Biophysical chemistry group

Logo

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DEPARTMENT: Department of Biotechnology, Chemistry and Pharmacy

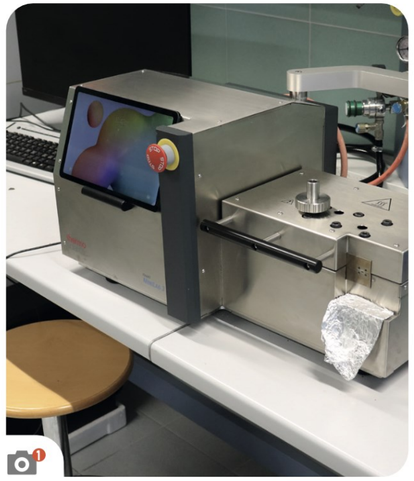
LAB: Physical chemistry

Research activity

The research group focuses on:

- Spectroscopic and spectrophotometric analyses of biological, enzymatic, and material systems, with particular focus on the use of electron paramagnetic resonance (EPR) spectroscopy.
- Use of EPR spectroscopy for traceability, quality, and safety determination in agri-food supply chains.
- Use of fishery and agricultural by-products for the production of innovative materials for packaging, in a circular economy perspective.
- Synthesis and characterization of melanin-like polymeric materials and their applications in biotechnology.
- Methods for enzyme immobilization on nanosystems for industrial applications.
- Life Cycle Assessment (LCA) analysis of processes and products

Images



Technologies and services

- **Electron Paramagnetic Resonance Spectrometer** - Bruker, S, X, and Q bands operating in continuous wave and pulsed modes at variable temperature (3-370 K). It is used for the spectroscopic investigation of paramagnetic species, including transition metals (Fe3+, Mn2+, Cu2+, VO2+, etc.) and free radicals. Its high sensitivity and ability to identify the generation of free radicals in situ allow for a wide range of applications, from food science to medicine and nanotechnology.

- Haake MiniLab 3 **Extruder**, a twin-screw system designed for processing small sample quantities (5-10g), optimizing the formulation process of various materials on a laboratory scale.

- Wasp **3D Printer** - for industrial-scale prototyping from pellets.

- Fontijne **Heat Press** - for film production.

- Instron Single Column **Dynamometer** 3400 series and Die Cutter - Instron, a globally recognized brand for manufacturing the world's most advanced mechanical testing systems. This instrument can perform a wide range of mechanical tests, including tension, compression, bending, peel, tear, friction, and cutting, using hundreds of accessories. With two load cells of 100 N and 1 kN, it allows for tensile testing in accordance with ASTM, ISO, and other industrial standards.

- Life Cycle Assessment (**LCA**) analysis of processes and products.

Applications and collaborations

Projects:

- FISH4FISH n. 863697 : **FISH** chitinolytic biowastes **FOR FISH** active and sustainable packaging material

- PNRR – AGRITECH – SPOKE 9 - RICERCA SU METODOLOGIE E STRUMENTI INNOVATIVI PER L'AUTENTICITÀ, QUALITÀ, SOSTENIBILITÀ E TRACCIABILITÀ DELLE FILIERE AGROALIMENTARI

-WINBLUE n. 101112278: Empowering women and Mainstreaming Gender Equality in the Blue Economy

Collaborations:

Next Technology Tecnotessile (NTT) – Prato Italia

Tecnopackaging – Zaragoza (Spagna)

ANFACO – Vigo (Spagna)

Biochica SRL – Italia

For more information

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