

HABILITATION THESIS

Abstract

Advanced researches on the development of biotechnology processes and the improvement of the products quality in the food industry

Author – Georgiana Gabriela CODINĂ

„Ștefan cel Mare” University of Suceava

This habilitation thesis entitled *Advanced researches on the development of biotechnology processes and the improvement of the products quality in the food industry* includes three main parts. The first part includes the *scientific and professional achievements*, the second part the *carrer evolution and development plans*, and the three part the *references*, related to the content of the first two parts.

In the first part are presented my scientific and professional achievement from 2005 up to 2016 (inclusive) which has concretized in: 3 books, 3 national projects won (were I was/am the project leader), 19 articles published in journals indexed ISI or with impact factor (like main author 13), 57 articles published in journals quoted in different international databases other than ISI (like main author 28), 3 patents published to the State office for inventions and trademarks of Romania (like main author), 4 no of patents proposed to State office for inventions and trademarks of Romania (2 like main author), 20 participations with articles in international conferinces (5 of them in ISI proceedings). During my activity I obtained some *prizes* as fallowing: 5 prizes in money for my articles published in international journals from the Unit Executive for Funding Education Higher, Research Development and Innovation (UEFISCDI), under the Human Resources programme Research Results Awarding and 1 prize from the Ștefan cel Mare Univeristy Suceava at the Young Researchers Competition for my research activity during the university year of 2012-2013. The articles awarded by UEFISCDI (through the program Research Results Awarding) are the fallowing:

- Codină G. G., S. Mironeasa, C. Mironeasa, C.N. Popa, R. Tamba-Berehoiu, *Wheat Flour Dough Alveograph Characteristics Predicted by Mixolab Regression Models*, 2012, Journal of the Food Science and Agriculture, 92 (3): 638-644, ISSN 0022-5142 impact factor 2.076, SRI=2.74 (situated in the *red area* in the Agriculture, Multidisciplinary category) awarded by the UEFISCDI under the Human Resources programme Research Results Awarding in 2012;

- Codină G. G., 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 Food Science and Agriculture, 92 (10), 2162-2170, ISSN 0022-5142 impact factor 2.076, SRI=2.74 (situated in the *red area* in the Agriculture, Multidisciplinary category) awarded by the UEFISCDI under the Human Resources programme Research Results Awarding in 2012;

- Mironeasa S., Codină G. G., Mironeasa C., 2012, *The effects of wheat flour substitution with grape seed flour on the rheological parameters of the dough assed by Mixolab*, Journal of Texture Studies, 43 (1): 40-48, ISSN 0022-4901, impact factor 1.051, SRI= 1.06 ((situated in the *yellow area* in that year) awarded by the UEFISCDI under the Human Resources programme Research Results Awarding in 2012;

- Mironeasa C., Codină G. G., 2013, *A new approach of audit functions and principles*, Journal of Cleaner Production, 43 (1): 27-36, ISSN 0959-6526, impact factor, 4.959, SRI=1,21 (situated in the *yellow area* in the Engineering Environmental category and Green & Sustainable Science & Technology Category) awarded by the UEFISCDI under the Human Resources programme Research Results Awarding in 2013;

- Codină G.G., S. Mironeasa, 2013, *Influence of mixing speed on dough microstructure and rheology*, Food Technology and Biotechnology, 51 (4): 509-519, ISSN 1330-9862, impact factor 1.179, SRI=0.917 (situated in the *yellow area* in the Food Science & Technology Category) awarded by the UEFISCDI under the Human Resources programme Research Results Awarding in 2013.

This main content of this part includes some significant results obtained and published in different journals (most of them ISI quoted) or patented. The research presented in detailed form include only the studies made after obtaining the PhD thesis (February 2009) and confirmed by the Ministry of Education and Research (August 2009) as following:

1. Research related to the wheat flour quality on dough rheological properties identifies for the flours obtained from Romanian wheat, some correlations between main wheat flour quality characteristics and some rheological devices like Alveograph, Mixolab,

e.g. For different correlations were established some predictive models for evaluating the value of some parameters, as a function of others. On this topic, I was author to 2 books and to 13 articles published in different journals (11 articles after obtaining the PhD title from which 4 in ISI journals with impact factor).

2. Research related to the influence of technological parameters (mixing speed) on dough rheological properties analyze the effect of different mixing speed on dough microstructure and dough rheological behavior. On this topic I was author to 2 books and to 1 article published in ISI journal with a high impact factor.

3. Research related to the fermentation process in the food industry analyze the dynamics fermentation of carbohydrates in wheat flour dough, presents some dough fermentable sugar content variation during the fermentation process by means of a HPLC device and wheat flour dough gas production using a Chopin Rheofermentometer and describes the use of the dry lager brewing *Saccharomyces cerevisiae* yeast strain in a beer factory during the fermentation process from the physical-chemical and microbiological point of view. On this topic I was author to 13 publications (10 after after obtaining the PhD title from which 3 in ISI journals with impact factor).

4. Research related to the use of different improvers in bread making is one of my large research activity in the food industry field at this point being presented in detail only a few part of my research activity in this direction namely the improve of wheat flour with a low alpha amylase activity and of a strong one for bread making. On this topic I was author to 27 publications (11 after after obtaining the PhD title from which 1 in ISI journals with high impact factor).

5. Research regarding the improvement of food quality from the nutritional point of view presents 2 parts namely some studies on fiber-enriched products and other studies regarding the enrichment of the nutritional value of food products by using pulses or oilseeds in different forms as flours addition being presented in detail the effect of flaxseed on dough rheological, microstructure and bread quality. On this research direction I won by competition 2 research project namely *Improvement of the biochemical, rheological and technological aspects in bread making by using different composite flours*, supported by UEFISCDI, project number PNII-RU-TE-2014-4-0214, period 01/10/2015-30/09/2017 and *Research regarding the use of inulin and minerals in bread making. Technological aspects*, supported by UEFISCDI, project number PN-III-P2-2.1-BG-2016-0079, period 01/11/2016-31/10/2018. On this topic I was author to 25 publications (20 after obtaining the PhD title from which 6 in ISI journals). Also in this research area I obtained 3 patents and I proposed

to OSIM another 4 patents.

The future research directions are briefly presented being focused on some activities that must be done under the project won by me and which are still running or by the projects were I am member and I must done a series of activities. Also are presented an others research directions beyond those included in research projects underway. Briefly the research direction mentioned are: the use of inulin and minerals in bread making, the improvement of the biochemical, rheological and technological aspects in bread making by using different composite flours, the use of different germinated legumes flours in bread making from the biochemical, rheological and technological aspects, the use of some by-products from winemaking in order to create new bakery products improved from the nutritional point of view, the obtaining of new fermented dairy products of a high quality from the nutritional point of view, products quality improvement by using some additives, enzymes, vitamins, e.g. single or in different combinations, enriching food products with protein derivates obtained from vegetal origin raw materials, using fermented cereals in food products, valorization of different by-products from the food industry and their use in food products, e.g.

My didactic activity has the main objective to help the students for a better acknowledgement by improving their curriculum, by making with them different research activities in order to publish the results in different journals or by participating at different national or international conferences. Also I want to help them to integrate on the labor market.