

Microorganisms as sources of biobased colorants. Going deep into the rainbow of colorful fungi, yeasts, microalgae and bacteria

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Ingredients derived from microbial fermentation or extracted from microalgae are steadily gaining ground in the food industries (*the food industry being taken here as an example of industrial application, among many others*). Thickening or gelling agents (e.g. polysaccharides such as xanthan, curdlan, gellan), flavour enhancers (yeast hydrolysate, monosodium glutamate), polyunsaturated fatty acids (PUFAs), flavour compounds (gamma-decalactone, diacetyl, methyl-ketones), vitamins, essential amino acids, and acidulants (lactic acid, citric acid) are some examples illustrating this trend of the biobased economy. Efforts have been made and continue to be done in order to reduce the production costs of pigments produced by algal ponds and microbial fermentation, since synthetic pigments or those extracted from natural plant sources can often be produced more economically. The successful marketing of natural pigments such as β -carotene, lutein, and astaxanthin derived from microalgae (i.e. non-conventional sources) or extracted from flowering plants (conventional sources), both as food colorants and nutritional supplements, reflects the presence and importance of niche markets in which consumers are willing to pay a premium for 'natural healthy ingredients'. Among other non-conventional sources, filamentous fungi and bacteria are known to produce an extraordinary range of pigments that include several chemical classes such as carotenoids, melanins, azaphilones, flavins, phenazines, quinones, and more specifically, monascins, violacein, and indigo. The success of any class of pigment produced by fermentation depends on its acceptance by the consumers, regulatory approval, and the capital investment required bringing the product onto the

market. Twenty years ago, influential representatives from food industry expressed doubts about the successful commercialization of microalgae-derived and fermented food grade pigments due to the high investment required for open ponds, photo-bioreactors and fermentation facilities, and the extensive and lengthy toxicity studies required by the regulatory authorities. Poor public perception of fungal-derived products for food use had also to be taken into account. Nowadays, some microbial and algal food grade pigments obtained by fermentation are existing on the market worldwide. Among them, fungal *Monascus* pigments, Arpink red™ (now Natural Red™) produced by *Penicillium oxalicum*, microalgal phycocyanin from *Arthrospira (Spirulina) platensis*, riboflavin from the mold fungus *Ashbya gossypii*, lycopene and β -carotene from the tropical mold *Blakeslea trispora*, β -carotene from the microalgae *Dunaliella salina*, and astaxanthin from the bacterium *Paracoccus carotinifaciens* and microalgae *Haematococcus pluvialis*, respectively. As an example, the production yield of β -carotene may be as high as 17g/L of the *Blakeslea trispora* culture medium.

Based on proprietary research works conducted on carotenoids and azaphilones for 20 years in our laboratory, the talk will emphasize the crucial role that microorganisms and microalgae are currently playing and are likely to continue to play in future as microbial cell factories for the production of food grade pigments and biobased colourants in general. This is due to the versatility in their pigment colour and chemical profile, amenability for easy large-scale cultivation, and a long history of production by well-investigated production strains.



Thursday, September 13
Natural Products and Analytical Chemistry
Eolian Milazzo Hotel (Congress Center)

9:00 Plenary Session

Laurent Dufossé – “Microorganisms as sources of biobased colorants. Going deep into the rainbow of colorful fungi, yeasts, microalgae and bacteria”. University of Reunion Island (FR)

I Session Chairs

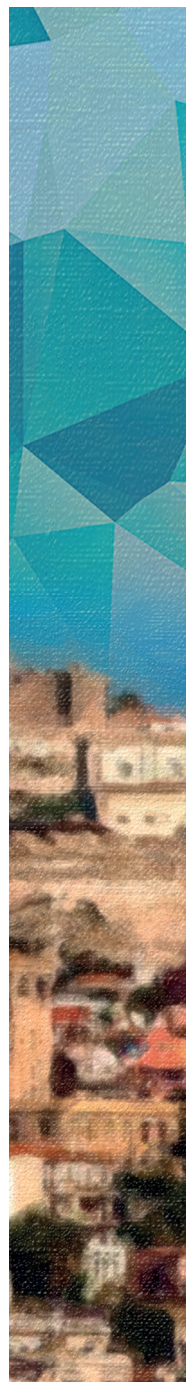
Daniele Giuffrida and **Sara Vitalini**

9:45 Mohammed Benkhaled – “Antioxidant activity and chemical constituents of *Astragalus monspessulanus*”. University of Batna (DZ)

