ABSTRACT

Habilitation thesis ” Innovative approaches in food microbiology”

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Key words: *probiotic, functional foods, food safety, non-conventional yeast*

The habilitation thesis is structured according to the approved methodology and includes two main sections, one section allocated to professional, scientific and academic achievements, and another one presenting the career evolution plans.

The professional achievements are describing the educational path and the career path of 29 years of high education activity, starting with the debutant assistant in 1996 until nowadays when I am a Full Professor. The longer part of this academic activity (27 years) belongs to the Faculty of Biotechnology in the University of Agronomic Sciences and Veterinary Medicine from Bucharest, and the main domain of teaching and research is linked to Applied Microbiology. In the past two years I was a Full Professor in the Faculty of Food and Tourism from Transilvania University of Brasov. My first Habilitation, in the Biotechnology domain, was obtained in 2014 in UASMV Cluj-Napoca. As a results of my research activity, my publication list includes 63 articles indexed in WoS/Clarivate (of which 39 have impact factor) and other 68 IDB indexed articles.

Projects’ coordination is presented both through the lens of international (one project) and national (4 projects) research projects, as well as three educational and human resource training projects (two Erasmus+ strategic partnership projects and one POSDRU practice project for students).

The research activity is presented according to the three main research directions, respectively: (1) Microorganisms with probiotic potential and functional foods; (2) Molecular tools to identify microorganisms in different food matrices; (3) Non-conventional starter cultures in wine-making.

Regarding the first research direction, microorganisms with probiotic potential and functional foods¸ the thesis presents the results and publications related to subjects as follows: studies on Kombucha products - characterization and development of tri-biotic foods (study of the influence of different fermentation substrates on the characteristics of Kombucha products; characterization of the microbial consortium in Kombucha; antimicrobial activity of Kombucha

products; development of a tri-biotic product on base of Kombucha and pollen), characterization of the probiotic potential of *Pediococcus* sp. isolates. from Kombucha, as well as presentation of other sources of isolation of microorganisms with probiotic and antagonistic potential.

The second research direction is related to molecular techniques for the identification of microorganisms in different food matrices and containts the results of the development and validation of some detection methods by qPCR and v-qPCR techniques in the case of some pathogens, such as *E.coli* and *Salmonella* in milk and salad mixes, as well as the spoilage fungus *B.cinerea* on raspberries on the shelf. The chapter is completed with the presentation of the methodology for monitoring the populations of microorganisms (yeasts, lactic bacteria and acetic bacteria) during fermentation processes of food interest from Kombucha and winemaking products.

The third research direction addresses the topic of using non-conventional starter cultures in winemaking. The results and conclusions are of applied nature as follows: the study of the oenological properties of the yeasts selection isolated from the Dealurile Munteniei wine-making area, by testing the tolerance to ethanol, low pH and osmotic pressure, the production of acetic acid and hydrogen sulphide, testing the killer character and highlight the relevant enzyme activity; testing the winemaking potential of three yeast strains, *Saccharomyces cerevisiae* BB06, *Starmerella bacillaris* PFE-15 and *Metschnikowia pulcherrima* PFE-II-9, through laboratory fermentations. The most promising results were obtained using the mixed culture of *Starmerella bacillaris* (PFE15) and *S.cerevisiae* PFE II-3.

Regarding the recognition level and impact, especially on research side, the activity led to the achievement of respectable Hirsch indices, respectively in WoS/Clarivate being 13, and in Scopus it is 12. The research work was awarded with 20 prizes, both for articles published in the Q1 and Q2 quartiles, as well as for the various inventions and innovations, which were awarded with gold and silver medals at exhibitions prestigious internationals.

Regarding the involvement in editorial activity, I am part of the editorial committee of two WoS indexed journals with impact factor, of a Scopus indexed journal, as well as two other journals indexed in other international databases. As a reviewer, I reviewed an average of 20 manuscripts annually in 14 indexed and WoS/Clarivate-rated journals. Also, I act or have acted as an expert-evaluator of projects in national (CEEX, PNCDI 1, PNCDI 2, etc.) and international (FP7, Horizon 2020, Era-NET, Erasmus+ CBHE) programs. In the period 2020-2024, I worked as

a member of the 14 CNATDCU commission (Engineering of Plant and Animal Resources), where I evaluated files both in the field of Biotechnologies and in the field of Food Engineering.

The last part of the thesis describes the career development plans, through the lens of a future habilitation in the second field, namely in Food Products Engineering. The main directions of research and fundraising projects target functional foods from a probiotic and postbiotic perspective, improvement in the area of formulation of this type of food, as well as the use of by-products and waste from the food industry to obtain food products with added value.