

РЕЗЮМЕТА НА НАУЧНИТЕ ТРУДОВЕ

НА ГЛ. АС. Д-Р МАРИЯ ДОНЕВА

представени за участие в конкурс за заемане на академичната длъжност „доцент” по ш. 5. Технически науки, професионално направление 5.12. Хранителни технологии, научна специалност „Технология на биологично активните вещества (вкл. ензими, хормони, белтъчини)“ обявен от Институтът по криобиология и хранителни технологии - София, в ДВ бр. 51 /27.06.2017 г.

Б. НАУЧНИ ПУБЛИКАЦИИ, ПРЕДСТАВЕНИ ЗА УЧАСТИЕ В КОНКУРСА ЗА АКАДЕМИЧНАТА ДЛЪЖНОСТ "ДОЦЕНТ"

ПУБЛИКАЦИИ В МЕЖДУНАРОДНИ СПИСАНИЯ С IF ИЛИ SJR

1. Dyankova, S. & **Doneva, M.**, 2009. Analysis of oxycellulose obtained by partial oxidation with different reagents. *Bulgarian Chemical Communications*, 41(4), pp. 391-396.

IF₂₀₀₉ = 0,156

Abstract: The object of the present work was to study the possibilities for activating of dressings of cellulose and synthetic fibre by a partial oxidation with sodium hypochlorite, hydrogen peroxide and sodium periodate and to investigate the effect of the reaction parameters on the quantitative content of aldehyde groups in the obtained product. Textile dressings of cellulose and synthetic fiber were treated with oxidizing solutions of sodium hypochlorite, hydrogen peroxide and sodium periodate with an aim to modify the material and form aldehyde groups in the cellulose molecule. The highest values of the copper number and content of aldehyde groups indexes were obtained for pure cellulose treated with sodium periodate solutions. The obtained textile materials could be used as carriers for immobilization of proteolytic enzymes to achieve a biologically active dressing.

2. Todorov, Y., Nacheva, I., Metodieva, P., **Doneva, M.**, & Tsvetkov, T., 2013. Soft computing applications in food technology. *Bulgarian Journal of Agricultural Science*, 19(3), pp. 503-507.

SJR₂₀₁₃ = 0,174

Abstract: This paper describes the potentials of the application of modern soft computing techniques into development stage of contemporary food products. Recently, soft computing has been extensively studied and applied for scientific research and engineering purposes. In biological and food engineering, researchers have developed methods of fuzzy logic, artificial neural networks, genetic algorithms, decision trees,

and support vector machines to study complex characteristics of many products in order to be adopted cost effective measures satisfying the production constraints and consumer expectations.

3. **Doneva, M.**, Nacheva, I., Metodieva, P., Todorov, Y., Miteva, D., Georgieva, L., & Tsvetkov, T., 2014. Application of cryobiotechnologies for development of lyophilized polyenzyme complexes. *Bulgarian Journal of Agricultural Science*, 20(6), pp. 1401-1405.

SJR₂₀₁₄ = 0,197

Abstract: Good nutrition is key factor for human health. Conditions of secondary insufficiency of the gastric gland and a decreased production of digestive enzymes lead to changes in the gastric-intestinal metabolism, which imposes the intake polyenzyme products as food supplement. The created on the basis of freeze-drying complex polyenzyme product with its composition, containing the main groups digestive enzymes (chymosin, α – amylase, bromelain, lipase), incorporated in a hydrocolloid matrix and in combination with plant biologically active components is appropriate for prophylaxis in cases of gastric-intestinal tract discomfort and disturbed digestion. The obtained product was qualified by organoleptic, biochemical, physical-chemical and microbiological characteristics. The retaining of the catalytic activity of the enzyme substances and the chemical composition of the incorporated biologically active substances has been established.

4. Dyankova, S., **Doneva, M.** & Ts. Tsvetkov, 2., 2014. Validation of Radiation Sterilization Dose For Proteases Immobilized On Aldehyde-Containing Textile Carriers. *IOSR Journal of Pharmacy*, 4(10), pp. 63-68.

