Politechnika Łódzka

SUPERVISOR _CANDIDATE **PROFILES**
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The Deputy Director for Education of the Institute of Food Technology and Analysis, the Leader of the Starch and Confectionery Technology Team, the Member of the Council of the Field of Study: Food and Nutrition Manager, Cosmetics Technology and Food Technology and Human Nutrition, the Member of the Food and Nutrition Technology Discipline Council, the Member of the Council for Scientific Degrees in the Disciplines of Chemical Sciences, Chemical Engineering, Food and Nutrition Technology, the Member of the Disciplinary Committee for Academic Teachers.

RESEARCH INTERESTS

Food technology and analysis, especially food of plant origin. Her research concerns the impact of technological processes on food ingredients, health-promoting and anti-nutritional compounds found in raw materials, semi-finished and finished products, their isolation, identification, technological and nutritional characteristics, as well as the development of methods elimination/limitation anti-nutritional substances. Her works are used, among others, in designing food with functional features, convenient or special-purpose food, and bioactive preparations from plant raw materials and by-products of the food industry.

Author/co-author of 69 publications (h-factor=26; ~1700 citations, according to the Scopus database*)***,** *8 patents, Project manager of 3 scientific and R&D projects and Principal Investigator (cooperating with number of business entities) of 10+ scientific, R&D and infrastructure projects, valued over €9.7M.*

Active in the scientific community in Poland and abroad as a member of many scientific bodies, i.e. the member of the Committee of Food and Nutrition Sciences, Faculty II of Biological and Agricultural Sciences, Polish Academy of Sciences (3rd term), the advisor to the Łódź Council of the Federation of Scientific and Technical Associations NOT - Technical Services Team for Innovation, the member of expert bodies assessing research and innovations in Poland and abroad, and the member of the Polish Society of Food Technologists.

Member of the Scientific Council of the journal "FOOD. Science. Technology. Quality". Reviewer in scientific journals, including: Food Chemistry, Food Research International, LWT – Food Science and Technology, European Food Research and Technology, Antioxidants.

She has supervised over **70** masters and engineers, **2** doctors and **1** is finalizing a doctoral project. She is a reviewer of doctoral theses, habilitation achievements and professor promotion applications.

RESEARCH PROJECT_ABSTRACT

As part of the post-doc project, bioactive preparations obtained from plants of the genus *Scutelaria* L. from the *Lamiaceae* Lindl family, small-leaved bacopa (brahmi), purslane (*Portulaca oleracea*), etc. will be obtained and characterized. These plants have many medicinal properties and have been used in traditional medicine in various regions of the world for centuries. The group of bioactive compounds that has the greatest impact on the therapeutic properties of *Scutelaria* are flavonoids, with slightly different qualitative and quantitative compositions of these compounds occurring in different morphological parts of these plants. Plants of the genus *Scutelaria* may also contain sterols such as beta-sitosterol, stigmasterol and daucosterol. Due to the high content of phenolic compounds, *Scutelaria* extracts are characterized by antimicrobial, antioxidant, anti-inflammatory, antiallergic, antiasthmatic, antianxiety, antidepressant, anticonvulsant, spasmolytic and antineurodegenerative properties. *Purslane* contains many nutrients valuable for health and well-being: vitamins A, C, B group and minerals of potassium, magnesium, calcium, iron, zinc and selenium, as well as many other trace elements. It is a rich source of omega 3 fatty acids (seeds). It also contains high amounts of fiber, flavonoids and other antioxidants, phytoestrogens, organic acids and melatonin, which is a hormone that regulates sleep and wake-up cycles. Brahmi, on the other hand, improves brain function, increases the ability to concentrate and improves memory. This plant also supports the treatment of neurodegenerative diseases. Steroid saponins, mainly bacoside A and B, are responsible for the healing properties of Brahmi, although the plant is

also rich in other valuable ingredients, such as antioxidant flavonoids, phenols and phytosterols, which lower cholesterol. The plant supports the speed of neurotransmission due to its influence on dendrites, i.e. projections of neurons (nervous system cells). It increases blood flow to the brain, which improves cognitive functions, memory and concentration. As a result of using Brahmi, an improvement in learning ability is observed. So we are talking about nootropic effects here. The beneficial effects may last even several weeks after stopping the use of the plant.

Taking into account the above, the research material will be various morphological parts (roots, herbs, flowers) of the above-mentioned plants, plants from which extracts and preparations in the form of encapsulates will be obtained. For this purpose, several extraction methods will be used (traditional, modern - e.g. aided by microwaves or ultrasounds) and several encapsulation methods (e.g. formation of inclusion complexes, alginate-chitosan capsules...). Extracts and encapsulates will be characterized in detail in terms of morphology, short- and long-term stability, chemical composition (FTIR, HPLC methods), antioxidant properties (e.g. DPPH, FRAP methods), anti-inflammatory activity (*in vitro* tests for inhibition of pro-inflammatory enzymes - lipoxygenase and hyaluronidase), and bioavailability (digestion in the gastrointestinal model) using modern methods and techniques (e.g. HPLC/MS, electron microscopy, laser particle size meter, *in vitro* tests). The obtained preparations will be applied to food. Then, the physico-chemical, textural, organoleptic and health-promoting properties (content of bioactive compounds, antioxidant activity, anti-inflammatory properties, bioavailability) of the obtained functional products will be examined.

CANDIDATE PROFILE

Discipline - Nutrition and Food Technology or Life-science & Technical Science

Experienced in food studies, health-promoting properties of food, antioxidant, anti-inflammatory activity, etc.

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