

ABSTRACT

The habilitation thesis entitled "RESEARCH ON TECHNOLOGIES FOR THE PRODUCTION AND ANALYSIS OF SOME PHARMACEUTICAL FORMS" comprise an important part of my academic achievements realized after receiving the Ph.D. title, in 2011. Based on my professional, academic, and scientific accomplishments, as well as future directions, it is divided into four major chapters.

The **first chapter** presents my scientific achievements in three of the main research directions based on some of my relevant publications.

The *first research direction* is dedicated to the development and evaluation of different solid pharmaceutical forms, and is divided into three subdivisions:

- 1.) tablets containing rutoside inclusion complexes in β -cyclodextrin and hydroxypropyl- β -cyclodextrin;
- 2.) innovative capsules formulations;
- 3.) cellets coated with rivaroxaban- hydroxypropyl- β -cyclodextrin inclusion complex.

Each section provides data regarding the preformulation, formulation, manufacturing process and the results of the specific control performed. The research conducted within this research direction was materialized in 4 ISI indexed articles, 1 abstract published in ISI listed journals and 2 abstracts published in journals and volumes of scientific events with ISBN / ISSN.

The *second line of research* deals with the manufacturing process and characterization of some liquid pharmaceutical forms, mainly hydroalcoholic solutions and O/W emulsions. The products contain various natural ingredients and are intended for different biological activities. The studies carried out in this line of research have been published in 4 ISI-indexed articles.

The *third research direction* reveals the determination of antioxidant activity by means of various *in vitro* analysis methods. The analyses include

- 1.) electrochemical methods,
- 2.) superoxide dismutase (SOD) method,
- 3.) DPPH method,
- 4.) ABTS method and
- 5.) FRAP method.

The research conducted within the framework of this research direction have led to 5 ISI-indexed articles.

The **second chapter** details my academic activities in the Pharmaceutical Technology and Biopharmacy discipline. These activities include teaching third-, fourth-, and fifth-year Faculty of Pharmacy students, assisting with their scientific and practical projects, coordinating undergraduate theses (a total of 117 theses), planning and assisting first-year residents in the General Pharmacy specialization, and providing tutorial activities for students and residents. As a co-author, I helped create a number of specialized books aimed at experts in pharmaceutical practice as well as students and residents. A few of the publications that were published received awards at various pharmaceutical gatherings. Between 8 and 12 May 2017, I was an invited professor at the Faculty of Pharmacy in Belgrade, Serbia, by being awarded a CEEPUS Mobility Grant at the University of Belgrade, Faculty of Pharmacy, Department of Pharmaceutical Technology, within the FREEMOVER 104260 program, to teach specific courses in the field of semisolid dosage forms for students, Ph.D. students and teachers of the Department of Pharmaceutical Technology.

The **third chapter** is dedicated to my professional preoccupations in the pharmaceutical community. I developed and supported 4 postgraduate courses with annual frequency, starting from 2008, ("Formulation of semisolid preparations for cutaneous application", "Technology of dermatological and cosmetic preparations", "Pharmaceutical aerosols" and "Design, production technologies and applications of transdermal therapeutic systems" - period 2008 – 2011) addressed to the graduates of the faculty of pharmacy, regardless of the field in which they exercise their activity: community pharmacy, hospital pharmacy, pharmaceutical industry, analytical laboratories and even the university environment, as well as doctors, chemists or biologists. I gave a number of oral presentations that were highly interesting to the pharmaceutical community as a whole during the activity, and I took part in the scientific and organizing committees of many congresses and national conferences. The publication of several scientific publications aimed at pharmacy and medical professionals, with whom we hope to fortify an interdisciplinary relationship, was also part of the professional pharmaceutical activity plan.

The **fourth chapter** displays my future university career plans, following also the three main domains of activity: scientific, educational and professional. Regarding the research topics, I plan to cover innovative themes such as:

- 1) development of new drug formulations, analyzing the influence of key parameters on the product characteristics, such as: dissolution, redispersion, particle size, rheological properties and viscosity, including the role of selected excipients;
- 2) conducting preformulation studies and experimental design, in order to determine the impact of critical parameters and process conditions on the quality and consistency of the final product; 3) biopharmaceutical evaluation of solid forms, to identify potential performance problems that may arise following changes in composition or technology;
- 4) research and development of new products, drugs or cosmetics, using active ingredients encapsulated in cyclodextrins;
- 5) design and manufacture of micro- and nano-encapsulated pharmaceutical forms;
- 6) testing advanced manufacturing technologies, such as the production of capsules loaded with pellets obtained by modern methods, including the use of inclusion complexes;
- 7) application of 3D printing technology for the production of personalized medicines;
- 8) creation of semi-solid gelled forms with variable structural properties depending on temperature.