

**„ȘTEFAN CEL MARE” UNIVERSITY OF SUCEAVA**  
**FACULTY OF FOOD ENGINEERING**

# **HABILITATION THESIS**

**Contributions to the Evaluation of  
Food Products Quality**

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## Abstract

The present habilitation thesis contains three main parts, structured as follows:

- I. Scientific, academical and professional accomplishments;
  - I.1. Scientific accomplishments;
  - I.2. Professional and academical accomplishments;
- II. Evolution and development of career plans;
- III. Bibliographical references.

The food industry is continuously preoccupied with the development of new products, which are market competitive, but which at the same time provide health benefits to the consumer. Knowing the quality of the raw materials, the ingredients used in the manufacturing of the products and their behaviour during processing is very important for the review of the finished products. A recent approach is to capitalize on the byproducts from different sectors of the food industry, by converting them into new ingredients and also using them in innovative food products, with an emphasis on the type of recovered ingredients, dosage preparation and processing. By adding one or more essential nutritive substances, such as proteins, amino-acids, vitamins and minerals, we can prevent and correct the shortcomings of one or more nutritional substances. Foods that are being taken into consideration for improvement are baking products and fermented dairy products.

I have began my research activity in the food industry with the enrollment in the Engineering of food products Master, after finishing my doctoral studies, in the material engineering domain, under the guidance of Professor Eng. Gheorghe GUTT Ph.D. My academically experience at the Faculty of Food Engineering from the Ștefan cel Mare University began in the year 2007, and until now I have obtained the titles of lectured and associate professor.

The main research paths which have been conducted after the doctoral thesis (July 2014), confirmed by the Ministry of Research and Education (November 2014), are: (i) the evaluation of the quality of some raw materials and of the ingredients used in the various food products; (ii) the evaluation of wheat flour quality, a raw material in the baking industry; (iii) the investigation of wheat flour quality related to the used ingredients; (iv) assessing the effects of the used ingredients on the rheological properties, microstructure and quality of the food product; (v) evaluating the influence of the processing parameters on the quality of the food product; (vi) optimization of flour mixture involved in achieving certified quality products; (vii) the development of new food products.

Regarding the evaluation of the quality of some raw materials and of the ingredients used in the food products, related to the wheat flour quality and oilseeds, scientific achievement consisting in publishing of 13 articles indexed in BDI and 4 in ISI journals. Among these works, 3 articles indexed in BDI, 3 articles in ISI journals and a monography entitled *Grape seed. Studies and research* comprise results of studies and researches to the grape seeds from Romanian variety. I have also published 1 article in an ISI ranked journal, regarding oilseeds, which is presented in detail in *section 1.1* and other 6 articles, with the same theme, in other national and international journals, articles which have been presented and international conferences. The raw material evaluated in the current research is wheat flour. Regarding (ii) the evaluating the quality of wheat flour, some papers address the assessment of the baking properties of the flour through empirical methods, others present a complex analysis of the flour (protein quality, starch behaviour, enzymatic activity) and the correlation between parameters determined through various methods, useful for bakery processors. In this area I have published 9 articles in ISI journals, 16 articles in national and international journals, BDI indexed and 10 papers have been presented at international conferences. Two of these papers, 1 article in ISI and 1 BDI indexed article, are presented in detail in *section 1.2*.

In relation to (iii) the investigation of flour quality related to different added ingredients, enzymes and grape seeds, I have published 2 articles in ISI journals, papers which are presented in detail in *section 2* and 3 BDI indexed articles. In the wheat flour used for baking products, other ingredients have been added, such as tomato seeds, pumpkin seeds, flax seeds, mustard seeds, etc. On this thematic I have taken part in the research project PN-II-RU-TE-2014-4 which approaches different types of composite flours used in the bread making process. In this approach I have published 4 articles in BDI indexed journals and 2 articles in ISI indexed journals. The 2 ISI articles are described in detail in *section 3* and *section 5*. Other research results on the evaluation of baking products, in which different ingredients have been used (citrus fiber, Psyllium fiber, inulin, flax seed, hemp seed) have been published in 6 articles in BDI indexed journals and 1 article in an ISI indexed journal. The research regarding the addition of inulin in the baking products are continuously approached in the national research project PN-III-CERC-CO-BG-2016, project in which I am as member of team research.

At (iv) assessing the effects of the ingredients on the dough rheological properties, microstructure and quality of the product I have contributed with researches referring to: (a) the influence of addition of quinoa flour on the rheological properties, microstructure and quality of yoghurts; (b) the effects of the mix between wheat flour and degreased mustard seed flour on the rheological properties, microstructure and quality of bread. On this path, I have published 2 articles in ISI journals, articles which are detailed in *section 3*. Also, the effects of the addition of

golden flaxseed and brown flaxseed in the wheat flour on the rheological properties and microstructure of the dough have been evaluated. The results of this research have been published in an ISI article, presented in *section 5*. The research regarding (v) assessing the influence of the processing parameters on the quality of the food product have been published in 2 articles in ISI journals, the articles are presented in detail in *section 3* and *section 4*.

