

## ABSTRACT

### **Habilitation thesis „Innovative solutions for ultrasound and natural extracts integration in the food industry”**

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**Key words:** *ultrasound, natural extracts, innovative processes, food product quality*

The habilitation thesis is structured according to the current methodology and consists of two major sections: the first part highlights professional, scientific, and academic achievements, while the second part outlines career development plans.

My professional activity reflects a continuous evolution in the field of food engineering, combining teaching and research expertise with active involvement in academic projects. My career path is marked by experience in teaching, scientific research, project coordination, and the publication of specialized works, starting in 2012 when I held the position of Lecturer at Transilvania University of Braşov, Faculty of Materials Science and Engineering, with a primary focus on teaching and research in food product analysis. Currently, I hold the position of Associate Professor within the Faculty of Materials Science and Engineering at Transilvania University of Braşov.

As a result of my research activity, my publication portfolio includes 21 ISI scientific articles (of which 12 are ranked) and 48 other articles indexed in BDI databases. Regarding project coordination, three national projects have been highlighted in which I have participated as project director or project manager.

The research activity is presented through the main results obtained, structured into two major research directions, namely: (1) *Assessment of the impact of ultrasound treatment on the quality of liquid foods*; (2) *The applicability of natural extracts in the food industry*.

First Research Direction *Assessment of the Impact of Ultrasound Treatment on the Quality of Liquid Foods* provides a detailed analysis of the findings published in studies on topics such as: the effects of certain treatments on L-ascorbic acid and other physicochemical properties of grape juice; an overview of the effects of pasteurization and high-power ultrasound treatment on the quality of red grape juice; optimization of a procedure to improve the extraction rate of biologically active compounds in red grape must using high-power ultrasound; the effect of high-power ultrasound treatment on the bioactive compound content and chromatic characteristics of red

wines; the influence of high-power ultrasound treatment on red wine quality parameters; the application of ultrasound in the winemaking process; the influence of ultrasound treatment on the antioxidant properties of blueberry vinegar.

The second research direction *The Applicability of Natural Extracts in the Food Industry* details the results obtained in studies published on topics such as: insights on the potential of carob powder (*Ceratonia siliqua* L.) to improve the physicochemical, biochemical, and nutritional properties of durum wheat pasta; the impact of the infusion method of chokeberry powder in white tea. The use of natural extracts in the food industry is a highly relevant research area due to the benefits they provide, both in terms of improving the quality of food products and from the perspective of functionality and their positive impact on consumer health.

From the perspective of recognition and impact, my professional activity, particularly in research, has led to the achievement of significant scientific indicators, reflected by a Hirsch index of 5 according to WoS/Clarivate, 5 in Scopus, and 8 in Google Scholar databases.

My research activity has been acknowledged through the UEFISCDI Award in the PRECISI2020 Competition, for an article published in the yellow zone.

As a result of my publishing activity, I have been invited by editors of prestigious journals to review manuscripts submitted for publication in WoS/Clarivate indexed journals, such as MDPI Applied Sciences and MDPI Sustainability.

The final section of the thesis is dedicated to career development plans, which include, in addition to strengthening and improving teaching activities, strategies for creating an academic environment of excellence. This section focuses especially on supporting and mentoring young researchers, facilitating their integration and advancement in the scientific and academic fields.

In this regard, I will actively contribute to the establishment of a new doctoral program at Transilvania University of Braşov, specifically in Food Product Engineering (FPE). Therefore, obtaining the habilitation in the field of FPE is an essential objective in my professional trajectory.