IF₂₀₁₄ = 1,448

Abstract: The main objective of this work is to establish the parameters of radiation sterilization for three proteolytic enzymes (papain, trypsin and subtilisin) immobilized on aldehyde-containing textile carriers in terms of the development of new biomaterials – wound dressings with debridement effect. This paper describes the steps taken to validate a low dose sterilization process by following the Method 2A defined in ISO 11137. The content of aldehyde groups in the used modified cellulose carriers is 0.798 ± 0.002 mmol/g. After immobilization and freeze-drying of the respective enzyme, all experimental variants demonstrated proteolytic activity in the following ranges: Variant 1 (immobilized papain) - 47.64 ± 1.73 U/g; Variant 2 (immobilized trypsin) - 84.57 ± 1.45 U/g; Variant 3 (immobilized subtilisin) - 55.53 ± 3.46 U/g. The obtained results for enzyme activity made it possible to determine the dose of 30 kGy as the maximum acceptable dose for all experimental variants biomaterials. The minimal doses necessary

to achieve sterilization at SAL of 10^{-6} are respectively: variant 1 (immobilized papain) - 16.0 kGy; variant 2 (immobilized trypsin) - 15.2 kGy and variant 3 (immobilized subtilisin) - 12.1 kGy. These low terminal doses provide effective bactericidal coverage and very likely have minimal impact on the properties of the biomaterials. For all three variants the proteolytic activity remains above 90% of the initial value.

5. Miteva, D., Dimov, K., Nacheva, I., Todorov, Y., **Doneva, M.**, & Metodieva, P., 2014. Modern Technological Approaches for Ensuring of Harmless and Quality Fruits. *Bulgarian Journal of Agricultural Science*, 20(2), pp. 17-19.

SJR₂₀₁₄ = 0,197

Abstract: The problem of the rational use of the food sources and their long-term preservation is of particular importance. Modern technologies offer a solution of this problem by applying of new methods for fruits preservation. Gamma sterilization is identified as a safe technology for reducing the risk of spoilage and prolongation of the storage term. It has been proved that the low irradiation doses are appropriate for fruits processing, which is a prerequisite for obtaining of high quality produce. In the present study was investigated the effect of the irradiation with low gamma ray doses (2.5÷3.5 κGy) on the chemical and microbiological characteristics of fruits not subject to long-term storage. By irradiation of packed strawberries and raspberries with 2.5 κGy dose the refrigerated storage term is prolonged with 12÷13 days, which is of substantial importance for preserving of their quality characteristics.

6. Nacheva, I., **Doneva, M.**, Todorov, Y., Metodieva, P., Miteva, D., Dimov, K., & Tsvetkov, T., 2014. Innovative technologies for creation of probiotic foods. *Bulgarian Journal of Agricultural Science*, 20(4), pp. 830-833.

SJR₂₀₁₄ = 0,197

Abstract: Lyophilized probiotic products have been developed by high technology methods for nutrition prophylaxis and healthy nutrition to ensure a maximum working capacity and well-being of each individual. In their composition are included natural sources of essential bioelements and physiologically active substances – a complex of probiotic lactic acid bacteria, oligosaccharides, antioxidants, vitamins and others. Their fine consistency and chemical composition create a possibility for rhythmical introduction in the organism of nutritious mixtures with adequate content of plastic substances and energy. Their proved healthy effect makes them suitable to be included in combined nutrition diets for ensuring of better quality of life in terms of the effective prevention and improvement of the health status of the population.

7. Miteva, D., Dimov, K., Nacheva, I., Todorov, Y., **Doneva, M.**, Metodieva, P., & Tsvetkov, T., 2015. Prolongation of the Storage and Quality Preservation of Potato Semi-Finished Foods by Specific Technological Treatment. *Bulgarian Journal of Agricultural Science*, 21(1), pp. 174-178.

