

# IX WORKSHOP AICIng

## Chemistry for sustainable materials



***Ancona 16-17 Giugno 2022***

**AICIng**

Associazione Italiana di Chimica  
per Ingegneria

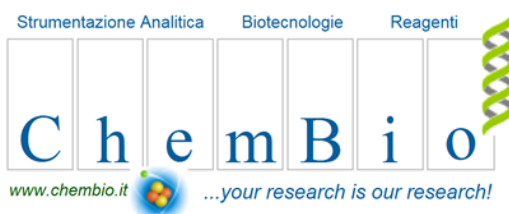


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## PROGRAMMA SCIENTIFICO workshop AICIng 2022

Giovedì 16 giugno - Aula Mario Giordano

8:30-9:00	<b>Registrazione</b>
9:00-9:20	<b>Saluti di benvenuto:</b> - Magnifico Rettore - Presidente AICIng
<b>Sessione 1: Prof. Piero Mastrorilli (Politecnico di Bari)</b>	
9:20-9:35	<b>O1-Elena Cazzaniga (Politecnico di Torino):</b> Determination of lipid content in hazelnuts using NIR spectroscopy.
9:35-9:50	<b>O2-Nico Zamperlin (Università di Trento):</b> Barium Titanate functionalization with Organosilanes: enhancing particle-matrix compatibility in nanocomposites.
9:50-10:05	<b>O3-Martina Lippi (Politecnico di Milano):</b> Nanocellulose-based aerogel as urea-controlled release systems.
10:05-10:20	<b>O4-Massimo Zambito Marsala (Politecnico di Milano):</b> Bionanocomposites based on a covalent network of chitosan and edge functionalized graphene layers.
10:20-10:35	<b>O5-Roberto Martini (Università di Roma Tor Vergata):</b> Solvent-induced Aggregation of Prolinated Porphyrin Derivatives: Comparison between Solution Behavior and Solid-State Morphology
10:35-10:50	<b>O6-Mattia Sozzi (Politecnico di Torino):</b> <sup>1</sup> H NMR Spectroscopy as a tool for monitoring and optimizing lentil flour extraction and enzymatic hydrolyzation processes.
10:50-11:20	<i>Coffee Break</i>
<b>Sessione 2: Prof. Salvatore Failla (Università di Catania)</b>	
11:20-11:35	<b>O7-Giulia Calabrese (Università di Messina):</b> Perovskite oxides for hydrogen storage.
11:35-11:50	<b>O8-Martina Bortolami (Università di Roma La Sapienza):</b> Anodic generation of BF <sub>3</sub> from imidazolium ionic liquids: a safe and effective alternative to commercial etherate form.
11:50-12:05	<b>O9-Ivan Pietro Oliveri (Università di Catania):</b> Tunable transmetalation properties of a new Lewis acidic Zn(II) Schiff-base complex
12:05-12:20	<b>O10-Manfredi Caruso (Politecnico di Milano):</b> One (benzene) ring to rule them all: overcoming solubility and reactivity issues of N-hydroxyphthalimide in the oxidation of hydrocarbons.



12:20-12:35	<b>O11-Fatima Margani (Politecnico di Milano):</b> A green approach to the edge functionalization of graphene layers with a bio-based 2-pyrone.
12:35-12:50	<b>O12-Claudio Gioia (Università di Bologna):</b> Synergic cooperation for the synthesis and advanced modelling/characterization of novel functional bio-polymeric architectures.
12:50-13:05	<b>O13-Cristina Minnelli (Università Politecnica delle Marche):</b> Layered double hydroxide as versatile and sustainable platform for biomedical applications.
13:05-14:30	<i>Pranzo</i>
<b>Sessione 3: Prof.ssa Michelina Catauro (Università degli Studi della Campania)</b>	
14:30-14:45	<b>O14-Viviana Bressi (Università degli Studi di Messina):</b> Rilevamento elettroanalitico di ioni metallici pesanti in acqua di mare mediante sensori TPYP-SPEEK/SPCE.
14:45-15:00	<b>O15-Fabrizio Caroleo (Università di Roma Tor Vergata):</b> Colour Catcher® : low-cost colorimetric sensor and laundry. Kill two birds with one stone.
15:00-15:15	<b>O16-Simona Crispi (Università degli Studi di Messina):</b> Gas sensing modulation of CNTs and m-TiO <sub>2</sub> nanomaterials by atomic layer deposition (ALD).
15:15-15:30	<b>O17-Alberto Taffelli (Università di Trento):</b> Large area photodetectors based on sol-gel-derived MoS <sub>2</sub> films.
15:30-15:45	<b>O18-Francesco Moriggi (Politecnico di Milano):</b> Chemical functionalization of graphene surface as filler for rubber compounds: modeling of supramolecular interactions.
15:45-16:15	<i>Coffee Break</i>
<b>Sessione 4: Prof. Roberto Paollesse (Università di Roma Tor Vergata)</b>	
16:15-17:00	<b>Conferenza Plenaria-Prof. Luca Prodi (Università di Bologna):</b> Luminescence-based systems for analytes of biomedical and environmental interest.
17:00-17:15	<b>O19-Daniele Veclani (Università di Udine):</b> Thermodynamic of Adsorption of Diclofenac on graphene by molecular dynamics simulations.
17:15-17:30	<b>O20-Elaheh Mohebbi (Università Politecnica delle Marche):</b> VO <sub>2</sub> (B) Nanostructures as Promising Cathode Materials for rechargeable Li-ion Battery.
17:30-17:45	<b>Dott.ssa Maria Grazia Garavaglia (Perkin Elmer)</b>
17:45-19:00	<b>Sessione Poster</b>
20:30	<b>Cena Sociale - Bar Caffè Giuliani - Corso Giuseppe Garibaldi, 3</b>

