

OPINION

for awarding the educational and scientific degree "doctor"

in the field of higher education: 4. Natural sciences,

professional direction: 4.3. Biological Sciences,

PhD program: Microbiology

**From Assoc. Prof. Dr. Plamen Pilarski, Institute of Plant Physiology and Genetics,
BAS, Laboratory „Experimental Algology“**

Author of the dissertation: Milena Nikolova Petrova, full-time doctoral student, Faculty of Biology, Department of "General and Industrial Microbiology".

Topic of the dissertation: Development of biologically active products from new natural sources.

The thesis submitted for defense is dedicated to the search of new natural sources of antimicrobial substances for use in medicine and agriculture. The topic is related to the appearance of more and more resistant to the antibiotic drugs strains and other medications used in practice.

The dissertation work has a volume of 160 pages, incl. 41 tables and 26 figures and 21 pages of appendices (12 tables and 28 figures). The list of references includes 477 titles.

The introduction and the literature review provide extensive and serious arguments in favor of the choice of dissertation topic. Several groups of organisms have been considered as sources of natural antimicrobial substances, with a primary focus on microalgae.

The good literary awareness of the chosen topic has allowed Milena Petrova to justify and clearly formulate the goal of her scientific work, as well as the specific tasks to achieve this goal. Of particular interest is the idea of using combinations of extracts from various microalgae and other natural sources, as well as with antibiotics.

The methods applied in the execution of the dissertation work (including newly developed software for easier measurement of inhibition zones by the Bauer-Kirby method from photographic images) are diverse, scientifically based and undoubtedly allow obtaining correct scientific results. Dissertations with a similar interdisciplinary nature of the research are rare.

Within the framework of the dissertation, two strains of microalgae and one natural sample were used, from which 16 extracts were obtained, tested for antimicrobial and antioxidant activity. For the first time in Bulgaria, experiments are being made with products from algal biomass collected from nature (*Nostoc commune*). Original and significant results were obtained regarding the growth characteristics, the qualitative composition of the used algal strains, the biological and antioxidant activity of the products from them. Encouraging results are presented for the potential of some of the extracts against human pathogens and phytopathogenic bacteria

The conclusions (9) and contributions (5) formulated by the doctoral student are concurrent with the obtained results. To summarize, the dissertation work is particularly valuable, and makes a scientific and scientifically applied contribution by obtaining and proving new facts.

My personal impressions of Milena Petrova's work in the Laboratory „Experimental Algology" of the Institute of Plant Physiology and Genetics - BAS are of a promising young scientist who is dedicated and precise in experimental work.

In conclusion, I would like to point out that the dissertation work submitted for opinion, together with the received credits, with the publications and participation of the dissertation student, fully meets the criteria of the Law for the Development of the Academic Staff in the Republic of Bulgaria. Taking into account the personal qualities of the doctoral student, I strongly recommend to the respected members of the Scientific Jury to award the educational and scientific degree "doctor" to Milena Nikolova Petrova.

7.09. 2022 г.

Sofia

Signature:

/Assoc. Prof. Plamen Pilarski/