



OPINION

on a dissertation work for obtaining the scientific degree "**Doctor of Sciences**" in: field of higher education 5. Technical sciences, professional direction 5.13. "General Engineering", scientific specialty "Technology of milk and milk products"

Author of the dissertation: Dr. Chuluunbat Tsend-Ayuush, doctoral student of independent training at the Department of Animal Husbandry Sciences at the Agricultural University, Plovdiv.

Topic of the dissertation labor: Теоретическое и экспериментальное обоснование технологии молочных продуктов функционального питания в условиях Монголии.

Reviewer: Assoc. Dr. Maria Doncheva Doneva-Nikolova, Institute of Cryobiology and Food Technologies-Sofia, field of higher education 5. "Technical sciences", professional direction 5.12. "Food technologies", scientific specialty "Technology of biologically active substances (incl. enzymes, hormones and proteins)", designated as a member of the scientific jury by order No. РД 16-824/13.07.2022 by the Rector of AU Plovdiv .

1. Relevance of the problem.

In recent years, scientific research has been increasing to prove the beneficial effect of probiotic bacteria. The selection of probiotic strains with significant probiotic properties and their inclusion in the composition of products that may have one or more prophylactic purposes is an up-to-date research and applied task.

The dissertation on the topic " Теоретическое и экспериментальное обоснование технологии молочных продуктов функционального питания в условиях Монголии" contains theoretical summaries and solutions to scientific and applied problems that represent an original contribution to science.

The relevance of the topic of the dissertation is also complemented by the fact that, based on the conducted research, technologies for obtaining new healthy probiotic products have been developed.

The dissertation is presented on 266 pages and includes the following sections: introduction, analytical review of literary sources, research objects and methods, results of conducted research, practical application of research results, conclusions and contributions.

2. Purpose, tasks, hypotheses and research methods.

On the basis of the general conclusions from the analytical review of the scientific literature, the goal and the tasks for its realization were determined. The choice of a research methodology is a fundamental element for the

qualitative solution of the scientific problems posed. The methods of research and analysis, described in the third section of the dissertation work, are selected in accordance with the currently set goal and tasks. The procedures for the selection of microorganisms, the nutrient media for cultivation, the various parameters of the investigated processes are described in detail, precisely and thoroughly. Methods and approaches for proving the health properties of strains of lactic acid bacteria are presented.

3. Transparency and presentation of the obtained results.

The obtained results of the research are visualized and shown in a synthesized form with the help of 73 tables and 25 figures. I consider them appropriate, for a more complete and comprehensive presentation of the large volume of information. The visualization approach is balanced and allows discussion of dependencies.

4. Discussion of the results and used literature.

Scientific information was systematized on the dissertation topic, using 257 literary sources. All cited literary sources are in relation to the subject under consideration. The interpretation of the literature used shows thoroughness and knowledge of the problem being developed.

The results of the research, their analysis and discussion occupy a significant part of the dissertation work. They are presented in a structured logical sequence. The data is specified correctly. They are analyzed and interpreted to the extent necessary.

Results of an conducted identification of lactic acid bacteria strains isolated from national dairy products in Mongolia are presented. An effective study of an important problem for science and practice was carried out - the study of the health properties of lactic acid bacteria and the selection of probiotic strains for the development of products with their participation.

The presented results of clinical trials of antihelicobacterial and therapeutic efficacy in the gastrointestinal tract of fermented dairy products are extremely impressive. The beneficial effect of the obtained results is specified in the presented patents and author's certificates.

5. Contributions of the dissertation work.

As a result of the experimental work performed and the presentation of the results, conclusions were formulated, on the basis of which Dr. Chuluunbat Tsend-Ayuush made 6 scientific and scientific-applied contributions. They are formulated correctly and completely follow from the obtained dependencies.

I believe that the mentioned contributions are well-founded, and exactly meet the requirements for new scientific knowledge, as well as useful increase of knowledge in the given scientific field.

An original contribution was the study of the microflora of Mongolian fermented milk products, as a result of which 10 homofermentative probiotic strains of lactic acid bacteria were identified and classified.

Applied contributions are related to the development of starter cultures for products with health effects and the technological parameters for their production. Innovative technology has been implemented for a range of fermented milk products with probiotic properties.

6. Critical Notes and Questions.

In essence, I have no objections to the dissertation work.

7. Published articles and citations.

In connection with the dissertation, 36 scientific publications are presented. 10 have been published in journals that are refereed and indexed in world-renowned databases. The listed publications reflect the main results in the dissertation work. The essence of the work is also reflected in a monograph and two books. Confirmation of the relevance and applicability of the obtained results, as well as the quality of the publications, is their high citation rate - 112 items. The predominant number of citations is in publications referenced and indexed in world-renowned databases with scientific information - 92 issues.

The presented report shows a total of 431 points in Group Г and 960 points in Group Д, which covers the minimum requirements by groups of indicators in professional direction 5.13. "General engineering". The presented abstract reflects objectively the structure and content of the dissertation work.

CONCLUSION:

Based on the various research methods learned and applied by the doctoral student, the correctly performed experiments, the generalizations and conclusions made, I believe that the presented dissertation meets the requirements of the The Law on the Development of the Academic Staff in the Republic of Bulgaria and the Regulations of the Agrarian University for its application, which gives me reason to evaluate it **POSITIVE**.

I allow myself to propose to the honorable Scientific Jury to also vote positively and award Dr. Chuluunbat Tsend-Ayush the scientific degree "**Doctor of Agricultural Sciences**" in the scientific specialty "Technology of milk and dairy products" in scientific field 5. "Technical Sciences" ", professional direction 5.12. "Food Technology"

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Plovdiv

PREPARED THE OPINION
/Assoc. Dr. Maria Doneva/