

STUDY AND DEVELOPMENT OF NEW TECHNOLOGIES FOR THE PRODUCTION OF INDUSTRIALLY RELEVANT ORGANIC MOLECULES FROM BIOMASSES

The areas of interest of the researchers in industrial chemistry focus on the use and valorization of vegetal biomasses for the production of industrially (commercially) relevant organic molecules. In particular, studies are addressed to the transformation of agri-food byproducts and wastes for the manufacture of synthetic primary intermediates (e.g. lactic acid, 5-hydroxymethylfurfural, levulinic acid and glicerol) through catalytic and fermentative processes.

Project activities closely connected to these themes include the development of synthetic methodologies with a low environmental impact aimed at converting building blocks derived from renewable sources into commercially viable secondary intermediates. In this regard, particular attention is being paid to technologies dedicated to the production of bio-monomers and corresponding biocompatible and biodegradable bio-based polymers to be used as new plastic materials.

As a part of biomass valorization, the research group is working on the development of methodologies for the selective extraction of fractions and/or substances from agri-food industry wastes which can be applied in food, nutraceutical and agronomic areas. This work is supported by analytical studies (HPTLC, MS, HPLC-DAD) with a view to firmly identify and characterize the molecules of interest.

It has to be said that these research lines are developed in close collaboration with other groups related to diverse scientific disciplines (SSD). In particular, it does exist a strict cooperation with researchers within the Department of Chemical and Pharmaceutical Sciences (Organic Chemistry - CHIM/06; Food Chemistry - CHIM/10) and the Department of Life Sciences and Biotechnology (Pharmaceutical Biology - BIO/15; Vegetal Physiology - BIO/04).

GOALS

- Development of biotechnological and catalytic methodologies for the transformation of biomasses into primary intermediates for industrial chemistry
- Development of chemo- and biocatalytic synthetic strategies for the conversion of primary building blocks into synthetic secondary intermediates and biopolymers
- Development of methodologies for the selective extraction of fractions and/or substances from agri-food industry wastes
- Identification and characterization of the molecules of interest

INSTRUMENTS AND METHODS

Mass (MS) spectrometry and infrared (FT-IR) spectroscopy. Nuclear magnetic resonance (NMR). Elemental analysis. Chromatographic instruments. Analytical techniques (HPTLC, HPLC-DAD).

MAIN SUBJECTS

Industrial chemistry, organic chemistry, food chemistry, analytical chemistry, pharmaceutical biology, vegetal physiology

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