

PhD Program: Food Science

Research Project Title: New reduced-fat ice cream formulations with innovative and sustainable ingredients

Supervisor: Prof. Alessandro Genovese

Co-supervisor (Optional):

Reference Academic Discipline (SSD): AGRI-07/A

Research project objectives, methodologies, and interdisciplinary collaborations:

The project aims to develop reduced-fat ice cream formulations capable of delivering health-promoting compounds through the combined use of ingredients obtained from food by-products, including legume brines and cooking liquids, as well as plant fibers. The objective is to improve the chemical and nutritional profile of ice cream while maintaining physical and sensory characteristics comparable to those of the traditional product. The project adopts an interdisciplinary approach integrating: (i) experimental formulation and production of ice creams with different levels of fat replacement; (ii) chemical characterization of the innovative ingredients and the ice creams (SSD: CHEM-01/A); (iii) physical and sensory analyses of the ice creams; and (iv) statistical modeling through Response Surface Methodology for recipe optimization (SSD: STAT-03/B).

Innovation and/or originality of the project:

The originality of the project lies in the use of agri-food by-products, still only marginally explored in the field of functional ice cream, as sources of technologically useful and nutraceutically active ingredients. The integration of chemical analyses, physico-structural measurements, predictive modeling, and sensory investigation will make it possible to define formulations that are sustainable, health-oriented, and transferable to industrial applications. The expected outcomes include new, healthier and more sustainable ice cream recipes, with potential scientific, economic, and environmental impacts.

Availability of funds:

Project GELSI (Healthier ice cream formulated with sustainable and innovative ingredients) by University Research Funding Program – UNINA, 40,000 Euro.

Availability of facilities:

Individual desk workstation with PC availability, along with shared research laboratories equipped with advanced instrumentation for physico-chemical and sensory analyses (GC/MS, E-Nose, Texturometer, NIR, etc.) at the STAL section (Building 84).

Collaborations with International Institutions:

Universite de Liege (Prof. Sabine Danthine).

University of Nottingham, Sutton Bonington Campus (Prof. Ian Fisk).

Collaborations with External Organizations (outside of UNINA):

Istituto di Scienza dell'Alimentazione (ISA) del CNR (Avellino) (Prof. Gianluca Picariello).