STEFAN CEL MARE UNIVERSITY OF SUCEAVA

FACULTY OF FOOD ENGINEERING

HABILITATION THESIS

ABSTRACT

Applicative research in the field of food product engineering

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ABSTRACT

The habilitation thesis entitled ***"Applicative research in the field of food product engineering"*** is an ample study and comprises some of the academic, professional and scientific results obtained after being awarded the PhD degree.

The thesis is structured in two parts: **I – Academic, professional and scientific achievements**, **II – Plans of career evolution and development** and ***Bibliographic References*** associated to the first two ones.

The main content of **the first part** includes some significant results obtained and published in different journals or patented, conference proceedings, reports of some research grants, books. The research activities hereby presented in detailed form include only the studies made after the PhD thesis award (December 2000) and confirmed by the Ministry of National Education (March 2001) as follows:

1. *Research on the quality of raw materials for food industry* includes the results of the research carried out to determine the quality of raw materials used in different branches of food industry: dairy industry, beer industry and milling and bakery industry. The quality of raw materials plays an essential role in the manufacture of food products by standards; therefore the assessment study on their sensory, physico-chemical and microbiological characteristics becomes imperative and compulsory in applicative research. Together with the technical-scientific progress, methods of quality assessment of food products have become more and more complex, using highly performing equipment capable of providing accurate results in short time and easy processing. Hence, it is required to identify new analysis methods of raw materials' quality so as to meet the demands of food industry processors. The research activities carried out focused on: *the study of factors influencing the quality of raw materials (cereals, wheat flour and milk), the assessment of quality characteristics of raw materials for the manufacture of a food product (flour for biscuits, malt for beer, bakery yeast, and starter cultures for dairy products).*

The author has published **2 books** and **22 articles** in different journals (**2 in ISI journals**).

2. *Research on the quality improvement of certain food products*. This approach holds a significant share in the thesis of habilitation and summarizes studies on the quality improvement of foods, as a practical necessity for the producers in the field and as a

permanent requirement for consumers. Permanent quality improvement of raw materials is a real concern for the specialists in the field of food product engineering. Processing of raw materials leads to inherent changes in the quality characteristics and of their nutritional value as well. During the manufacture of food products, processes that allow better assimilation of the product in question occur, but, at the same time, the reduction of the content in bioactive compound takes place, too. Consequently, there emerges the need to improve the quality by addition of new ingredients in the manufacture recipe of food products, by optimization of these formulas and technological processes. The research done focused on: *improvement of yoghurt quality by addition of dietetic fibers, vegetable proteins, plant extracts, fruits and seeds*; *the study on the influence of amylolytic enzymes on milling and bakery products; study on the optimization of culture medium of bakery yeast; study on the influence of enzyme derivatives on the quality of frozen dough.*

The author has published **1 book** and **24 papers** in different journals and conference proceedings (**7** of them being indexed ISI).

A significant part of this research represents the results of the activities carried out within **4 research projects,** where the author of this thesis of habilitation was director of project, namely: 1. "*Research on establishing the optimum diagram of malt action in order to obtain high biotechnological quality malt"*, Grant no. 3557/2001, beneficiary S.C. MARTENS, Galati; 2. "*Research on optimizing the biotechnological properties of Saccharomyces cerevisiae yeast",* Grant no.101/2002, financed by CNCSIS; 3. "*Diversifying product range and improving the quality of fermented dairy products at SC TUDIA S.R.L. Suceava",* Grant PN-III-P2-2.1-BG-2016-0089, (2016-2018), financed by UEFISCDI; 4. *"Study on implementation at industrial level of some innovative solutions by extending shelf-life of trout products",* Grant PN-III-P2-2.1-CI-2017-0097 (2017), financed by *UEFISCDI*.

3. *Research on food safety assessment*. The research of this section focused on the study on the contamination degree in the manufacturing process of some food products, starting from raw materials' storage to the finished product and on assessment of quality management systems implemented industrially. From this perspective, the following studies have been made: *study on antibiotics present in milk, dairy products and honey; study on the incidence of aflatoxins in milk, dairy products, barley for malt industry and cereals for milling industry; research on the presence of radioactive substances identified in food products; study on the implementation of quality management systems in brewing industry, bakery yeast, dairy and meat products*.