SJR₂₀₁₅ = 0,229

Abstract: In the food industry are applied modern methods for processing and storage of products of animal and plant origin. In contrast to the past when more attention was paid to productivity, now the requirements are moving towards searching of technologies which guarantee the obtaining as end product of foods with high purity and preserved nutritious value. One of the approved technologies in this field is the gamma-ray sterilization, the so called cold sterilization. According to many years researches of IAAE and FAO the consumption of foods irradiated with doses up to 10 kGy is absolutely harmless for the human organism. During the study was investigated the effect of gamma irradiation on potato semi-finished foods. The samples were irradiated a single time with doses 100, 150 and 200 Gy. They were stored at temperature 0-4°C for three months term and prolongation of the preservation of the irradiated samples with 30 days was established. The results have shown that the applying of the traditional technology is an appropriate method for obtaining of harmless and with preserved taste qualities foods.

8. Dyankova, S., **Doneva, M.**, Todorov, Y. & Terziyska, M., 2016. Determination of particle size distribution and analysis of a natural food supplement on pectin base. *IOSR Journal Of Pharmacy*, 6(5), pp. 1-8.

IF₂₀₁₆ = 1,448

Abstract: The pectin is among the most studied soluble dietary fiber with cholesterol lowering properties. The major difficulty in its use is the slow dissolution and the lumps formation when placed in water. The main objective of this research is through technological methods to achieve a more rapid and complete dissolution of high-esterified citrus pectin in water. The method used is wet granulation with different granulation liquids (sucrose solution, distilled water and water-ethanol mixtures) and the resulting variant granules are tested for particle size distribution, solubility and hydration rate. Granulation of high-methoxyl citrus pectin improves its dissolution in water in comparison with the powder pectin. Also, the hydration rate at the 300th s is greater than 90% with the granulated pectin and only 54% with non-granulated. Among the obtained five variants of granules, the best results are observed in the variant, granulated with 40% (v/v) ethanol. The analysis of the size and distribution of the particles reports the least scattering of the results during the variants granulated with

25% and 40% ethanol, which corresponds to the highest degree of uniformity of the granules.

ПУБЛИКАЦИИ В РЕФЕРИРАНИ СПИСАНИЯ

9. Metodieva, P., **Doneva, M.**, 2010. Study of the effect of storage temperature and time on main quality characteristics of cow, goat and sheep yogurt. *Journal of Mountain Agriculture on the Balkans*, 13(5), pp. 1078-1085.

Abstract: The effect of storage temperature on main quality characteristics of cow, goat and sheep yogurt was studied. Generalized results from the conducted studies showed that for a period of 14 – 21 days, total titratable acidity of the three types of yogurt decreased, and variation in active acidity pH was nonsignificant. It was found that the storage for 24 h – 21 days and the temperature increase of 5 – 15°C resulted in a change in the ratio between *Lb. Bulgaricus* and *Str. Thermophilus*.

10. Dyankova, S., **Doneva, M.** & Metodieva, P., 2011. Obtaining and characterization of collagen from by-products of the meat processing and leather industries. *Journal of Mountain Agriculture on the Balkans*, 14(3), pp. 451-466.

Abstract: Opportunities for optimization in the technology for production of collagen from waste products of the meat processing and leather industry were investigated.

Swine skin and calf Achilles tendons were used as feedstock. From 1 kg of lyophilized feedstock the following output was obtained: from swine skin –15 to 18 kg of collagen dispersion, and from calf Achilles tendon – 26 kg. The usage of calf tendons provides not only a higher yield, but also the obtaining of a product with less impurity.

When the two types of collagen dispersion were freeze-dried, microporous blocks and sponges, characterized with significant absorption capacity, low percentage of residual lipids and high hydroxyproline (respectively collagen) content, were obtained.

11. **Doneva, M.**, Dyankova, S. & Solak, A., 2012. Enzymatic hydrolysis of collagenous raw materials from different sources (by-products from meat and leather industry). *Journal of Mountain Agriculture on the Balkans*, 15(4), pp. 743-758.

