

**Admission to the PhD program in Pharmaceutical Sciences XLII cycle, A.A. 2026/2027–
Research Project. PR Umbria Fondo Sociale Europeo Plus (FSE+) 2021-2027**

Curriculum: Pharmaceutical Technology and Nutraceuticals

Title: “Sustainable valorization of agri-food waste for the development of neuroprotective functional ingredients”

Project supervisors: Prof. Federica Ianni and Prof Carmela Conte, federica.ianni@unipg.it

Abstract: Large amounts of agro-industrial waste are generated every year, despite being rich sources of valuable bioactive and functional compounds. The recovery and reuse of these constituents can support the development of innovative ingredients while promoting circular economy principles. Among their potential health benefits, a wide range of bioactive compounds, including polyphenols, peptides, polysaccharides, and fermentation-derived metabolites have shown promising neuroprotective properties. Therefore, this project aims to identify and characterize bioactive ingredients obtained from selected agri-food by-products and evaluate their potential role in the prevention of neurodegenerative disorders.

Particular attention will be given to their ability to modulate α -synuclein (a-syn) aggregation, a key molecular event involved in Parkinson’s disease. Defective protein clearance combined with elevated a-syn concentrations can precipitate aberrant aggregation. Therefore, the efficacy of bioactive ingredients in preventing a-syn aggregation will be investigated in a cellular model. Moreover, fermentation-derived metabolites acting as critical messengers along the gut-brain axis will also be evaluated.