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РЕЦЕНЗИЯ

по конкурс за заемане на академична длъжност „Доцент“ по 5 „Технически науки“, 5.12. Хранителни технологии, специалност „Технология на биологично активните вещества /включително ензими, хормони, белтъци/“, обявен в ДВ 45/28.05.2021 г. с кандидат гл. ас. д-р Петя Маринова Методиева от Института по криобиология и хранителни технологии, гр. София.

Рецензент проф. д-р Тодор Димитров Димитров, член на Научно жури, утвърдено съгласно заповед № РД05-161/22.07.2021 г. на Председателя на ССА, гр. София.

По обявения конкурс за „Доцент“ за нуждите на ИКХТ гр. София, единствен кандидат е гл. ас. д-р Петя Маринова Методиева.

Представените материали, с които гл. ас. д-р Петя Методиева участва в конкурса по начин на подреждане, обем и съдържание отговарят на изискванията на ЗРАСРБ и ППЗРАСРБ /Правилника за приложение на ЗРАСРБ в ССА/ за провеждане на процедура по обявения конкурс за заемане на академична длъжност „Доцент“.

Представените от гл. ас. Методиева на електронен носител документи, приложения за участия в национални и международни научни или образователни проекти, списъци на публикации и др. отразяват научно-изследователската работа и другите дейности на кандидата.

1. Биографични данни и професионални постижения

Гл. ас. д-р Петя Маринова Методиева е родена на 11.01.1976 г. Средното си образование придобива в Езикова гимназия, гр. Ловеч, профил немски език.

Висшето си образование „Магистър“ получава в СУ „Климент Охридски“, гр. София, квалификация „Европейска интеграция“ през 2001 г.

От 2003 г. до 2011 г. работи в ИКХТ гр. София като младши научен сътрудник, последователно II и III ст., като Ръководител лаборатория „Научна информация и евроинтеграция“. От 02.11.2007 г. е докторант, с научноизследователска тема за разработване „Изследване на основните технологични показатели при получаване на българско кисело мляко от краве, козе и овче мляко“. Получава ОНС „Доктор“ по научна специалност 5.12. „Технология на млякото и млечните продукти“.

От 2011 г. и до момента е гл. асистент в ИКХТ гр. София. До 2019 г. изпълнява длъжността Ръководител сектор „Научна-техническа информация и международно сътрудничество“.

Владее английски и немски езици, четене и писмено отлично, а говоримо на много добро ниво.

Основни дейности и отговорности:

- умее да работи в екип;
- добри презентационни умения и представяне на научни проекти;
- задълбочена аналитична способност и умения за придобиване на нови знания и изучаване на новостите и проблемите в професионалната област в която работи;
- умение за управление на проекти, задачи и ръководство на аналитичен персонал; работи със специализираната апаратура и лабораторното оборудване на института без проблеми.

Отлично владее всички приложни програми на Microsoft Office (Word, Excel и Power Point), специализира софтуер за статистическа обработка SPSS статистика и др.

2. Изпълнение на количествените и качествените показатели на ЗРАСРБ и ППЗРАСРБ на ССА по 5. „Технически науки“, 5.12. „Хранителни технологии“

- показател А – 50 т. за получаване на ОНС „Доктор“ 16.12.2011 г.;

REVIEW

in a competition for the academic position of "Associate Professor" in 5 "Technical Sciences", 5.12. Food technologies, specialty "Technology of biologically active substances /including enzymes, hormones, proteins/", announced in SG 45 / 28.05.2021 with candidate Ch. Assistant Professor Petya Marinova Metodieva, PhD from the Institute of Cryobiology and Food Technology, Sofia.

Reviewer Prof. DSc Todor Dimitrov Dimitrov, member of the Scientific Jury, approved by order RD05-161/22 July 2021 of the Chair of Agricultural Academy - Sofia.

According to the announced competition for "Associate Professor" for the needs of ICFT Sofia, the only candidate is Ch. Assistant Professor Petya Marinova Metodieva, PhD.

The presented materials with which Ch. Assistant Professor Petya Metodieva, PhD participates in the competition in a way of arrangement, volume and content meet the requirements of LDACRB and RILDACRB /Regulations for application of LDACRB in AA/ for conducting a procedure for the announced competition for the academic position of "Associate Professor".

Presented by Ch. Assistant Professor Metodieva on electronic media documents, applications for participation in national and international scientific or educational projects, lists of publications, etc. reflect the research and other activities of the candidate.