10:00 Hamada Haba – “New acylated triterpenoids from *Euphorbia pterococca* with biological activities”. University of Batna (DZ)

10:15 Marta Goleniowski – “Profile Characterization of VOCs on *in vitro* propagated plants of *Hedeoma multiflorum* and its comparison with wild plant”. Centro Científico Tecnológico CONICET (AR)

10:30 Coffee Break





XXVII SILAE CONGRESS
9-13th September 2018 MILAZZO
CONGRESS PROGRAM BOOK



Science
4Life



Monday, September 10
Food Chemistry and Microbiology
Eolian Milazzo Hotel (Congress Center)

8:00 Congress Registration (Hall of the Eolian Milazzo Hotel)

9:00 Plenary Session

Alberto Ritieni – “Comprehensive two-dimensional chromatography in food analysis: an overview.” University of Napoli “Federico II” (IT)

I Session Chairs

Luca Rastrelli and Suzana Leitão

9:45 Giuseppa Di Bella – “Geographical discrimination of Italian and Tunisian herbs and spices by multi-element analysis”. University of Messina (IT)

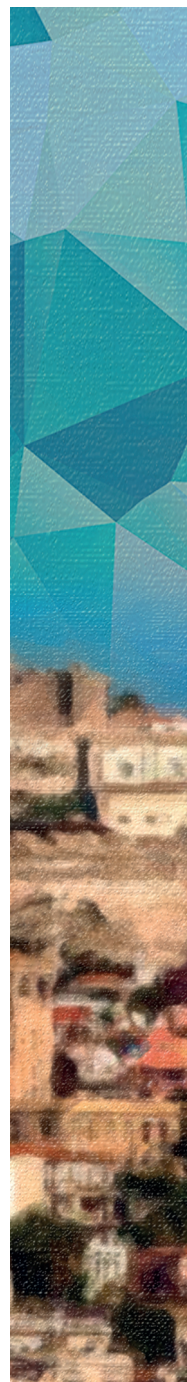
10:00 Claudio Corradini – “Evaluation of new natural ingredients for innovative functional food”. University of Parma (IT)

10:15 Vita Di Stefano – “Biofortification of pasta and bread with fatty acid extracted from purslane”. University of Palermo (IT)

10:30 Archimede Rotondo – “Experimental NMR strategy for a data throughput toward a complete nutritional labelling of olive oil samples”. University of Messina (IT)

10:45 Andrea Ariano – “Levels of heavy metals in muscle and digestive gland of *Octopus vulgaris* from the Southern Tyrrhenian Sea”. University of Napoli “Federico II” (IT)

11:00 Coffee Break



Monday, September 10
Food Chemistry and Microbiology
Eolian Milazzo Hotel (Congress Center)

II Session Chairs

Vincenzo Ferrantelli and **Teresita Di Bernardi**

11:30 Vincenzo Lo Turco – “Plasticizers and BPA in spices and aromatic herbs of Mediterranean areas”. University of Messina (IT)

11:45 Maria Elena Ristuccia – “Valorisation of Sicilian quality agro-food products”. Consorzio di Ricerca sul Rischio Biologico in Agricoltura (Co.Ri.Bi.A.) (IT)

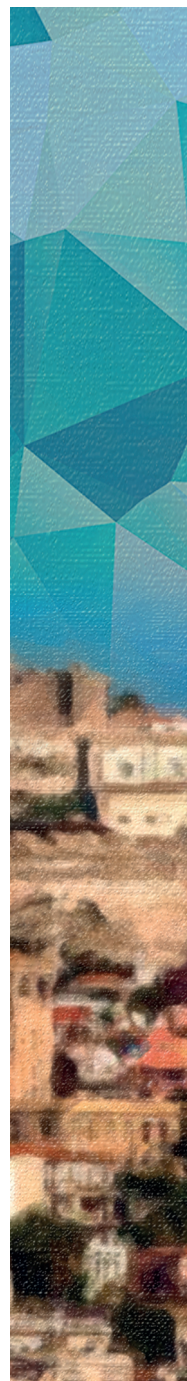
12:00 Alexandra Lena Galetovic Carabantes – “Use of phycobiliproteins from Atacama cyanobacteria as a food colorant”. University of Antofagasta (CL)