## Venerdì 17 giugno (Sessione Parallela A) - Aula Mario Giordano

<b>Sessione 4A: Prof.ssa Isabella Chiarotto (Università di Roma La Sapienza)</b>	
8:30-8:45	<b>O21-Simone Naddeo (Politecnico di Milano):</b> Two steps one pot process for the conversion of dimethylfuran to pyrrole compounds with almost null E factor.
8:45-9.00	<b>O22-Anna Paola Panunzi (Università di Roma Tor Vergata):</b> Enhancing electrocatalytic activity of $\text{La}_{0.6}\text{Sr}_{0.4}\text{FeO}_3$ by Pt-doping for IT-SOFC cathodic applications.
9:00-9:15	<b>O23-Beatrice Ricciardi (Università di Roma Tor Vergata):</b> 3D Spherical Fe-N-C Oxygen Reduction Electrocatalysts for Energy Conversion.
9:15-9:30	<b>O24-Francesco Lanero (Università di Padova):</b> Functionalized copolypyrrole-polyketone anion exchange membrane.
9:30-9:45	<b>O25-Emanuele Previti (Università di Messina):</b> New Calcium Lactate-SPEEK composite Coatings for Thermal Energy Storage Applications.
9:45-10:00	<b>O26-Gloria Nicastro (Politecnico di Milano):</b> Co-Polymeric Nanosponges from Cellulose Biomass as Heterogeneous Catalysts for Organic Reactions.
10:00-10:15	<b>O27-Laura Riva (Politecnico di Milano):</b> Cellulose Nanofibers as Additives for Sustainable Buildings: LCA and Analysis on Raw Earths.
10:15-10:30	<b>O28-Rida Jbr (Università Politecnica delle Marche):</b> Chemical separation: a step towards a full recycling and recovery of Cotton and PET fibers from blended textile.
10:30-11:00	<i>Coffee Break</i>
<b>Sessione 5A: Prof.ssa Giuseppina Raffaini (Politecnico di Milano)</b>	
11:00-11:15	<b>O29-Giovanni Dal Poggetto (Università di Modena e Reggio Emilia):</b> Effect of acid attack on geopolymers based on recycled corundum.
11:15-11:30	<b>O30-Edoardo Bondi (Università di Bologna):</b> Comparison between films and scaffolds of cyclohexane-based random copolyesters for vascular repair.
11:30-11:45	<b>O31-Edoardo Testa (Politecnico di Milano):</b> Innovative bioplastics from polypeptides of <i>Hermetia illucens</i> .
11:45-12:00	<b>O32-Elena Battaglini (Università di Bologna):</b> Sealing properties of fully bio-based poly(butylene 2,5-furanoate).

## Venerdì 17 giugno (Sessione Parallela B) - Aula A 7/8

<b>Sessione 4B: Prof.ssa Simona Sabbatini (Università Politecnica delle Marche)</b>	
8:30-8:45	<b>O33-Enrico Bianchi (Università di Bologna):</b> Isomerism, glycol chain length and copolymerization as tools to achieve outstanding furan-based sustainable food packaging

