

# STATEMENT

by Assoc. Prof. Dr. Valentin Alexandrov Savov

Sofia University "St. Kliment Ohridski" Faculty of Biology

regarding the dissertation submitted for defense to a scientific panel, assembled by order № RD-38-163/01.04.2024 of the Rector of Sofia University "St. Kliment Ohridski" for earning the educational and scientific degree "Doctor" in the professional field 5.11. Biotechnology

**Dissertation topic:** Functional and technological characteristics of newly isolated strains of lactic acid bacteria from traditional foods

**Author of the dissertation:** Ramize Hodzha

**Advisor:** Prof. Dr. Dilyana Nikolova

## 1. Relevance and significance of the dissertation topic:

The dissertation work presented by Ramize Hodzha is a scientific piece related to the study of lactic acid bacteria, isolation of new strains and their investigation for possible application in new fermented products.

Traditional fermented foods attract the attention of researchers because they are a source of biologically active substances and represent an interesting field for scientific research. Examining their characteristics in order to isolate new strains of lactic acid bacteria and include them in similar products is a very relevant challenge.

Lactic acid bacteria are a promising source for the development of new products that meet consumer requirements and generally fall under EFSA and FDA standards.

The use of lactic acid bacteria dates back to ancient times. Nowadays, they are used in a variety of directions for the preparation of fermented foods, fermentations for preservation of fruits and vegetables, production of bread, alcoholic beverages, silage of fodder, etc.; their activity contributes to the improvement of organoleptic characteristics and shelf life, give additional taste and aroma qualities and produce a wide range of biologically active substances, such as organic acids with preservative properties.

The diverse applications of lactic acid bacteria, such as fermented foods and probiotics, place a serious demand on establishing their characteristics, proven safety and technological characteristics.

The selection of the new strains includes proper identification, a number of biochemical and molecular genetic studies, modeling of conditions for adaptation to relevant environments and proof of positive effects in their potential use to improve human health.

Based on what has been stated so far, I believe that the topic of the presented dissertation is extremely relevant.

## **2. Evaluation of the dissertation structure:**

The dissertation is written on 143 standard pages, following the generally accepted structure as follows: Introduction, Literature review, Aim and objectives, Materials and methods, Results and discussion, Conclusions, Contributions, Publications on the topic of the dissertation, Bibliography, Appendix I .

The recommended ratios between the individual parts of the work are complied with. The professional style and formatting of the dissertation makes a good impression. The piece is well illustrated with 22 figures and 18 tables supporting the obtained results.

The literature review is very well organized, in terms of structure and consistency of the research paper. It is structured in 7 subsections. Serious attention has been given to functional foods, lactic acid bacteria and their application. Probiotic lactic acid bacteria as mode of action and their importance from a health point of view are separately considered.

In the following sections, interesting and up-to-date information is given regarding classical and modern methods and research from the last 10 years.

The aim of the dissertation and the 4 experimental tasks with detailed sub-tasks related to its achievement are clearly and precisely formulated. The range of materials and methods used shows that appropriate and modern methods have been selected. They are described in detail:

- The examined test microorganisms, nutrient media and solutions; isolation, cultivation and storage of microorganisms; physiological, biochemical and molecular genetic methods; description of the antibiotic resistance profile of the studied strains; determination of auto-coaggregation properties; determination of ability to adhere to mucin under *in vitro* conditions; determination of *in vitro* survival ability of the strains in model conditions; study of antiviral activity; methods for determining technological characteristics; obtaining model products and determining organoleptic and physicochemical characteristics; NMR spectrophotometric analyses.

In the Results and Discussion section, the experimental part is detailed in 4 subsections. The experimental data is correctly described in a logical sequence. A huge volume of research was carried out, through which the set tasks were fulfilled. The results are very well presented with illustrative material.

In addition, it can be said that the data was interpreted correctly, and the results were compared with similar ones from literature references from the last 10 years.

Based on the obtained results of the experimental work, 13 conclusions and 6 contributions were formulated, which do not raise any doubt around their informational value and the significance of the performed experimental work. The contributions of the dissertation have a scientific and applied character, emphasizing the potential of their practical use.

### **3. Assessment of correspondence between the abstract and the dissertation**

The abstract is presented on 58 pages, fully reflecting the scientific research and the obtained results. It is very well designed according to the requirements of the regulations for the application of the Law for the Development of the Academic Staff of the Republic of Bulgaria.

### **4. Publications in connection with the dissertation**

In connection with the dissertation, Ramize Hodzha has presented 4 publications in reviewed journals, the obtained results have been reported at 11 scientific forums and 7 citations have been indicated.

### **5. Acquired competence and compliance with the requirements of the doctoral degree**

In carrying out the research work and layout of the written dissertation by Ramize Hodzha, it is clearly evident that competence in terms of knowledge in the specific scientific field has been acquired. Competence in the formulation, construction and execution of tasks to achieve the ultimate goal is very clearly evident. The doctoral candidate shows skills for working with scientific literature, analyzing and interpreting scientific information.

### **Conclusion:**

I evaluate positively the doctoral candidate Ramize Hodzha's dissertation presented to me. The research work carried out, the overall design of the dissertation, as well as the correct and professional interpretation of the results give me reason to emphasize that during her studies

as a doctoral student, Ramize Hodzha has developed as a young, talented scientist and researcher, obtaining knowledge not only in the field of biotechnology, but also regarding the use of modern research methods and techniques.

The presented work in terms of relevance and research volume corresponds to the requirements, scientific results and contributions, and the publication activity also fully meets the requirements of the Law for the Development of the Academic Staff of the Republic of Bulgaria and the rules of the Sofia University "St. Kliment Ohridski" for acquiring the educational and scientific degree "Doctor".

Based on this, I will vote positively to award the educational and scientific degree "Doctor" on 5.11. Biotechnology of Ramize Hodzha.

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Sofia, Bulgaria

Author of the statement:  
/ Assoc.Prof. Dr. Valentin Savov/