12:15 Gaetano Cammilleri – “Seasonal trend of anisakidae infestation in South Mediterranean bluefish”. Istituto Zooprofilattico Sperimentale (IZS) della Sicilia (IT)

12:30 Sandy Yvette Tellez Vizcaya – “Fatty acid profile of dried chili seed oil (*Capsicum annum*)”. National Autonomous University of Mexico (MEX)

12:45 Teresa Gervasi – “Development of value added products from agricultural food waste”. University of Messina (IT)

13:00 Light lunch



Monday, September 10
Food Chemistry and Microbiology
Eolian Milazzo Hotel (Congress Center)

15:00 Plenary Session

Luisa Mannina – “NMR methodologies in food science”.
University of Rome “La Sapienza” (IT)

III Session Chairs

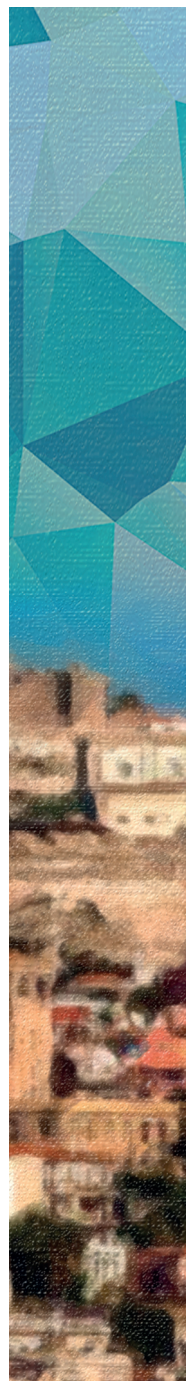
Nicola Cicero and **Maria Daglia**

15:45 Antonello Santini – “Food safety communication”.
University of Napoli Federico II (IT)

15:45 Francesco Cacciola – “Comprehensive two-dimensional
liquid chromatography in food and natural products analysis”.
University of Messina (IT)

16:15 Fabrizio Cincotta – “The aroma of Sicilian red garlic of
Nubia as affected by drying methods”. University of Messina (IT)

16:30 Coffee Break



Tuesday, September 11
Pharmacology and Phytochemistry
Eolian Milazzo Hotel (Congress Center)

9:00 Plenary Session

Carlos Velázquez – “Antiproliferative effect of Sonoran propolis on cancer cells: deciphering the cellular mechanisms of action of Sonoran propolis”. University of Sonora (MEX)

I Session Chairs

Ivana Bonaccorsi and **Ericsson Coy-Barrera**

9:45 Sergio Rosselli – “Evaluation of NF- κ B involvement in the cytotoxicity of oleanolic and ursolic acid semisynthetic derivatives toward hepatocellular carcinoma”. University of Palermo (IT)

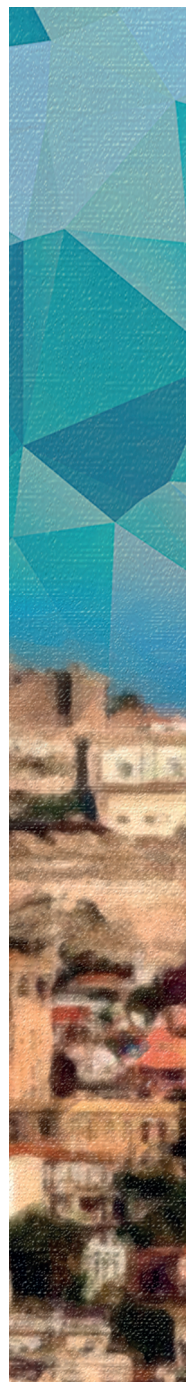
10:00 Erika Gomez-Chang – “*In vivo* and *in vitro* toxicity of a bioactive *Cyrtocarpa procera* methanol extract”. National Autonomous University of Mexico (MEX)

10:15 Pablo Chacón-Morales – “Preparation of highly functionalized himachalanes by oxidation of longipinene derivatives”. University of Guayaquil (EC)

10:30 Yasser Shahzad – “Natural and semisynthetic polymer blended oral fast dissolving films of citalopram”. COMSATS University Islamabad (PK)

10:45 Fernanda Kolenyak-Santos – “The influence of surfactant and cosurfactant in the formation of liquid crystals containing gemfibrozil”. University of Guayaquil (EC)

