OPINION

From Prof. Svetlozara Petkova, Ph.D.

Institute of Experimental Morphology, Pathology and Anthropology with Museum

Subject: Participation in a scientific jury for obtaining the educational and scientific degree "Doctor" in the professional field 4.3 Biological sciences, in the field of higher education 4. Natural sciences, mathematics and informatics, scientific specialty 01.06.12 "Microbiology". appointed by Order I-26 / 01.03.2022 of the Director of the Institute of Microbiology - BAS

Candidate for the announced competition is Lilyana Vasileva Nacheva, Assistant Professor, PhD student at the Department of Biotechnology, Stefan Angelov Institute of Microbiology.

The presented dissertation is on the topic: "Biodegradation of aromatic and aliphatic xenobiotics from free and immobilized bacterial cells" with supervisor Assoc. Prof. Dr. Lyudmila Kabaivanova. The doctoral student has provided the necessary documents in accordance with the requirements of the Academic Staff Development Act and the Regulations on the terms and conditions for obtaining scientific degrees and for holding academic positions.

The dissertation is written on 105 pages. Relevant parts: introduction, literature review, purpose and tasks, material and methods, results, discussion, conclusions, contributions and publications on the topic of the dissertation and literature are sufficient in volume, filled with specific content, observing the ratio of individual parts in this type of scientific work.

The results are presented concretely and clearly, illustrated in 5 tables, 46 figures and 7 diagrams. The bibliographic reference includes 181 literature sources. The abstract is written on 57 pages, reliably and accurately reflects the huge amount of experimental work, as well as excellent results and conclusions. The aim of the dissertation to study the ability of microbial species in free and immobilized form for biodegradation of aromatic and aliphatic xenobiotics is clearly formulated and successfully completed through six tasks, specifically set and accurately performed. As a result of the work on the dissertation, 10 conclusions and 5 contributions were formulated.

Stable simultaneous biodegradation of hydrocarbon xenobiotics under certain conditions and use of polyethylene oxide cryogel matrix has been achieved.

An original contribution is the possibility of application of adapted and immobilized cells of strain Rhodococcus wratislawiensis BN38 and Micrococcus luteus BN56 in real processes of biological treatment of wastewater or contaminated soils.

A new bacterial strain of BN66 was isolated by selective enrichment, identified as Bacillus cereus, which has been shown to degrade crude oil along with the synthesis of surfactants.

For the first time, cells of the newly isolated strain of Bacillus cereus BN66 in a cryogel carrier based on polyacrylic amide were immobilized as a way to increase the intensity of the process, which is applicable in the bioremediation of oil-contaminated sites.

The use of the immobilization technique has been shown to be a successful approach, which has been demonstrated by the high efficiency of the immobilized cells of Rhodococcus wratislawiensis BN38, Micrococcus luteus BN56 and Bacillus cereus BN66, which show great stability and resilience.

Assistant Nacheva has completed the required set of courses during her doctoral studies. She has successfully passed an exam in language training, computer skills and a basic specialized subject. According to the requirements of the Rules of Procedure of the Central Office at the Bulgarian Academy of Sciences, it has collected a total of 263 loans. The presented publications on the topic of the dissertation exceed the required minimum of 30 points. The total impact factor of the dissertation publications is 2,421 and they have 28 citations. The scientific supervisor also participates in all publications.

The problem treated in the dissertation is relevant and significant. With the overall scientific development, the author shows the qualities of an experimenter with the potential to plan, analyze and interpret the data obtained. The purpose of the study is clearly stated and the methods used are properly selected.

Conclusion:

My categorical opinion is that the dissertation: "Biodegradation of aromatic and aliphatic xenobiotics from free and immobilized bacterial cells" is of significance and scientific application for microbiology and ecology and I strongly suggest to assistant Lilyana Vasileva Nacheva to be awarded the educational and scientific degree "Doctor" in the professional field 4.3 Biological sciences, from the field of higher education 4. Natural sciences, mathematics and informatics, scientific specialty 01.06.12 "Microbiology".

April 15, 2022, Prof. Svetlozara Petkova

На основание
чл. 2 от ЗЗЛД