POLITECNICO DI MILANO

PhD in CHIMICA INDUSTRIALE E INGEGNERIA CHIMICA / INDUSTRIAL CHEMISTRY AND CHEMICAL ENGINEERING - 37th cycle

THEMATIC Research Field: VALORIZATION OF FOOD INDUSTRY WASTE AS A RENEWABLE FEEDSTOCK FOR THE SYNTHESIS OF PHARMACEUTICAL INTERMEDIATES

Monthly net income of PhDscholarship (max 36 months)
€ 1325.0 In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity	
Motivation and objectives of the research in this field	In recent years, there has been increasing pressure to design synthetic processes that comply as closely as possible with the established principles of Green Chemistry, an essential concept within the broader theme of Sustainable Development. Not only is it becoming increasingly important to use processes with a low environmental and energy impact, but it is also becoming crucial to design alternative processes based on renewable, non-petroleum-derived raw materials. In particular, waste from the food industry can represent a wealth that is still under-exploited: its origin from renewable resources, its low cost, its non-competitiveness with the food chain, the chemical richness of the compounds present and its intrinsically CO_2-neutral use are all characteristics that promote its use within a circular economy.The project proposes to start from low-value products (industrial waste) and exploit their chemical richness through biocatalytic cascade processes, which are intrinsically 'green', to obtain molecules with high added value for the chemical and pharmaceutical industries.
Methods and techniques that will be developed and used to carry out the research	Biomass from the food industry will first have to be carefully characterised, analysed and possibly fractionated. In this phase, the assistance of the Ronzoni Institute with its analytical facilities and expertise in natural

	organic substances will be crucial. Then, the PhD student will treat the obtained fractions with commercial biocatalysts or microorganisms, and a first characterisation of the obtained products will be carried out. Afterwards, the PhD student can go to TU-Delft where he/she will have the possibility to improve the biocatalyst and to set up an environmental compatibility analysis (E-factor) and then come back to PoliMI and finalise the new process.
Educational objectives	The candidate will learn to conduct a proper bibliographic research, to safely work in a specialized chemical lab, to carry out structural determination of organic compounds, to develop a biocatalyst and to work in an international team
Job opportunities	The candidate, after graduation, will constitute a valuable resource for the biotech and chemical industry at an European level, and will also be prepared to enter the Academic career.
Composition of the research group	1 Full Professors 2 Associated Professors 2 Assistant Professors 5 PhD Students
Name of the research directors	Dr. Davide Tessaro

Contacts
Website: https://www.cmic.polimi.it/en/ricerca/elenco-gruppi-di-ricerca/biocatlab/ davide.tessaro@polimi.it

Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--

Scholarship Increase for a period abroad	
Amount monthly	566.36 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information

Educational activities (funding for participation in courses, summer schools, workshops and conferences) - financial aid per PhD student per year:1st year: -2nd year: about 1.500 euros per student3rd year: about 1.500 euros per student Teaching assistantship: availability of funding in recognition of supporting teaching activities by the PhD student.There are various forms of financial of for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities within the limits allowed by the regulation.