11:00 Coffee Break



Tuesday, September 11
Pharmacology and Phytochemistry
Eolian Milazzo Hotel (Congress Center)

II Session Chairs

Giuseppa Di Bella and **Paola Vita Finzi**

11:30 Maria Sofia Molonia – “Cyanidin-3-O-glucoside ameliorates palmitate-induced inflammation and insulin resistance in 3T3-L1 hypertrophic adipocytes”. University of Messina (IT)

11:45 Antonella Smeriglio – “Phytochemical composition and biological activities of essential oils from two *Cannabis sativa* L. Biotypes”. University of Messina (IT)

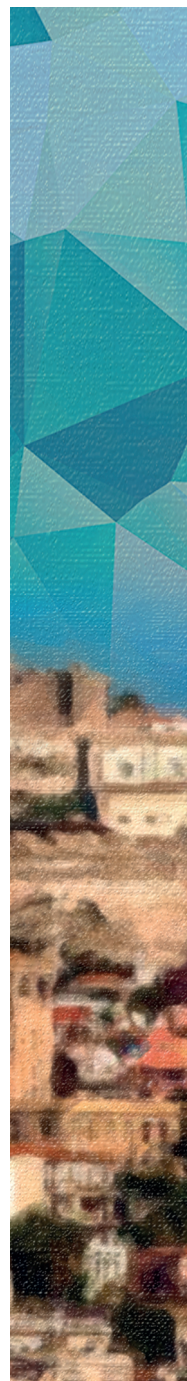
12:00 Erna Elisabeth Bach – “Hypoglycemic and hypolipidemic effects of *Spilanthes oleraceae* var *oleraceae* in streptozotocin. induced diabetic rats”. Universidade Nove de Julho (BR)

12:15 Maria Paola Germanò – “Anti-angiogenic activity of *Alnus glutinosa* (L.) Gaertn. (Betulaceae)”. University of Messina (IT)

12:30 Marcella Denaro – “Pistachio hull extract as source of Ideain: absorption, transport and anti-inflammatory studies on Caco-2 transwell model”. University of Messina (IT)

12:45 Daniela Russo – “Phytochemical composition and antioxidant activities of *Melicoccus bijugatus* Jacq fruits”. University of Basilicata (IT)

13:00 Light lunch



Tuesday, September 11
Pharmacology and Phytochemistry
Eolian Milazzo Hotel (Congress Center)

15:00 Journal Special Issues devoted to the XXVII SILAE Congress presented by:

Antonello Santini, Guest Editor for the Special Issue “FOODS” (MDPI)

Nicola Cicero, Guest Editor for the Special Issue “Natural Product Research” (Taylor & Francis)

III Session Chairs

Marta Goleniowski and Ramon Robles

15:45 Brenda Veronica Montejano – “Acute toxicity in mouse CD1 *Amphipterygium adstringens* (cuachalalate)”. Autonomous University of the State of Hidalgo (MEX)

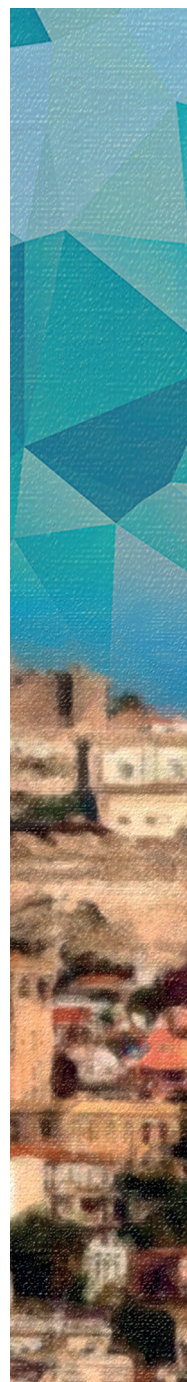
16:00 Georgina Almaguer – “Phytochemistry and acute toxicity in BALB/c mouse of *Decatropis bicolor*”. Autonomous University of the State of Hidalgo (MEX)

16:15 Alessandro Maugeri – “Mechanisms of interaction between flavonoids present in *Citrus bergamia* juice and the AMPK/SIRT-1 axis: an *in silico*, cell-free and *in vitro* study”. University of Messina (IT)