1. Biographical data and professional achievements

Ch. Assistant Professor Petya Marinova Metodieva, PhD was born on January 11, 1976. She acquired her secondary education at the Language High School, Lovech, German language profile. She received her Master's degree at Sofia University "Kliment Ohridski", Sofia, qualification, "European Integration" in 2001.

From 2003 to 2011 she worked at the ICFT in Sofia as a junior research associate, successively II and III degree, as Head of the Laboratory "Scientific Information and European Integration". Since November 2, 2007 she has been a PhD student with a research topic for the development of "Study of the main technological indicators in obtaining Bulgarian yogurt from cow, goat and sheep milk". Receives ESD "PhD" in scientific specialty 5.12. "Technology of milk and dairy products".

Since 2011 and until now is Ch. assistant at ICFT, Sofia. Until 2019, she held the position of Head of Sector "Scientific and Technical Information and International Cooperation".

She is fluent in English and German, reading and writing excellent, and speaking at a very good level.

Main activities and responsibilities:

- is able to work in a team;
- good presentation skills and presentation of research projects;
- in-depth analytical ability and skills for acquiring new knowledge and studying the novelties and problems in the professional field in which he works;
- ability to manage projects, tasks and management of analytical staff; works with the specialized equipment and laboratory equipment of the institute without problems.

Excellent knowledge of all Microsoft Office applications (Word, Excel and Power Point), specializes in software for statistical processing SPSS statistics and more.

2. Implementation of the quantitative and qualitative indicators of LDACRB and RILDACRB of AA under 5. "Technical Sciences", 5.12. "Food technologies"

- indicator A - 50 points for receiving ESD "PhD" 16.12.2011;
- sum of indicators B - 121.28 points / required 100 points /, received from the Habilitation Monograph, scientific papers - 10 pcs. / not less than 10 / in publications that are referenced and indexed in world-famous databases with scientific information;

- sum of indicators - 104.66 points in section G 7, as the sum of points is received from 20 pcs. publications in scientific journals that are referenced and indexed in world-famous databases of scientific information.

The remaining amount of G8 points is received from 15 pcs. publications reflected in unreviewed journals with scientific review of your edited collective volumes. Collected papers 12, reports from international conferences and one report from a national conference;

- sum of points D - 108 / required 50 points / Most of the citations are in scientific journals, referenced and indexed in world-famous databases with scientific information;

- sum of points according to indicator E - 40 points.

Ch. Assistant Professor Metodieva, PhD actively participates in national scientific and educational projects, such as "Technology for safe storage of food products" - DCM №577 / 11.09.2018. Assignor MES, Research Fund / 2018 - 2020 /.

- innovative technology for production of lyophilized symbiotic concentrates, with scientific supervisor Prof. Iliana Nacheva;

- Project DN 06/5 16.12.2016, on the topic "Alternative technology for reducing the allergenic and antigenic effect of milk proteins", won in 2016, Research Fund of the Ministry of Education and Science. The project leader is Assoc. Prof. Daniela Miteva, PhD. In this project ch. Assistant Professor Metodieva, PhD is the head of the package "Analysis of the obtained data and dissemination of the results".

According to the requirements of ZRASRB as a reviewer I am obliged to note that the candidate Ch. Assistant Professor Metodieva, PhD exceeds the requirements for acquiring the academic position of "Associate Professor" under 5. "Technical Sciences", 5.12. Food technology.

№	Indicator group	Number of points /national minimum requirements /	Number of points
1.	A	50	50
2.	Б	-	-
3.	B	100	121,28
4.	Г	200	239,85
5.	Д	50	108
6.	E	40	40

3. General characteristics of the research and scientific-applied activity of the candidate

In the announced competition for "Associate Professor", Ch. Assistant Professor Petya Metodieva, PhD participates with 48 scientific publications. Of these, 20 are in publications that are referenced and indexed in world-renowned databases of scientific information, 15 in unreviewed journals with scientific review, 12 in reports published in proceedings of conferences with international participation and one report from a national conference. It makes a good impression that the candidate works and publishes his research papers with a team of researchers, which in some of the papers is in first and second place. It has been proven that modern achievements in science are made by well-selected research teams.

Ch. Assistant Professor Metodieva, PhD has focused her scientific research in two main thematic areas, where the elucidation of some processes in cryobiology is not well understood or there is no data.

3.1. Research in the field of food technology

In this direction, a series of experiments have been carried out, reflected in the scientific publications of the candidate with improving the digestibility of the nutritional composition, obtaining lactic acid drinks based on fermented whey. The influence of the concentration of starter cultures on the

main microbial groups in goat milk kefir was studied. Developments with synthetic concentrates are extremely important, as a modern solution for overcoming dysbiosis, a problem in which the body for a number of reasons is unable to absorb and break down proteins, fats and carbohydrates.

