

Research activities

The research activity is focused on the study of the molecular mechanisms underlying biological processes and on the biochemical characterization of biologically active molecules and their use in the agro-food, industrial and biomedical sectors, and on the use and application of biochemical / biotechnological techniques and methodologies for their identification, characterization and analysis.

Keywords: Enzymology, Metalloproteinases and zymography, Proteomics (MALDI-ToF-MS, 2-DE), Biochemistry of nutrition, Impact of nutrition on human health, Plant proteases, Nutraceuticals, Biochemical characterization of mushrooms as source of health-promoting molecules and enzymes of agro-industrial interest.

Agri-food studies

- Purification, characterization and immobilization of enzymes of oenological interest
- Purification and characterization of phycobiliproteins from red algae
- Determination of the nisin and biogenic amine content by zonal capillary electrophoresis
- Setting up and management of a pilot plant for the recovery of proteins in native form from whey
- Proteomic studies (using two-dimensional electrophoresis, two-dimensional zymography and MALDI-ToF mass spectrophotometry) for:
 - nutritional and proteomic characterization of some Mediterranean demersal fish species
 - characterization of proteolysis in different cheeses
 - analysis of the proteolytic and protein pattern in honey samples of different botanical and geographical origins
 - characterization of proteases of plant origin (pineapple, kiwi and broccoli)
 - proteomic analysis of the main peach allergen
 - Proteomic analysis of the protein systems involved in the stress response in tomato seedlings and in bacteria
- Application of enzymes extracted from alternative sources (crustaceans) as adjuvants in the coagulation and maturation of cheeses and in general in the dairy sector (cheese-making).

Studies in the biomedical field

- Proteomics of myelin of the Central Nervous System (CNS) and Peripheral (PNS)
- Healthy and functional foods for multiple sclerosis (MS) patients
- In vitro evaluation of the effect of polyunsaturated fatty acids and natural antioxidants normally present in the diet, on the expression and / or activity of matrix metallo-proteinases in cell cultures
- Evaluation of the effects of nutrition in association with drug therapy on MS patients
- Analysis of the proteolytic pattern by means of two-dimensional zymography of matrix metalloproteinases and in particular of gelatinases (MMP-2 and MMP-9) in sera from patients with different forms of multiple sclerosis and cancer
- Study on the anti-inflammatory and antioxidant properties of *Armoracia rusticana* (horseradish), cauliflower leaves (*Brassica oleracea* var. Botrytis), *Muscari comosum* (lampascioni) and local bean ecotypes
- Impact of nutrition on human health (MS and neuroinflammation)
- Study on the neuroprotective potential of isothiocyanates in *vitro* models of neuroinflammation

Current research lines:

- Purification and characterization of lignolytic enzymatic systems, obtained from spontaneous fungi, potential applications in the biomedical and agro-industrial fields

- Study on the fibrinolytic and antiviral properties of proteases extracted from medical, edible and spontaneous fungi
- Study on the antioxidant and neuroprotective properties of glucans extracted from edible mushrooms

Author or co-author of a total of 115 papers (53 in international journals with referees, 3 chapters in books, 60 proceedings of National and International scientific conferences) and 2 Italian patents.
(*citations:1228, H-index: 22, Scopus*).