On this topic, the author has published **23 articles** in different journals (**1 in ISI indexed journals**).

4. *Research on the manufacture of some new food products* presents synthetically some of the results of our own research activities carried on in view of making some innovative food products, namely: *green cheese cream with onion and dill; blueberry and cranberry (lactose-free) yogurt*; *pumpkin seeds-yogurt; beer cooler and wine cooler like-products*.

On this topic, the author has published **1 book** and **5 articles** in different journals and conference proceedings (**1 in ISI-indexed journals**). She has applied for **two proposals of patents** at OSIM.

Since the first edition, 2012, the author of this habilitation thesis has coordinated teams of students participating in the "Ecotrophelia Europe", an International Competition for creating eco- innovative food products and got the following results: 2012 - IInd prize in the National Competition for "*Cheese with chanterelle mushrooms and almonds";*2014 - Ist prize at the National Competition and the "ECOTROPHELIA SILVER" award at the International Competition in Paris for "*TopIce Icecream - with artichoke and sea buckthorn"*; 2015 - Ist prize in the local stage for "*Milkberry - delactosed yoghurt with cranberry and blueberry*" , at the national stage - the special jury prize for best pastry and confectionery for "*Romanian Experience - praline premium*"; 2016 - Ist prize at the National Competition for "*ForestROut - canned fish paste type"*; 2018 - IIInd prize in the National Competition for *„Douce Citrouille*" – a cake with pumpkin.

5. *Research on capitalization of some by-products from food industry* presents a synthesis of research directions regarding the capitalization of some by-products in food industry. Identification, monitoring and optimum capitalization of these products are outstanding themes approached by researchers all over the world. As a specialist well-established in the field, this research direction has been a constant focus for the author, resulting in the following studies: *research on capitalization of by-products in beer industry: malt radicles, malt brewer's grains, hop brewer's grains, sediment filter press (cold and warm), beer yeast, waste waters; research on capitalization of whey in cheese industry; research on the capitalization of by-products in meat industry to improve texture of meat semi-products.*

On this topic, the author has published **1 book** and to **16 articles** in different journals (**1 in ISI journals**) and conference proceedings. Part of the research in this section of the thesis is the result of the activities carried out as a **director of project** of research grant:

"*Research concerning identification, monitoring and optimal capitalization of by-products from beer industry*", financed by CNCSIS.

The results of research activity have taken shape as follows: **12 specialty books** published in national CNCSIS - acknowledged publishing houses; **14 ISI Thomson Reuters-indexed and conference proceedings- indexed articles**; **130 articles** published in international data based journals and proceedings; **102 papers** published in non-indexed scientific journals and proceedings; **3 patent proposals**; **11 research grants,** in **5** of them as grant director.

The second part displays the plans of career evolution and development.

The academic career development will have in view the fulfilment of the essential mission of "Stefan cel Mare" University of Suceava, to educate and train highly competent and expertise specialists, personalities capable of meeting responsibly the requirements of a society in continuous change. As a well-established specialist in food industry, the author considers that students' practice activity in the units of the field has an enormous importance in the specialty training of the future engineers. Hence, she will keep in touch with the companies in question and increase the number of these partnerships, extremely useful for the future graduates.

From the professional point of view, the author of the habilitation thesis will carry on her professional teaching and training by attending specialty courses and by being actively involved in activities provided by professional national and international associations in the field of food product engineering.

Her own research activity will focus on the research directions previously mentioned, by applying for grants and getting involved in research teams within the *Research and training centre for science and food safety* established at the Faculty of Food Engineering, "Stefan cel Mare" University of Suceava.

The habilitation thesis comprises bibliographic references associated to the content, in alphabetic order.

My personal experience of over 32 years in the field of food product engineering is a reliable argument for the training of future specialists from bachelor, master and PhD programs in view of complying with the new challenges of food science.

In conclusion, food industry is a manifold research field, of major interest for consumers' health and food product manufacturers as well who are more and more interested in the results of these complex investigations.