

SPC Armbiotechnology NAS RA

Specialized Council 018

for Biotechnology

Academician Prof. A.S. Saghyan

### **Recommendation Letter: Hovik Panosyan**

Evaluation of the dissertation and scientific achievements of Hovik Harutyun Panosyan PhD, for conferring the scientific degree of Doctor of Biological Science in the specialty Microbiology/Biotechnology. The Doctoral dissertation is entitled „Diversity, biological features, and biotechnological potential of microbes of the geothermal springs in Armenia and Nagorno-Karabakh“.

#### **The topic of the dissertation**

Microorganisms living under extreme conditions, especially at high temperatures, are interesting research objects for understanding and unraveling the strategies and mechanisms involved in the survival of living systems under extreme conditions such as temperature, pH and high salt concentrations. In addition to their importance for basic research, thermophiles are exciting resources for various biocatalysts that can be used for industrial applications, including food, feed, pharmaceuticals, and energy. Little, however, has been studied so far regarding these aspects. Less than one percent of these microbes have been investigated in detail.

The dissertation of Hovik Panosyan focuses on the microbial biodiversity in hot Springs in Armenia and Nagorno-Karabach aiming to understand the mechanisms involved in microbial survival in extreme habitats. The candidate performed with great success intensive research involving classical microbiology as well as modern molecular biological techniques, including metagenomics and bioinformatics. With these advanced approaches, the candidate was able to discover and characterize several novel enzymes, including amylases, proteases, as well as unique polysaccharides.

In addition, the microbial diversity in hot Springs in Armenia was studied in detail. Hovik Panosyan could identify and isolate more than 100 species from Armenia with unique properties. These studies will result in the delivery and description of a vast

number of enzymes, that are of potential interest not only for basic science but also for applied research. It has been also shown, that many of the species isolated from Armenia have different metabolic pathways, and some of them are unique to the hot springs in Armenia. This will for sure have a significant impact on the analysis of the ecosystems in the geothermal habitats of Armenia.

### **The experimental approach**

Hovik Panosyan was able to analyse microbial diversity, physiology, metabolism and enzymology, employing modern techniques in molecular biology, enzymology, fermentation technology and bioinformatics. He was able to investigate microbes with different metabolic pathways, including aerobes as well as anaerobes. Furthermore, modern techniques for chemical analysis of complex compounds such as polysaccharides and nucleosides were applied. The interdisciplinary approach allowed him to analyse complex biological systems very efficiently, with high precision and with a great success.

### **Dissemination of results**

The candidate was very successful in presenting his results in various congresses on the national and international levels. Furthermore, he had an intensive collaboration with International well-known groups worldwide. He has a high reputation in the scientific community due to his high-quality contributions and papers and book chapters. His achievements will also initiate further projects, which are of relevance to the development of sustainable biobased technologies (Circular Bioeconomy). He deserves respect for his efforts to educate young researchers in the field of microbiology. He was involved in the coordination of several workshops, two of which were in the field of bioeconomy.

### **Recommendation**

Accordingly, the work presented by Hovik Panosyan is of a very high scientific quality and an international level and deserves acknowledgment and respect. The dissertation complies with the requirements of the SCC of RA for a doctoral dissertation.

I fully support his nomination and congratulate Yerevan State University for this achievement.

Official Opponent



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Hamburg, Sept. 30, 2022

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