



**UNIVERSITY OF AGRONOMIC SCIENCES
AND VETERINARY MEDICINE OF BUCHAREST**



HABILITATION THESIS

Research domain: VETERINARY MEDICINE

**RESEARCH ON THE BIOCHEMICAL CHARACTERIZATION OF
EXTRACTS RICH IN BIOLOGICALLY ACTIVE NATURAL
COMPOUNDS OF INTEREST IN VETERINARY MEDICINE**

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ABSTRACT

Habilitation Thesis entitled " **Research on the biochemical characterization of extracts rich in biologically active natural compounds of interest in veterinary medicine** ", elaborated by Associate Professor Nicoleta Corina PREDESCU PhD.

The habilitation thesis entitled "*Research on the biochemical characterization of extracts rich in biologically active natural compounds of interest in veterinary medicine*", elaborated by Associate Professor Nicoleta Corina PREDESCU PhD, presents the most significant milestones of her teaching, scientific, and academic activity, from the moment of obtaining her doctoral degree until the present. On December 28, 2011, I publicly defended my PhD thesis entitled "*The Effect of Certain Therapeutic Principles on Free Radicals Responsible for the Onset of Oxidative Stress*", under the supervision of Professor Maria CRIVINEANU PhD (MECTS No. 3639/27.03.2012, Diploma H, 0011600).

The habilitation thesis consists of three main parts: (I) Scientific, academic, and professional achievements, (II) Career development and evolution plans, (III) Bibliographic references related to the content of the first two parts.

Part I (divided into two chapters: Chapter I.1. Scientific achievements and Chapter I.2. Professional and academic achievements) constitutes the central element of the thesis, describing the most important scientific results, demonstrating the originality and relevance of the published and presented research, as well as the main professional and academic accomplishments.

The addressed field focused on research activities involving natural compounds with antioxidant and antimicrobial properties for food products and animal health. This was complemented by studies on the characterization of phytoextracts for combating reactive oxygen species, and innovative research regarding oxidative stress resilience in animals, using biochemical analyses of biological samples (blood, serum, organs), as well as the oxidative stability of food products (oils, meat, and meat products, etc.). Specific experimental models were employed for biochemical and analytical determinations to evaluate the antioxidant and antimicrobial potential of natural compounds and plant extracts, aiming at optimizing animal health and food quality.

The research included **in vitro** and **in vivo** methods to quantify the effects on oxidative stress markers (e.g., MDA, SOD, CAT) and to evaluate the oxidative stability of food products (oils, meat and meat products, yogurt). Furthermore, correlations were established between the levels of bioactive compounds and various extraction solvents (methanol, ethanol, acetone), thereby strengthening the scientific foundation for the development of innovative solutions in the food and veterinary domains. This integrated approach aimed to improve animal health (poultry, swine),

optimize the quality of animal-origin products, and reduce the risks associated with oxidative stress, contributing significantly to the advancement of knowledge in this field.

In recent years, I have expanded my studies to explore and investigate fermented plant juices, with the objective of assessing their antioxidant and antimicrobial potential, as well as their impact on animal health and food stability.

My research activities followed a multidisciplinary approach that enabled the consolidation of a unified research direction — **natural antioxidants for mitigating oxidative stress** — with the goal of supporting animal health and obtaining animal-origin products (such as meat and eggs) with improved quality parameters. Some of the research activities were conducted within national projects I coordinated. I was the USAMV Bucharest representative for two nationally funded projects, selected through competitive calls organized by UEFISCDI. In this context, I carried out the project *"Industrial Validation of a Technology for Obtaining Natural Preservatives for Ready Meals in Order to Produce Foods Free from Synthetic Preservatives"*, CLEANMEALS, PN-III-P2-2.1-PTE-2021, 71PTE/2022, as Project Leader (the Coordinator being an economic operator). I was also Project Leader for USAMV Bucharest in the project *"Functional Feed Rich in Phytochemical Compounds for the Production of Functional Eggs"*, PHYTOFEED, PN-III-P2-2.1-PED, 631PED/2022, coordinated by the National Research-Development Institute for Animal Biology and Nutrition (INCDBNA-IBNA Balotești).

Research on the characterization of polyphenolic compounds from plant extracts or plant juices has been disseminated in numerous studies and communications presented at various scientific events, covering topics ranging from the biochemical mechanisms responsible for antioxidant activity, metal-chelating power, and antimicrobial effects of polyphenol-rich plant extracts (in vitro studies), to the role of plant-derived polyphenols in mitigating oxidative stress and improving antioxidant defense in in vivo models, and the application of natural compounds as substitutes for synthetic preservatives in various food and non-food matrices (meat and meat products, yogurt, bread, and creams/gels).

Collaboration with colleagues from the faculty, university, and various institutes and universities has been reflected in my participation as a team member in six national and international research projects selected through competitive funding, as well as in scientific articles and presentations at conferences.

Through my scientific activities, I aimed to contribute to the development of sustainable and innovative solutions for animal health and food safety, with an emphasis on the transfer of scientific results to practice and the economy. In this regard, together with my research team, I obtained two patents: *"Natural Antioxidant Preservative for Edible Oils Extracted from Sea Buckthorn Fruits (Hippophae rhamnoides)"* (Patent No. 127155/26.02.2016), *"Veterinary Polyphenolic Extract Used as Adjuvant in Anticancer Chemotherapy"* (CHIMIOHELP) (Patent No. 128486/29.11.2016), which were awarded with numerous diplomas and medals at national and international invention fairs.

All these research themes, funded through competitively won projects, have led to the publication and presentation of 31 ISI scientific papers, 6 ISI proceedings, and 45 papers indexed in international databases.

Five ISI articles and the two patents were awarded by UEFISCDI. I have also received numerous awards at invention and innovation fairs. My works have been cited over 850 times (excluding self-citations), and H-index is 10, according to Web of Science.

I am Guest Editor for a special issue of the journal *Foods* (Impact Factor 4.7, indexed in PubMed, Web of Science, Citescore 7.4), entitled "*The Latest Advances in Phenolic Compounds and Their Application in Healthy Food.*"

Academically, I have continually sought to improve myself. Between November 22 and December 3, 2010, I participated in a research internship organized and funded by the International Atomic Energy Agency in Seibersdorf, Austria. I have also attended courses on GDPR, communication (assertive and empathic, professor-student interaction, feedback evaluation, conflict management and problem-solving), university ethics and scientific research ethics, recruitment for education and research, digital competencies (IC3; for teaching and non-teaching staff), and pedagogy for practical internships in veterinary medicine.

My ability to mentor students, master's students, and PhD candidates is demonstrated by the supervision of over 90 undergraduate, diploma, and dissertation theses, and participation as a member of two doctoral advisory committees. I have published 14 books (monographs, guides, textbooks) as author/co-author in Romanian, English, and French, and authored one international chapter as lead author in a volume published in 2025.

Part II presents perspectives for professional development, with emphasis on scientific development, academic evolution, and professional visibility. It also outlines the main indicators for quantifying professional and academic development, as well as future actions to achieve the proposed goals. Based on the activities carried out so far, an extensive set of activities is expected in my fields of interest, both nationally and internationally. Results could be significantly enhanced by consolidating the research team through the inclusion of PhD students. It must be emphasized that my active role will continuously increase in the future, and the main indicators for assessing my career development will be research, lectures, and applied works developed in the aforementioned directions.

Part III contains the bibliographic references associated with the content of the first two parts.