Abstract: The ways to optimize the process of enzymatic treatment of animal material (cuttings from pig skin) were studied in order to obtain the well purified soluble collagen. The extent of enzymatic hydrolysis of native and thermally denatured lyophilized pig skin under the influence of three types of proteases (trypsin, alkaline protease and pancreatin) was examined.

The analysis of the relationship between the amount of released amino acids and hydroxyproline showed that until the 120th min of the enzymatic reaction mainly the non-collagen proteins in the material and the telopeptides are being hydrolyzed, while the essential parts of the tropocollagen molecule are hardly affected. Enzymatic hydrolysis is an appropriate method of obtaining collagen and collagen hydrolysates. Best results in the collagen dispersion and the final collagen product were observed after enzymatic hydrolysis with pancreatin. The percentage of protein in the dispersion obtained with this enzyme complex is the highest and the lipid content - the lowest.

12. Solak, A., Dyankova, S. & **Doneva, M.**, 2012. Technology for production of edible coatings for meat and meat products. *Journal of Mountain Agriculture on the Balkans*, 15(4), pp. 778-793.

Abstract: A technology was developed for producing of biopolymer films as novel edible coatings for meat and meat products. As film-forming source materials were used collagen, gelatin, sodium alginate and pectin. The produced experimental series showed good structural-mechanical characteristics. For the protein films, were established values of tensile strength (TS) – 7.44 MPa (collagen) and 19.08 MPa (gelatin). The obtained results for elongation at breakage (E) varied from 27.35% to 173.35%. For the alginate films TS was 18.26 MPa and E – 81.80%. The adding of plant extracts in concentration up to 10% did not affect significantly the mechanical properties of the materials. The end products of the proposed technology are a good basis for incorporating of antimicrobial and antioxidant substances of plant origin or other natural functional ingredients which can increase the nutrient value and improve the quality of the foods packed in them.

13. Nacheva, I., **Doneva, M.**, Miteva, D. & Metodieva, P., 2013. Survival of lactic acid bacteria after lyophilization using new cryoprotective media. *Journal of Mountain Agriculture on the Balkans*, 16(2), pp. 404-417.

Abstract: The survival of strains *Lactobacillus delbrueckii ssp. bulgaricus* 1381 and *Lactobacillus casei ssp. casei* 1014 after freezing and freeze drying in an installation with contact plates heating was investigated. The optimal process parameters were determined by applying of differential thermal analysis (DTA). As cryoprotective media were used solutions of saccharose, pectin, guar gum and chitosan. A high survival was achieved for both strains after freezing and lyophilization with their inclusion in the hydrocolloid solutions, and the highest percentage was determined for the variant with chitosan as protective agent. The obtained results are of great importance for the applied scientific research for creation of healthy lyophilized foods with high content of viable bacteria with probiotic properties.

14. Dimov, K., Miteva, D., Nacheva, I., **Doneva, M.**, Metodieva, P., & Valchkov, A., 2014. Using of innovative technologies for improvement of the quality of animal produce during preservation. *Journal of Mountain Agriculture on the Balkans*, 17(4), pp. 816-833.

Abstract: In the food industry are applied modern technologies for processing, preservation and obtaining of safe for the health foods of plant and animal origin. The irradiation of foods is also identified as a safe technology for reducing the risk of food spoilage, being in such a way an element for production of high quality production, processing and preparation. The objective of the present study was by the method of mathematical modeling to propose a mathematical model by which to be determined the optimum parameters of irradiation of buffalo meat with the task to preserve the physical-chemical, technological, microbiological and organoleptic characteristics of the treated samples during their preservation. The irradiation of the buffalo meat was carried out in a gamma-ray installation Gamma 1`300, charged with radionuclide Cs-137, at power of the dose 1,5 kGy/min. Two regimes of refrigerated storage were used – (-4°C) and (-18°C) for a term of 9 months. The trial samples were divided into 6 groups depending on the irradiation dose – 4 and 8 kGy and the regime of refrigerated storage. The results show that the irradiation model with a dose of 4 kGy during refrigerated storage at (-4°C) is most favorable for preserving of the quality of the studied characteristics.

