

ABSTRACT

The habilitation thesis entitled "***Molecules of natural origin with implications in the biology of oxidative stress and human nutrition***" is a synthesis of the research activity completed after the end of my doctoral studies, during 2017 – 2023. Regarding the research path, the finalized studies had the aim of continuing the research topics of the Ph.D. thesis, in the field of Pharmacy, specifically the analysis of biologically active compounds with implications in the modulation of oxidative stress and with enzyme inhibition activity, isolated from medicinal or nutritional plants. The current thesis includes a selection of research articles representative for the activity accomplished in these years.

The research paths chosen after the doctoral studies, also presented in this habilitation thesis, can be summarized:

- 1) The extraction (using classical and optimized methods) and separation of natural molecules with antioxidant potential – potential implications in the biology of oxidative stress
- 2) *In vitro* and *in vivo* methods of testing anti-inflammatory activity, in correlation with the biology of oxidative stress
- 3) Testing the inhibition potential of enriched natural extracts against certain pathologically relevant enzymes

The first part of the habilitation thesis includes **professional, scientific, and academic achievements**, and the presentation is structured into three chapters. The **first chapter** is a synthesis of the results related to the aforementioned research paths, and it is organized in three corresponding subchapters. Not less than 27 representative studies for these research fields have been selected.

The results of the post-doctoral research studies (presented systematically in **Chapters 2 and 3**) are highlighted by research projects (manager of 3 projects earned from national competitions and member of 7 research teams) and various publications (143 *in extenso* articles, indexed by Clarivate Analytics, as first author/co-author), with a high visibility in the scientific environment (a cumulative impact factor as principal author for post-doctoral studies of 246.823). At the beginning of June 2023, the Hirsch index according to Web of Science was 41, with a total number of citations of 5889 (5569 without self-citations). A publication in Nature Reviews Drug Discovery (IF = 112.288) has more than 1000 citations in Clarivate Analytics. Moreover, over the course of the academic career, 292 scientific paper reviews/verified peer-reviews have been accomplished.

The second part of the habilitation thesis consists of **plans for career development**, comprising a **plan for academic, scientific, and professional development**. The development objectives regarding the scientific activity will include interdisciplinary research in the biomedical field, regarding natural molecules and particularly polyphenols as natural antioxidant species, with enzyme inhibitory properties, originating in plants with medicinal and nutritional potential.

In particular, the development of research activity will be focused on the attendance to various national and international scientific meetings, on publishing the research results, and on the improvement of new methods or new sub-fields, through research projects.

The research paths that will be approached in the future will include, among others, subjects such as: the metabolomic characterization of certain plant matrices, the development of new modern extraction methods for natural molecules, the biological screening used in the identification of natural enzyme inhibitory compounds, the modulation of oxidative stress induced by hyperglycemia by natural molecules in β -pancreatic cells, modulation of intestinal microbiota using natural phytochemicals and the influence of thermal processing, and finally *in vivo* studies regarding the anti-inflammatory potential of natural products through oxidative stress modulation.