The utilization of raw materials as a waste product and the creation of a milk substitute based on fermented whey has not only an economic effect on calf feeding, but also importance for environmental protection.

3.1.1. Lactic acid drinks based on fermented whey

Variants of lactic acid drinks with the addition of henomeles and chocolate have been developed. The chemical indicators and technological parameters in the production of beverages have been studied. Very low levels of lactose and higher levels of minerals in the drinks have been found compared to milk. This will allow the use of the drinks by children and people allergic to lactose.

The addition of 0.5% stevia and 1.0% fruit concentrate of henomeles enriches the taste and makes it a dietary lactic acid drink.

In the second product "Energy lactic acid drinks with chocolate", the fruit concentrate was replaced by 1.0% natural chocolate.

The addition of 0.5% potassium sorbate provides a long period /45 days / of storage of beverages, without refrigeration.

Based on the obtained results, technological documentation /TD/ has been developed and offered to the milk processing enterprises for use.

3.1.2. Thematic area "Synthetic concentrates - a modern solution for overcoming dysbiosis"

Dysbiosis / dysbacteriosis / is a disease in which there is a qualitative change in the species composition of the normal microflora in the human body.

The problem is directly related to the normal development of microorganisms in the body, the physiological status and the state of the human immune system. The results of the conducted experiments allow to create new symbiotic products useful for the intestinal microflora. "Lactostim" are obtained on the basis of biochemical symbiotic interactions, and the concentrations by freeze-drying. The obtained symbiotic preparations contain active lactic acid microflora, polysaccharides, vitamins, mineral salts and other biologically active substances. The new preparations are characterized by a pronounced probiotic activity, high biological value, which achieves prevention and overcoming of the dysbiotic condition.

3.1.3. Monitoring of some qualitative and biochemical parameters of goat's milk kefir during storage

I highly appreciate the research for obtaining and researching qualitative and biochemical indicators of kefir from goat's milk during storage.

Kefir is a milk drink obtained from the action of a symbiotic complex of lactic acid bacteria and fungi /yeast/ in the decomposition of the physiological and biochemical composition of milk, which produces a product with valuable medicinal properties for the digestive tract, such as gastritis, ulcers, difficulty defecating, etc.

In the study, the data obtained show that at 4°C for 14 days, the product retains its organoleptic properties.

The established data on the physiological and biochemical composition of the fermented product obtained from goat's milk /kefir/ characterize it as a 100% natural product with various health effects. The performed electrophoretic studies and some changes in the casein and whey protein fractions make them easier to digest.

3.1.4. Electrophoretic profiles of fermented probiotic goat milk products

Goat's milk is the closest in composition and properties to breast milk, so it participates in the preparation of adapted milks for infants. Compared to cow's milk, it does not cause allergic reactions, and its small casein micelles allow easier digestion when eating for health problems.

In the presented scientific work the protein profiles of probiotic products from goat's milk are characterized. It was found that all three types of products produced did not show significant differences. The factors storage period and temperature are to a greater extent decisive for the change of the protein substances in the studied groups.

3.1.5. Study of the effect of low doses of gamma radiation on certain foods

The food industry is increasingly demanding modern technologies for processing, storage and production of safe food products of plant and animal origin. Irradiation of food products is also perceived as a safe technology to reduce the risk of food spoilage and is an element of technology for high quality products. When using methods of mathematical modeling, a mathematical model has been established by which the optimal parameters of irradiation of buffalo meat are established, in order to preserve the physicochemical, technological, microbiological and organoleptic parameters of the treated samples during storage. The results of the study show that the model of irradiation with a dose of 4 kGy in refrigerated storage of - 4°C is most suitable for maintaining the quality of the studied buffalo meat.

Studies have been performed on the effect of low doses of gamma radiation on white brined buffalo milk cheese. The effect of gamma sterilization on the natural microflora of white brined buffalo milk cheese was studied. Two low radiation doses of 1 and 2 kGy were administered. An organoleptic evaluation was performed after irradiation and changes in the microbiological status of the product during storage for a period of 10 weeks were monitored. The results show that irradiation with low doses of gamma rays (1 and 2 kGy) does not cause unwanted changes in the sensory characteristics and leads to a reduction of the total number of microorganisms in the order of one logarithm, less pronounced at higher doses. The dose of 1 kGy is not sufficient to destroy mold and yeast spores.