16:30 Natasha Irrera – “Reduction of atherosclerotic lesions in ApoE KO mice treated with lycopene extracted from Sicilian tomatoes”. University of Messina (IT)

16:45 Abdul Jaleel Cheruth – “Phytochemical analysis, antioxidant and antimicrobial activity of *Moringa peregrina* tuber extracts”. United Arab Emirates University (UAE)

17:00 Coffee Break



Tuesday, September 11
Pharmacology and Phytochemistry
Eolian Milazzo Hotel (Congress Center)

IV Session Chairs

Carlos Velázquez and **Mariateresa Russo**

17:30 Matthias Luebbert – “Application of batch and simulated moving bed chromatography for food and natural products processing”. KNAUER Wissenschaftliche Geräte GmbH (DE)

17:45 Jovan Durán Alonso – “Development and characterization of liquid-crystals based on new supramolecular amphiphiles”. São Paulo State University (BR)

18:00 Nilsa Sumie Wadt – “Use of phytotherapics in wounds skin healing at SUS”. Universidade Nove de Julho (BR)

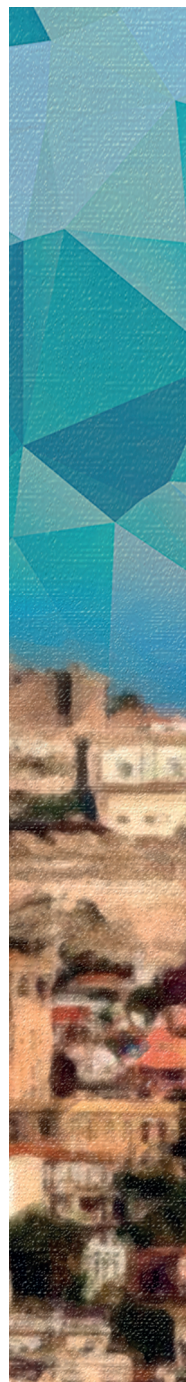
18:15 Yulma Lopez Gongalez – “Tumorigenic effect of *Thevetia peruviana* in Wistar rats”. Autonomous University of the State of Hidalgo (MEX)

18:30 Sara Vitalini – “Chemical profile and biological activities of *Achillea moschata* Wulfen”. University of Milano (IT)

18:45 SILAE Assembly

19:30 Poster Session (from PS001 to PS064)

20:30 Sunset Aperitif at the “Stone Beach” (Milazzo Playa)



Wednesday, September 12
Ethnobotany, Ethnopharmacology and
Ethnomedicine
Eolian Milazzo Hotel (Congress Center)

9:00 Plenary Session

Suzana Leitão – “Ten Year’s Research with the Amazonian adaptogen plant *Saracura-mirá: Ampelozizyphus amazonicus* Ducke”. Federal University of Rio de Janeiro (BR)

I Session Chairs

Nicola Cicero and **Palermo Mafron Melania**

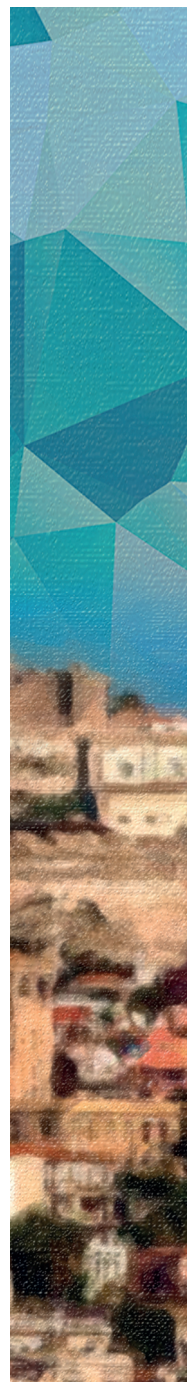
9:45 Sara M. Robledo – “Advances in the development of phytomedicines for treating cutaneous leishmaniasis”. University of Antioquia (CO)

10:00 Julio Alarcon – “Chemistry and biology of Chilean genus *Colletia* and *Discaria*”. University of Bío-Bío (CL)

10:15 Israr Ahmad – “Ethnoecological study of the plants profile of Village Malik kheil Kotkay, District Shangla, KPK, Pakistan”. Women University of AJK Bagh (PK)

10:30 Poster Session (from PS065 to PS127)

