



Ministry of Education
„ION IONESCU de la BRAD”
“Iași University of Life Sciences”

USV 1842

Scientific field: ANIMAL SCIENCE

HABILITATION THESIS

*Research on the quality
of animal originated food raw matters,
in relation with the production system*

Assoc. prof. Răzvan Mihail RADU-RUSU, PhD

**IAȘI
2023**

A. ABSTRACT

Worldwide, more and more producers and processors are concerned with obtaining higher quality food, also observing animal welfare requirements. The in-depth study of those properties of animal products, which directly interfere with a rational human diet and a healthy lifestyle, is pursued, taking into account all the ways to improve the nutritional and sanogenic value of food.

However, is the productive response of animals to the different farming systems used to improve their welfare sufficiently known? Does the quality of food raw materials differ according to breeding technologies in animal husbandry? During the period of continuous post-doctoral career (2009-2023) I oriented my own research directions to answer these questions but also to study some aspects that appear after obtaining animal products and how some physical, textural, biochemical and hygienic can affect their acceptability by consumers or the degree of food safety.

The habilitation thesis entitled **"Research on the quality of animal originated food raw matters, in relation with the production system"** is structured in accordance with the legislation in force and with the regulation of USV Iași regarding the organization and development of the process of obtaining the qualification certificate, in the following sections : A – Summary; B - Scientific and professional achievements; career development and development plans; B.I. – Scientific, professional and academic achievements; B. II. – Plans for the evolution and development of one's own professional, scientific and academic career and B.III. - Bibliographical references.

In section B.I., Chapter I - Scientific achievements, I presented research results on the influence of farming systems and of some phenomena that occur during or after obtaining animal productions (meat, eggs, milk), on their quality.

The first direction of research includes studies on the physico-chemical and nutritional evaluation of meat, obtained in different rearing systems, with significant differences for the chemical composition of white/red meat and between the applied rearing technologies. Lower caloric and cholesterol values were obtained for poultry from alternative rearing systems. The texture of the



meat was appreciated in relation to various factors of influence: growth system, species of origin, anatomical region of the carcass, method of conservation, application of post-sacrifice enzymatic treatments. A better meat tenderness was achieved in conventional technological systems or when freezing was used as a preservation method or marinating the meat with exogenous proteases of vegetable origin was identified.

The second direction of research looked at the physico-chemical and nutritional quality of table eggs, under the influence of the retechnologisation of European farms, in 2012, by introducing alternative technological systems of growth to ensure the well-being of laying hens. The dynamics of the morphostructure of the oviduct in relation to the intensity of egg production was also investigated. In the comparative study between cage-laying and free-range systems, little differences were found in the chemical composition of the eggs, but higher energy and cholesterol levels were observed in cage originated eggs. Polyunsaturated fatty acids were better represented in free range eggs. Looking at the morphometry of the oviduct, it was observed that the development of the mucosa, submucosa, muscosa of magnum and uterus overlapped the shape of the production curve. By the end of laying, mucosal degenerations were observed, especially in the uterus, explaining the more frequent occurrence of eggs with shell defects during this period.

The third animal production investigated is that of milk, looking at: the state of freshness at the time of marketing, the degree of hygiene, the monitoring of possible falsifications, the variation of the chemical components and the protein profile, in relation to the type of holding, the species, the production season. Milk freshness was mostly affected by storage and transport conditions. In individual households the quality of samples was poor, with NTG and NCS values close to or even above the threshold of current sanitary regulations (100000 germs/ml and 400000 somatic cells/ml milk). Some cases of milk fraud, by adding water, have been identified. The production season significantly affected NTG and NCS, with higher values observed in summer. The free stall system has been shown to provide better quality milk than the tied stall system.

In Chapter II. Professional and academic achievements - I have summarized the most important results obtained in the academic career, research management and dissemination of original research results: the publication of 11 books (3 sole or first author); director of 6 projects obtained through competition and member of 15 other grants; publishing more than 100 scientific papers, of which 31 in Web of Science rated journals and obtaining 8 awards.



In Section B.II I have included the proposed objectives for the development of the teaching and research career, in accordance with the strategic development and research objectives of the Faculty of Food and Animal Sciences and IULS Iași, but also with some future directions in research in the field applied biotechnologies, as well as different possibilities for their achievement.

I would like to express my thanks to all the mentors and colleagues from the team of the Faculty of Food and Animal Sciences and from the "Ion Ionescu de la Brad" Iasi University of Life Sciences, for their contribution in my continuous development, on a professional and personal level.