8:45-9:00	<b>O34-Nicola Cavallini (Politecnico di Torino):</b> Chemometric differentiation of sole and plaice fish fillets using three near-infrared instruments.
9:00-9:15	<b>O35-Arianna Rossetti (Politecnico di Milano):</b> TEMPO-oxidized cellulose nanofibers/polyvalent cations hydrogels: A multifaceted view of network interactions and inner structure.
9:15-9:30	<b>O36-Laura Fazi (Università di Roma Tor Vergata):</b> Towards an understanding of the connection between micro e macro behaviour of CNT/polymer composites: a 3D Raman imaging approach.
9:30-9:45	<b>O37-Serena De Santis (Università di Roma tre):</b> FTIR spectral fingerprints in Colorectal Cancer derived Tissues and Cancer Associated Fibroblasts.
9:45-10:00	<b>O38-Enrico Lemma (Università Campus Bio-medico Roma):</b> Selective positioning of different cell types on 3D scaffolds via DNA hybridization.
10:00-10:15	<b>O39-Emanuela Muscolino (Università degli studi di Palermo):</b> Recombinant mussel protein Pvfp5b enhances cell adhesion of poly(vinyl alcohol)/k-carrageenan hydrogel scaffolds.
10:15-10:30	<b>O40-Fabiana Pandolfi (Università di Roma La Sapienza):</b> New deferiprone derivatives as antibiofilm and antimicrobial agents: design, synthesis and biological evaluation.
10:30-11:00	<i>Coffee Break</i>
<b>Sessione 5B: Prof.ssa Paola Astolfi (Università Politecnica delle Marche)</b>	
11:00-11:15	<b>O41-Marco Parlapiano (Università Politecnica delle Marche):</b> Molecularly Imprinted Polymers for the CECs selective removal as tertiary treatment in Municipal Wastewater Treatment Plant.
11:15-11:30	<b>O42-Alessia Foglia (Università Politecnica delle Marche):</b> Assessment of alternative value chains for Polyhydroxyalkanoate recovery from municipal wastewater treatment plant.
11:30-11:45	<b>O43-Aurelio Bifulco (Università di Napoli):</b> PVP-based composites containing sol-gel nanosized SiO <sub>2</sub> and hybrid TiO <sub>2</sub> microparticles for water purification.
11:45-12:00	<b>O44-Grazia Maria Cappucci (Università di Modena e Reggio Emilia):</b> Assessment of impacts caused by local scale emissions introduced in USEtox model.

**SESSIONE CONGIUNTA - Aula Mario Giordano**

12:05-12:30	<b>Premiazioni e chiusura lavori</b>
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# Chemometric differentiation of sole and plaice fish fillets using three near-infrared instruments

*Nicola Cavallini<sup>1</sup>, Alessandro Giraudo<sup>1</sup>, Gentian Gavoci<sup>1</sup>, Francesco Geobaldo<sup>1</sup>, Francesco Savorani<sup>1</sup>*

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Fish species substitution is one of the most common frauds all over the world, as fish identification can be very challenging for both consumers and experienced inspectors in the cases of fish sold as fillets. Along the fishery production chain, one of the most vulnerable food chains [1], species replacement can often occur [2-4]: indeed, the difficulties in distinguishing among different species may generate a “grey area” in which mislabelling can occur. Thus, the development of fast and reliable tools able to detect such frauds in field is of crucial importance.

In this study we focused on the distinction between two flatfish species largely available on the market, namely the Guinean sole (*Synaptura cadenati*) and European plaice (*Pleuronectes platessa*), which are very similar looking. Fifty fillets of each species were analysed using three near-infrared (NIR) instruments: the handheld SCiO (Consumer Physics), the portable MicroNIR (VIAMI), and the benchtop MPA (Bruker).

Exploratory principal component analysis (PCA, [5]) models and classification partial least squares-discriminant analysis (PLS-DA, [6]) models were built using the spectral datasets, and all three instruments provided very good results, showing high accuracy in classification: 94.1 % for the SCiO and MicroNIR portable instruments, 90.1 % for the MPA benchtop spectrometer.

The good classification results of the approach combining NIR spectroscopy, and simple chemometric classification methods suggest great applicability directly in the context of real-world marketplaces, as well as in official control plans.

## References

- [1] Reilly, A. *Overview of Food Fraud in the Fisheries Sector*; 2018.
- [2] Calosso, M.C.; Claydon, J.A.B.; Mariani, S.; Cawthorn, D.M. Global Footprint of Mislabeled Seafood on a Small Island Nation. *Biol. Conserv.*, 2020, 245.
- [3] Donlan, C.J.; Luque, G.M. Exploring the Causes of Seafood Fraud: A Meta-Analysis on Mislabeling and Price. *Mar. Policy*, 2019, 100, 258-264.
- [4] Di Pinto, A.; Mottola, A.; Marchetti, P.; Bottaro, M.; Terio, V.; Bozzo, G.; Bonerba, E.; Ceci, E.; Tantillo, G. Packaged Frozen Fishery Products: Species Identification, Mislabeling Occurrence and Legislative Implications. *Food Chem.*, 2016, 194, 279-283.
- [5] Bro, R.; Smilde, A.K. Principal Component Analysis. *Anal. Methods*, 2014, 6, 2812-2831.
- [6] Ballabio, D.; Consonni, V. Classification Tools in Chemistry. Part 1: Linear Models. PLS-DA. *Anal. Methods*, 2013, 5, 3790-3798.



ISBN 978-88-3623-094-5



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