15. **Doneva, M.**, Nacheva, I., Metodieva, P., Miteva, D., & Dimov, K., 2014. Stabilizing effect of the xanthan biopolymer on the survivability of strains lactic acid bacteria in model conditions of gastrointestinal tract. *Journal of Mountain Agriculture on the Balkans*, 17(4), pp. 834-848.

Abstract: The ability of lactic acid bacteria strains to survive and to maintain their viability in the gastrointestinal tract is one of the basic characteristics and requirements for the probiotic properties. The effect of the xanthan biopolymer on the survivability of strains *Lactobacillus delbrueckii ssp. bulgaricus* 1381, *Lactobacillus casei ssp. casei* 1014 in model conditions of gastrointestinal tract was investigated. Experimentally were simulated in consequence the conditions in the stomach and the intestines by changing of the pH value – pH 2 with included pepsin and pH 7 with included pancreatin. The immobilization of the lactic acid bacteria in a xanthan matrix contributes to their higher survivability when treated with low and neutral pH values compared to the free cells of both strains. The inclusion of lactic acid bacteria in hydrocolloid gel increases their probiotic value and expands the possibilities for their application in the production of fermented dairy products.

16. Nacheva, I., **Doneva, M.**, Metodieva, P., Miteva, D., Dimov, K., 2014. Cryobiotechnological approaches to the formulation of a new range lyophilized foods with functional purpose. *Journal of Mountain Agriculture on the Balkans*, 17(4), pp. 889-904.

Abstract: In the article are presented scientific results from carried out cryobiological, physical-chemical, microbiological investigations related to the creation of new, lyophilized bioproducts with functional purpose. The using of modern cryobiotechnological approaches – immobilization, fermentation, cryoprotection and lyophilization in the process of formulation and development of the new foods guarantees their high quality and biological full value. In the composition of the obtained lyophilized symbiotic concentrates are included various sources of nutrients and of biologically active substances – probiotic complex of active lactic acid bacteria, polysaccharides, fruits, grain ingredients, bee products, antocyanes, plant oils and others. By their optimum combination in the composition of the new functional foods a high summary physiological effect has been achieved.

17. Dyankova, S. & **Doneva, M.**, 2016. Extraction and characterization of anthocyanin colorants from plant sources. *Agricultural Science and Technology*, 8(1), pp. 85-89.

Abstract: Natural pigments (and especially those of anthocyanins) are a valuable source of bioactive compounds and may be used in the production of new functional food ingredients. Furthermore, their applications in the treatment and prevention of chronic disorders are becoming more and more widespread. In the last few years consumers have focused their attention on the natural biologically active compounds as functional food ingredients, and therefore, it may be assumed that natural colorants are an alternative source of synthetic additives.

The aim of the study was to determine the quantitative content of monomeric anthocyanin pigments in extracts obtained from eight plants. The total content of monomeric anthocyanin pigments was measured by a pH-differential method.

The TLC analysis of the pigment extracts from the different plants showed intensive rose, red and violet stripes corresponding to the anthocyanin content. The extracts from chicory and lavender petals were unstable and their color decreased in intensity in 1 month.

The analysis of the experimental data shows that the yield of pigment substances depends on a few factors: the type of plant, the preliminary treatment of the plant and the solvent that is used. The largest quantity of extracted substances in the studied plants were isolated from chokeberry (2 195.9 cyd eq mg/l), followed by blackberry (1 466.2 cyd eq mg/l) and one variety of the grapes (1 199.3 cyd eq mg/l). In the case of

chokeberry, the pigment content included a large number of anthocyanins and the combination of these components was the reason for the deep red/violet color of the extract. Fresh or frozen materials are the most suitable for extraction of anthocyanin pigments. On the whole, fruit pulp yielded a larger quantity of pigments than juice.