10:45 Coffee Break



Wednesday, September 12
Ethnobotany, Ethnopharmacology and
Ethnomedicine
Eolian Hotel (Congress Center)

II Session Chairs

Luisa Mannina and Enrique Murillo

11:30 Kenza Bezza – “Anticonvulsant effect of *Anacyclus pyrethrum* on pilocarpine induced generalized seizures: possible involvement of cholinergic mechanism”. Cadi Aayad University (MA)

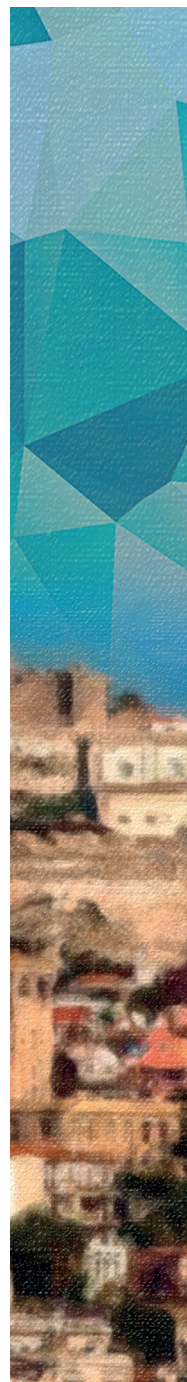
11:45 Veronica Micheli – “Effects of *Kigali africana* (Lam) Benth. fruits extract on the development and maturation of the reproductive system in immature male rats”. University of Messina (IT)

12:00 Zineb El Gabbas – “Chronic *Salvia officinalis* treatment and rosmarinic acid alleviates neuropathic pain in mice sciatic nerve chronic constriction injury model”. Cadi Aayad University (MA)

12:15 Alicia Consolini – “Ethnopharmacology of South American medicinal plants with cardiovascular effects”. National University of La Plata (AR)

12:30 Poster Session (from PS065 to PS127)

13:00 Light lunch



Wednesday, September 12
Natural Products and Analytical Chemistry
Eolian Milazzo Hotel (Congress Center)

15:00 Plenary Session

Maria Daglia – “Gallic acid: health protective activities via epigenetic mechanisms of action”. University of Pavia (IT)

III Session Chairs

Vita di Stefano and **Andrea Salvo**

15:45 Ivana Bonaccorsi – “Comprehensive data evaluation (CDE) of d13C for quality assessment and traceability of natural compounds”. University of Messina (IT)

16:00 Daniela Rigano – “Antimalarial Transmission blocking activity of angeloylated germacranolides from *Daucus* sp”. University of Napoli “Federico II” (IT)

16:30 Coffe Break

17:00 Round Table – “Nutrition: between safety and health aspects”

Ruggero Razza – Health Assessor, Sicilian Region

Giacomo Dugo – President of “Consorzio di Ricerca sul Rischio Biologico in Agricoltura” (Co.Ri.Bi.A.) (Palermo, IT)

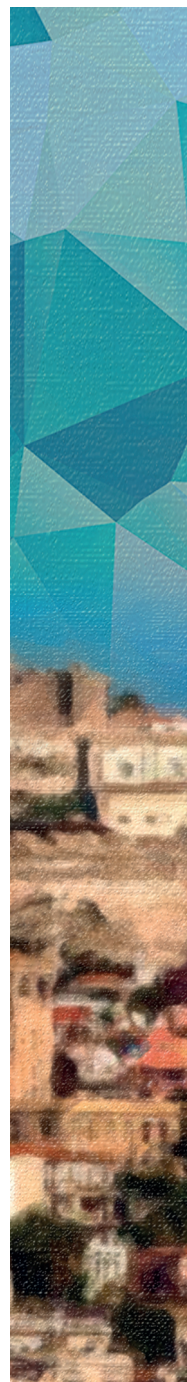
Salvatore Caruso – President of the Order of Pharmacists of Siracusa (Siracusa, IT)

Antonello Santini - Member of the Italian Authority for Food Safety (CNSA) of the Italian Ministry of Health (Rome, IT)

Paolo Rapisarda - Director of “Consiglio Per La Ricerca e la Sperimentazione in Agricoltura” (CREA) of Acireale (Catania, IT)

18:30 Poster Session (from PS065 to PS126)

21:00 Social Dinner at the “Eolian Milazzo Hotel”



Thursday, September 13
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Eolian Milazzo Hotel (Congress Center)

