

ABSTRACT

The habilitation thesis entitled "Integrated research on xenobiotic analysis" represents a significant contribution to my academic achievements subsequent to completing my PhD. This thesis is structured into three main chapters, according to my accomplished educational and professional activities, my scientific activities and the envisioned plans for my future academic career.

The **first chapter** of my thesis highlights my educational achievements in the Pharmaceutical field. These accomplishments encompass various teaching activities for the fifth-year students at the Faculty of Pharmacy, active involvement in students' scientific and practical pursuits, coordination of undergraduate theses, the organization and support of courses for residents specializing in the Medical-Pharmaceutical Laboratory Analyses, and tutorial activities for both students and residents.

As a co-author, I have contributed to the development of several specialty books and book chapters published by national and international publishing houses, catering to students, residents, and pharmaceutical professionals alike.

Regarding my involvement in the pharmaceutical community, I have successfully developed and supported two postgraduate courses on an annual basis: "Pharmaceutical products - control of impurities" (2016-2021), and "Quality control of herbal preparations" (2010-2015). Furthermore, starting in 2022, I have taken on the responsibility of teaching the postgraduate course "Pharmaceutical products - market authorization", which is open to graduates of the Faculty of Pharmacy, regardless of their field of activity: pharmaceutical industry, regulatory agencies, analytical laboratories, community pharmacy, hospital pharmacy, and even the university environment. Additionally, the course extends its reach to doctors, chemists, and biologists seeking further knowledge in this domain.

In addition to my curricular activities, I have been actively engaged in promoting the pharmacy profession and our faculty. I have taken on the role of guiding students and young pharmacists in making informed decisions about their career path, while also striving to create ample opportunities for them. My efforts in this regard include:

- Founding member and secretary (2018-2019), and later serving as president (2019-2023) of the "Alumni Association of the Faculty of Pharmacy from Bucharest,
- Member of the CIVIS OpenLab - Laboratorul Călător project (November 2021-May 2022)
- Acted as a mentor in the FASFR mentoring program (January - May 2021)

- Served as a tutor for fifth-year students (academic year 2020-2021)
- Playing an instrumental role in establishing collaboration agreements with pharmaceutical companies, facilitating internships for students and residents (e.g. AbbVie's Early Career Program)
- Contributed as teaching staff at UMF "Carol Davila" in informative sessions at various high schools in Bucharest (Sfântul Sava National College - 2014, International Theoretical High School of Informatics - 2017)
- Organization and providing guidance of laboratory activities tailored to high schools students from Bucharest who qualified for the National and International Chemistry Olympiad – 2019, 2021, 2022, 2023.

My dedication to these endeavours stems from a genuine passion for fostering growth and opportunities within the field of pharmacy.

Throughout my academic journey, I actively engaged in various administrative, license or promotion commissions. Notably, I served as a member of the commission for formulating subjects for the national residency entrance exam (2019-2022). Additionally, I made valuable contributions as part of the scientific and organizing committees for various congresses and national conferences. During these events, I delivered several oral presentations that piqued significant interest within the pharmaceutical community. Furthermore, the professional pharmaceutical activity plan included the publication of several scientific articles tailored to professionals in both the pharmacy and medical fields. These publications fostered an interdisciplinary relationship, strengthening the collaboration between pharmacists and doctors.

In terms of the administrative and managerial aspects of my work, I have actively participated in the evaluation and quality assurance process as a member of the university CEAC commission during 2005 – 2007, and as a member of the faculty CEAC commission from 2022 till present.

Another aspect I would like to highlight my voluntary engagement in a special field of activity, serving as a quality assessor at National Agency for Medicines and Medical Devices of Romania. This role reflects my commitment to ensuring the highest standards and quality in this field.

In the **second chapter** of my thesis, I showcase my scientific achievements, focusing on two primary research directions supported by the most significant and relevant publications.

The *first research direction* is dedicated to the development of analytical methods for the quality control of some innovative or conventional pharmaceutical formulations (both medicines and food supplements). The objectives of the studies are represented by the use of modern analytical methods both for the analysis of innovative formulations containing nanostructured lipid carriers (NLC) loaded with active compounds, and for the analysis of conventional formulations with immediate release or with modified release, containing various active pharmaceutical ingredients. Additionally, my research extends to the analysis of newly developed food supplements with vitamin C and hesperidin, or with alpha-lipoic acid, as well as the examination of potential adulteration in certain food supplements available in the Romanian market. Within this research direction, the outcomes have been substantial, leading to the publication of twelve ISI-indexed articles, of which I have taken the primary authorship in six of them.

The *second research direction* consist of integrated research regarding the evaluation of the analytical and pharmaco-toxicological profile of various xenobiotics. This line of research encompasses multiple aspects, including:

- Evaluation of the profile of methadone and its metabolites in patients with addictions
- Examination of dextromethorphan, nicotine and cotinine, with a focus on their analytical and pharmaco-toxicological characteristics
- *In vivo* and *in vitro* studies exploring the therapeutic and toxicological response of certain compounds used in rheumatoid arthritis.

Additionally, analytical researches with applications in eco-toxicology has been a key area of focus, specifically concerning the determination of heavy metal concentrations in soil, water, vegetable samples, and in biological samples (hair, teeth) from children from two Romanian industrial areas, Copșa Mică and Zlatna. The results obtained from these analyses have been correlated with neurological dysfunctions observed in children or with the chronic conditions of workers exposed to occupational poisoning. As a result of these investigations, my contributions led, among others, to the publication of three book chapters in international publishing houses, and seventeen ISI-indexed articles, of which I have taken the primary authorship in six of them.

In the **third chapter**, I outline my prospective university career plans, encompassing three primary activity domains: scientific, educational and professional. As an academic, my aspiration is to seamlessly integrate teaching and scientific research, assigning equal importance to both endeavours. My vision entails developing innovative approaches in both didactic and research activities, ensuring the realization of fundamental principles that

uphold quality assurance in the national and European realms of research and higher education. By fostering this balanced and progressive approach, I aim to make valuable contributions to the advancement of knowledge within my field while providing high-quality education to future generations of students. Through relentless dedication and a commitment to excellence, I envision a future in which my contributions positively impact the academic community and contribute to the broader advancement of science and education.

On the principle of continuity, my intention is to regularly update the course content and experimental methodology for students, keeping in mind the evolving demands of the labour market and the current EU regulations. I propose developing and introducing new experimental works within the Drug Control Laboratory, utilizing state-of-the-art equipment to achieve this goal. These new protocols will be modern, aligned with laboratory homologous curricula in the countries of the European Union. Regarding research topics, my plan is to delve into innovative themes, including: 1) developing novel analytical tools to assess the quality of medicines and dietary supplements; 2) formulation and in-process control of new medicines and dietary supplements; 3) developing advanced analytical methods to monitor therapeutic and toxicological levels of xenobiotics in biological samples. By exploring these cutting-edge areas, I seek to enhance the academic experience for students while contributing valuable insights to the field of pharmaceutical research. My aim is to stay at the forefront of advancements in the industry, fostering a dynamic and progressive environment within the Drug Control Laboratory.

In conclusion, the primary career objective is to excel in educational, professional and research pursuits, upholding the highest standards that align with my personal principles and the qualitative and ethical guidelines adopted by the Charter and the Strategic Plan of UMF “Carol Davila” Bucharest. By maintaining a commitment to excellence and integrity, I aim to make meaningful contributions to the academic community and advance the field of pharmaceutical science while adhering to the institution’s esteemed values and vision.