latest in sensing technologies and ground-truth devices to characterize Lycopersicon esculentum Mil phenology and to identify critical periods of biostimulant activity. **Meerae Park,** Graduate Student Researcher, **UC Davis**
12.15	**Bio2Bio: From Organic Agro Waste Streams To Biostimulants** Many biostimulants are sourced from renewable resources or even waste products. In the framework of circular economy, the Ghent university initiated an ambitious project to develop new biostimulants and biopesticides from agro-food waste products. The project, entitled Bio2Bio is a close collaboration between the research institutes Ghent University, VITO, ILVO and KULeuven and the industry.In the project 10 organic waste streams and by-products from food and agricultural industries are being investigated. Different extracts were prepared and tested for their bioactivity in a screeningsplatform containing 54 different bioassays ranging from in vitro tests, to greenhouse and even field tests. The project has created a unique library of extracts with specific bioactivity from organic waste streams. Upon evaluation of the screening results, determination of bioactive ingredients and biostimulant mode of action studies will be carried out. The project will have an impact on the discovery of new bioactive compounds of natural origins which conforms with circular economy. By linking academia with industry, it will provide valuable leads for biostimulant product development which is suitable for market needs. **Maaike Perneel,** Business Developer, **CropFit - Ghent University**
12.40	**Poster Award Preseantation** Given to the best student's poster by **Prof. Patrick Brown,** Co-chair of the **Scientific Committee**
1:20	**Closing Remarks** **Prof. Patrick du Jardin,** Chair or the **Scientific Committee**