9:00 Plenary Session

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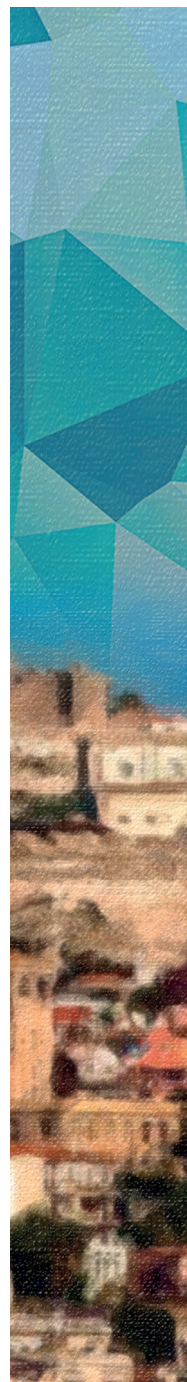
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9:45 Mohammed Benkhaled – “Antioxidant activity and chemical constituents of *Astragalus monspessulanus*”. University of Batna (DZ)

10:00 Hamada Haba – “New acylated triterpenoids from *Euphorbia pterococca* with biological activities”. University of Batna (DZ)

10:15 Marta Goleniowski – “Profile Characterization of VOCs on *in vitro* propagated plants of *Hedeoma multiflorum* and its comparison with wild plant”. Centro Científico Tecnológico CONICET (AR)

10:30 Coffee Break



Thursday , September 13
Natural Products and Analytical Chemistry
Eolian Milazzo Hotel (Congress Center)

11:00 Plenary Session

Enrique Murillo – “Nuevos carotenoides en el Mamey rojo (*Pouteria sapota*)”. University of Panama (PA)

II Session Chairs

Alicia Consolini and **Archimede Rotondo**

11:45 Carolina Santiago Dugarte – “2',3,4-trihydroxychalcone, phloretin and calomelanone from *Stevia lucida*. The first chalcones reported in *Stevia* Genus”. University of Guayaquil (EC)

12:00 Ericsson Coy-Barrera – “Biochemometrics based identification of antifungal quinolizidines”. Nueva Granada Military University (CO)

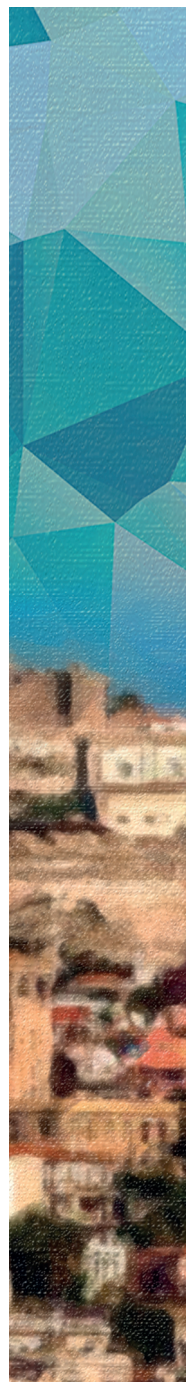
12:15 Closing Ceremony

Giacomo Dugo , Chairman of the XXVII SILAE congress

Luca Rastrelli SILAE general secretary

Mariateresa Russo, SILAE Vice-president

13:00 Light lunch



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Santo Caracappa

Giuseppa Di Bella

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INTERNATIONAL SCIENTIFIC COMMITTEE

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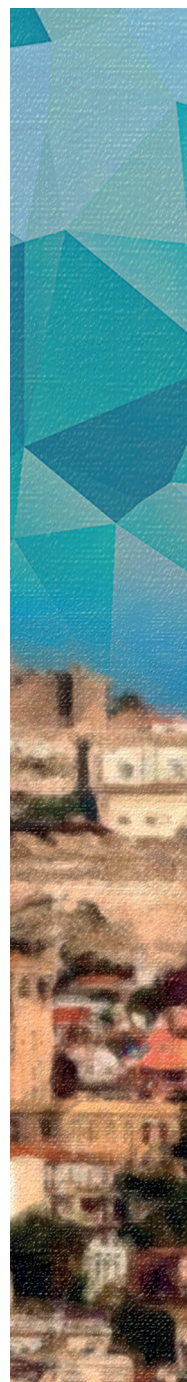
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