In order to obtain quality products, research has been done (vi) on the optimization of wheat flour mixes and oilseeds such as, grape seed and flaxseed. The results have been published in 2 articles in ISI journals, articles which are presented in detail in *section 5* and 4 BDI indexed articles.

The research regarding (vii) the development of new food products, in particular, by the valorization of winemaking by-products, grape seed respectively, has materialized at the present time with achieving of 3 patents at OSIM, mentioned in *section 6*, together with other 4 proposal patents, 2 from these conducted in the project PN II-RU-TE-2014-4-0214 *Improvement of the biochemical, rheological and technological aspects in bread making by using different composite flours*, as member of research team. Regarding the valorization of winemaking by-products, research continues in the national project PN-III-P2-2.1-BG-2016-0136 entitled *High valorization of winemaking by products to obtain new bakery products improved nutritional*, as project manager, project in collaboration with Dizing S.R.L. Brusturi Neamț, represented by Eng. Dumitru ZAHARIA Ph.D.

Research done after the year 2004 until present materializes in: publishing 16 articles in ISI journals; 58 articles in quoted journals into International Data Bases; registering 3 patents at OSIM and 4 proposals of new patents; publishing 4 books at CNCS recognized publishers; communicated 14 papers at international conferences; the implementation of 19 research contracts with private organizations that carry out production and services (11 as project manager), 3 research projects with UEFISCDI, as member of research team; 1 research projects with UEFISCDI, as project manager; 1 research and consultancy project (46000 lei), as project manager and I was short term expert, responsible with the development and management of the program, in the project POSDRU/87/1.3/S/60891. The number of citations (114, index Hirsh = 6 according to Google Academic; index Hirsh = 4 according to Scopus; index Hirsh = 4 according to Web of Science) in ISI Thomson Reuters journals, in journals indexed in international databases and specialty books shows the international visibility of the research activity and the interest of other researchers for the obtained results.

The research results have been awarded by UEFISCDI, through the Research Award Program, as follows:

- 2 articles awarded by the UEFISCDI, each with 4000 lei: a) G.G. Codină, S. **Mironeasa**, C. Mironeasa, 2012. Variability and relationship among Mixolab and Falling

Number evaluation based on influence of fungal alpha-amylase addition, *Journal of the Science of Food and Agriculture*, 92 (10), 2162-2170, ISSN 0022-5142. Impact factor 1.43. (PN-II-RU-PRECISI-2012-6-0085); b) G.G. Codină, **S. Mironeasa**, C. Mironeasa, C.N. Popa, R. Tamba-Berehoiu, 2012. Wheat flour dough Alveograph characteristics predicted by Mixolab regression models, *Journal of the Science of Food and Agriculture*, 92 (3), 638-644, ISSN 0022-5142, Impact factor 1.43. (PN-II-RU-PRECISI-2011-3-1160).

- 2 articles awarded by the UEFISCDI, each with 2000 lei: a) **S. Mironeasa**, G.G. Codină, C. Mironeasa, 2012. The effects of wheat flour substitution with grape seed flour on the rheological parameters of the dough assessed by Mixolab, *Journal of Texture Studies*, 43 (1), 40-48, ISSN 0022-4901. Impact factor 0.821. (PN-II-RU-PRECISI-2011-3-1159); b) G.G. Codină, **S. Mironeasa**, 2013. Influence of Mixing Speed on Dough Microstructure and Rheology, *Food Technology and Biotechnology*, 51 (4), 509–51. Impact factor 0.977 (PN-II-RU-PRECISI-2014-8-5189).

The development plan of my scientific career embodies the following research paths:

- testing the potential of adding various seeds, different the ones from cereals, to be incorporated in various food products;
- the evaluation of parameter impact on the quality of the finished product;
- the valorisation of by-products from different sectors of the food industry, with a focus on obtaining extracts from different vegetable sources and testing these in different food products;
- the optimization of the extraction process from vegetable sources with the purpose of obtaining quality compounds, with high yields and minimum resource consumption;
- the optimization of composition with the purpose of obtaining nutritionally improved products and testing their market viability, from the point of view of sensory characteristics;
- developing innovative food products (baking products, fermented dairy products) in a collaboration with local companies (Dizing S.R.L. Brusturi, Neamț, TUDIA S.R.L., Suceava).

The research-development activity which I will continue to perform will be interlinked with the teaching activity and will have the purpose of transferring knowledge and staff training in area food products engineering. Extending the research team by involving master and doctoral students represents a significant opportunity in obtaining scientific results with and impact on the food products and market. I will make sure that through the acquired skills, the future graduates (bachelor, master, and doctorate) will integrate easily into the labor market.

The accumulated skills and dissemination of information gained through the duration of the research process will allow them to operate in an industrial environment, to develop innovative products that solve problems of nutritional, environmental, and economic type.