3.1.6. Influence of gamma rays to reduce the allergenic effect of milk proteins

Allergic intolerance to milk proteins in children and adults is a serious problem. The results obtained in the present study by gamma irradiation show a change in some nutrients, including protein. Studies show that low-dose ionizing radiation in dairy products destroys the epitopes of proteins, reducing their allergic effect without affecting sensory and taste characteristics. It has been found that the success of the irradiation effect depends on the process conditions. It is necessary to study the effects of antigenicity and allergy of milk proteins.

The research is subject to current trends in obtaining new data, scientific knowledge and technology transfer.

3.2. Cryobiology and lyophilization

In recent years, freeze-drying has become a modern biotechnological solution in the production of healthy probiotic products. Examples in this regard are the production of special purpose foods, space foods, starter crops and others. With the development of new technologies, it meets the requirements of the market for a greater variety of food products.

3.2.1. Influence of freezing rate on the survival of lactic acid bacteria

Lactic acid bacteria are used as starter crops for the production of cheese, fermented milk, bakery and meat products produced by various parameters of the technology of freezing and drying. The resistance of lactic acid bacteria to freezing is different and depends on the strain, the symbiotic interaction of the strains (whether they like each other), the conditions to which the pH will be affected in the bioreactor, the concentration and type of cryoprotectant.

The results of the study conducted in this scientific experiment show that the studied strains have the highest survival in shock freezing by immersion in liquid nitrogen up to 53% in samples without a protective medium. The inclusion of protective agents increases the survival of *Lactobacillus bulgaricus* to 70% and *Streptococcus thermophilus* to 80%. The use of chitizan as a cryoprotectant significantly increases the survival of the studied strains.

3.2.2. Symbiotic concentrates - modern solutions for overcoming dysbiosis

The obtained new modified foods from the Lactostim series are quality long-lasting products with high biological value, determined by the content of milk proteins, free amino acid peptides, plant fibers, etc. High survival of the obtained cultures after lyophilization was achieved. Before lyophilization 2.5×10^9 , and after 4.5×10^6 , ie. 71% live active cells, due to the pectin used as an effective cryoprotectant.

3.2.3. Application of cryobiology for development of lyophilized polyenzyme complexes

Decreased production of digestive enzymes leads to changes in gastrointestinal metabolism. This requires the intake of polyenzyme products as food supplements. Created on the basis of lyophilized complex food enzymes /chymosin, amylase, bromelain, lipase/ included in hydrocolloid matrices in combination with plant active ingredients is suitable for the prevention of discomfort in the gastrointestinal tract. The resulting product retains the catalytic activity of the enzymatic substances and the chemical composition of the included components.

3.2.4. Innovative technologies for creating probiotic foods

Lyophilized probiotic products have been created through high-tech methods for food prophylaxis and healthy eating to ensure maximum performance. The composition includes natural sources of basic bioelements and physiologically active substances - a complex of lactic acid bacteria, oligosaccharides, antioxidants, vitamins and others. It has been proven that their health effect makes them suitable for inclusion in combined diets.

The presented habilitation extended reference for the scientific results, decisions and conclusions to ch. Assistant Professor Petya Marinova Metodieva, PhD in 5 "Technical Sciences", 5.12. Food Technology has been developed with skill, with maximum insight and understanding of the researched problems and I highly appreciate it.

4. Main contributions

I accept the author's reference for the research activity, reflected in the scientific works of the candidate categorized by directions.

1. Direction cryobiology and lyophilization

1.1. Original scientific contributions

Publications (G₈₋₁₂; G₈₋₂₀; G₈₋₂₂; G₈₋₁₈; G₈₋₂) in which the mechanism of lyo- and cryoprotection of different in structure and structural features, natural and synthetic hydrocolloids during freezing and lyophilization of certain strains is proved. Lactic acid bacteria. Biopolymers have been shown to act on microbial cells as a protector. It has been experimentally proven that when freezing lactic acid bacterial cell suspensions at high cooling rates in liquid nitrogen, their survival is highest (72-80%). The reliability of cryopreservation as a technology for obtaining stable enzyme products has been proven (B₄₋₂; G₈₋₁₈; G₈₋₂).

1.2. Scientific and applied contributions with elements of originality

A technology has been developed, including immobilization of biological systems and hydrocolloid matrices, freezing and subsequent lyophilization. This approach has been applied to a variety of formulas and the production of functional foods (G₈₋₁₇; G₈₋₂₄). Qualitatively new in composition and technology, lyophilized foods for healthy and prophylactic nutrition have been created (G₈₋₁₁; G₈₋₁₆; G₈₋₂₂; G₈₋₂₈). A new polyenzyme product has been created with included digestive enzymes and purified biologically active substances, providing a positive effect in case of indigestion (B₄₋₂) and others.

