UNIVERSITATEA DE ŞTIINTE AGRICOLE ŞI MEDICINĂ VETERINARĂ CLUJ-NAPOCA
ŞCOALA DOCTORALĂ DE ŞTIINȚE AGRICOLE INGINEREŞTI

TEZA ABILITARE

Nutrigenomics approach of personalised nutrition – from molecular mechanisms to functional foods

Abordare nutrigenomică a nutriției personalizate - de la mecanisme moleculare la alimente funcționale

Domeniul: Biotehnologii

Autor: **Ramona SUHAROSCHI**

CLUJ-NAPOCA, 2021

Abstract

This habilitation thesis describes my scientific activity in the postdoctoral period (from 2008 to the present), constituting the necessary support for obtaining the habilitation to coordinate PhD students. I have also included in this thesis the description of a series of future research directions to which I wish to dedicate my efforts in the near future.

This thesis is structured in three main sections, according to the criteria recommended and approved by the National Council for Attestation of University Degrees, Diplomas, and Certificates (CNATDCU):

* Section I - The main research and teaching results obtained in the postdoctoral period;

* Section II - Main directions of professional development;

* Section III - References.

The first section of the habilitation thesis, entitled "The main research and teaching results obtained in the postdoctoral period", includes five chapters. The present chapters contributions in the field of Nutrigenomics that treat the complex molecular mechanisms involved in the effects of bioactive molecules from plant's foods, in the effects of various natural plant extracts investigated in vitro, in silico, and in vivo (on sustainable animal models), and in effect phytosynthesized nanoparticles with natural plant extracts and probiotics, molecular mechanisms involved in non-communicable diseases associated with nutrition and metabolism from the perspective of nutrigenomics.

The second chapter presents contributions in the field of the marine microbiome and human microbiome research. We are going through a period of social and economic realities change, which opens up new research opportunities in food and nutrition, correlating the aspects of current issues with the impact of food on health and well-being. I am extremely motivated for this thesis, which exposes the research and education program developed together with the group that I am coordinating and comes to answer today's most burning and challenging questions: how can we feed a growing and wealthier world population in a sustainable way? Therefore, we have to think about solutions to produce food, especially animal-source food and proteins, in a climate-smart way.

The third chapter develops basic research applications from the perspective of personalized nutrition, developing and implementing the concept of HaelthyCatering and functional foods (from superfoods to probiotics).

The second section of the thesis has a short introduction in which I reviewed my teaching, professional and scientific activity, mentioning the studies I followed and the directions in which I built my professional career from graduation to the present. I described here the teaching activity with undergraduate, and graduate students, with Eugen Ionescu scholarship holders (PhDs and postdoctoral level) and Erasmus' students from EU and non-EU countries; the activity within the academic community and the professional societies that I am associated with; the projects on education capacity building and postgraduate study programs in which I am involved as coordinator and lecturer; research peojects that I coordinatored; the main capitalization of research results in the form of publications ISI listed or included

in the international information flow (BDI); participation to national and international conferences; patent applications and participation to invention fairs.

I emphasized the importance of research and publishing throughout my career, of which I mention a number of 2 scientific books published in national publishing houses and two textbooks and 3 guiding practical works; 7 scientific book chapter published at international publishing houses; 46 ISI indexed articles (WOS) in Clarivate Analytics Web of Science Core Collection (21.05.2021) (10 Q1; 3 Q2; 4 Q3; 3 Q4), of which 19 scientific articles in extenso, ten proceeding paper, eight reviews, seven meetings abstract, two book chapter; 26 SCOPUS indexed articles, of which 14 OpenAccess, 11 Gold, 1 Hybrid, 2 Bronze, 10 Green - 16 articles in extenso, six reviews, three book chapter, one conference paper. All these works attracted 130 citations in the Clarivate Analytics Web of Science Core Collection and 339 citations in the Google Scholar, which generated a Hirsch index of 7 according to Clarivate Analytics (WOS), Hirsch-index 7 (Scopus), respectively 10 (Google Scholar). 9 ISI papers were awarded by UEFISCDI and over 50 BDI articles. The research also materialized in 3 patents, 7 research projects as director / project manager, projects PNII innovation checks, one academic grant, 2 international projects, 5 Erasmus, 1 Phare, 1 Tempus and 23 projects as an active member of the research team. We have obtained 23 distinctions at the International Exhibition of Research, Innovation, and Invention "Pro Invent" and at other national and international Salons and Fairs of invention, obtaining diplomas of excellence and gold medal. As a member of the Romanian Society of Bioinformatics (from 2018), I participated in the design and coordination of national and international bioinformatics training.

The second section also includes a series of specific research strategies based on which I propose to develop each of the two professional fields important to me: academic activity and research activity. I propose that in research, I focus on two current fields, studies of nutrient (epi) genomics and metaproteomics, to understand the mechanisms of SMART food ingredients with the development of sustainable and intelligent ingredients involving green technologies, nutritional interventions for understanding, evaluation and validation the impact of SMART ingredients involving novel technologies, ML and AI and the preparation of national databases on a specific food, composition and beneficial ingredients in the prevention of non-communicable diseases with addressability to users in the general population, by categories of the population at risk (elderly, rare diseases, children) as well as for food industry processors for recommendations on making functional foods.

The third section includes a number of 335 references used for this thesis and the included articles.