2. Food technology

Original biotechnological solutions were used to obtain functional lyophilized dairy and meat-based foods for specialized and prophylactic nutrition with the inclusion of biologically active components in the composition of novel foods. Radiation technologies / gamma irradiation / have been used to increase the quality, safety and extend the shelf life. Innovative computer methods have been applied, the composition of probiotic dairy products has been formulated.

Due to the limited scope of the review, contributions will be marked by importance and significance.

2.1. Scientific contributions

- the technological parameters of kefir from goat's milk have been experimentally established- initial concentration of the starter culture and duration of fermentation (G₇₋₃; G₇₋₆);
- the applicability of lyophilization for the production of high quality functional foods, preservation of the viability of the beneficial microflora during the process and during long-term storage has been confirmed (G₈₋₁₁; G₈₋₁₆; G₈₋₂₀).
- the possibilities of artificial intelligence in solving scientific and applied problems in the food industry are proven (B₄₋₁; B₄₋₄).

2.1.2. Scientific and applied contributions

- a recipe formula for lactic acid drinks based on whey enriched with helomenos fruit concentrate has been developed. It has been proven that the technological processing does not change the fatty acid composition of the raw materials (B₄₋₈);
- Fermented probiotic products based on goat's milk have been developed by introducing additional strains to the classic yeast (G₇₋₃; G₇₋₅; G₇₋₈; G₇₋₁₀; G₈₋₁; G₈₋₆);
- a technology for granulation of functional products on a lactic acid basis has been developed, for obtaining homogeneous particles, which improves their solubility (G₈₋₂₁);
- the production of a new range of meat foods for specialized nutrition through developed technology for tenderization of turkey and buffalo meat by plant proteolytic enzymes / bromelain and papain / is a novelty with an element of originality (G₇₋₁₉; B₄₋₇; G₇₋₄; G_{8-23, 25});

- for the first time in Bulgaria an innovative model of artificial neural network /ANN/ and adaptive neural interface system /ANFIS / has been applied for programming the product composition of a new series of functional probiotic products. Based on them and a survey, new healthy dairy products with a balanced composition have been developed. (B₄₋₄; B₄₋₅; G₈₋₈).

The innovative data received from the candidate, for the achievement of which he has consulted with the scientific works and achievements of the most authoritative Bulgarian and international scientists in the field of dairy and functional food science. . As a result of good awareness, the candidate is cited in 10 scientific journals, which are referenced and indexed in a database of scientific information.

5. Significance of contributions to science and practice.

The presented scientific results and contributions of the candidate are of great importance for science. The research focus is on developing innovative moments for the processes and technologies in the dairy and food industries. They are essential for the management of fermentation technologies, the introduction of freezing and freeze-drying for the production and preservation of food products.

Significant are the scientific contributions to the creation of new technologies for fermented milk drinks obtained by kefir and symbiotic starter cultures, the use of computer neural networks, etc.

7. Critical remarks and recommendations

I do not have critical remarks and recommendations to the presented scientific production and author's reference for the contributions from the presented scientific works..

8. Personal impressions

I know Ch. Assistant Professor Petya Metodieva from the moment he entered as a doctoral student, as well as from the contacts during the development and defense of the doctoral dissertation. Our contacts deepened during our participation in scientific sessions, conferences, juries for obtaining scientific degrees, academic procedures, etc. This gives me reason to be objective in assessing the qualities of the candidate as a researcher. Thorough and very well prepared in the scientific field in which he works. Extremely responsive and friendly in her relationship with people and colleagues.

Conclusion

The presented materials and documents from Ch. Assistant Professor Petya Metodieva as volume, content and quantity meet all the requirements of the LDACRB and RILDACRB of AA. The scientific papers with which he applied were published after acquiring the academic position of "Chief Assistant". In the works of the candidate there are significant original scientific and scientific-applied contributions, which have gained popularity in scientific journals, published in refereed and indexed scientific journals and collections.

After getting acquainted with the presented scientific papers, analysis of their significance, content and contributions, with full conviction I propose to the respected Scientific Jury to vote on Ch. Assistant Professor Petya Metodieva to be elected and hold the academic position of "Associate Professor" at ICFT, Sofia, scientific field 5 "Technical Sciences", professional field 5.12. "Food technology", specialty "Technology of biologically active substances/ including enzymes, hormones, proteins".

23.08.2021 г.
Stara Zagora

Заличено на основание 33ЛД

Reviewer:
/Prof. Todor Dimitrov, DSc/