Anthocyanins are water-soluble compounds and for that reason, their isolation requires water and other polar solvents. Better stabilization of color is obtained by a slight acidification of the solvent with diluted hydrochloric acid. Due to the high content of organic acids in fruits, this effect is attained in a natural way.

18. **Doneva, M.**, Miteva, D., Dyankova, S., Nacheva, I., Metodieva, P., & Dimov, K., 2015. Efficiency of Plant Proteases Bromelain and Papain on Turkey Meat Tenderness. *Biotechnology in Animal Husbandry*, 31(3), pp. 407-413.

Abstract: The main subject of study is the effect the plant proteases bromelain and papain exert on turkey meat tenderness. Experiments are conducted with samples of raw meat in 3 different concentration levels of the enzyme solutions (50U/ml 100U/ml and 200 U/ml) and in 3 different time periods (duration) of treatment (24 h, 48 h, 72h). An increase in enzyme concentration and treatment duration results in a higher degree of protein hydrolysis in the turkey meat. The optimal conditions for hydrolysis with minimal loss of protein and highest retention of organoleptic qualities of the meat samples are established.

19. **Doneva, M.**, Dyankova, S., Miteva, D. & Metodieva, P., 2016. Tenderization effect of plant proteases bromelain and papain on buffalo meat. *Journal of Mountain Agriculture on the Balkans*, 19(3), pp. 28-41.

Abstract: Tenderness is one of the most important flavor characteristics of the meat. The aim of this study is to investigate tenderization effect of plant proteases bromelain and papain on buffalo meat. Experiments are conducted with samples of raw meat in 3 different concentration levels of the enzyme solutions (50U/ml 100U/ml and 200 U/ml) and in 3 different time periods (duration) of treatment (24 h, 48 h, 72h). Upon treatment with solutions of 50 U/ml and 100 U/ml caseinolytic activity, the water retention rate is higher, while the degree of hydrolysis is lower. The processing of buffalo meat with papain preserves higher level native texture, color and moisture of fresh meat compared to variants tenderized with bromelain. The optimal conditions for hydrolysis with minimal loss of protein and highest retention of organoleptic qualities of the meat samples are established.

20. Dyankova, S., **Doneva, M.**, Solak, A. & Metodieva, P., 2016. Extraction and characterization of carotenoid pigments from plant sources. *Journal of Mountain Agriculture on the Balkans*, 19(2), pp. 286-299.

Abstract: The discovery of numerous health problems with the use of synthetic colorants (including carcinogenicity and chronic toxicity) led to renewed interest in natural pigments derived from different sources (plants, fungi, microorganisms and animals).

The aim of the study was to obtain and characterize pigment extracts rich in carotenoids from 4 plant sources - carrot, tomato, red pepper and pumpkin. Three versions of each type of raw material were tested: fresh, freeze-dried and dried in a conventional dryer. As solvents were used isopropanol, 90% acetone and heptane. The highest content of total carotenoids was obtained from dried red pepper after extraction with heptane - 246,65 mg/l, followed by freeze-dried pumpkin and carrot in isopropanol solvent, 74,50 mg/l and 35,20 mg/l respectively. In tomato variety "Bella", the highest yield was obtained from freeze-dried material and solvent 90% acetone - 21,95 mg/l. The fresh raw materials are not suitable for extraction of pigments. In general, the lyophilized samples give a higher yield, except red pepper, wherein the best results are obtained after conventional drying.

21. Nacheva, I., Loginovska, K., Metodieva, P. & **Doneva, M.**, 2016. The effect of starter culture concentration on the basic microbiotic groups in goat milk kefir. *Journal of Mountain Agriculture on the Balkans*, 19(1), pp. 15-25.

Abstract: The authors present data from bio fermentation experiments to obtain a fermented milk product (kefir) of goat milk with different concentration of starter kefir grain culture (1, 2 and 5%). The main technological parameters of the fermentation process are recorded throughout the experiment: the active acidity, titratable acidity and the duration of the fermentation process. During the study was investigated the dynamics of development and survival of existing microflora in the kefir and the ratio of the various microbial groups in the process of storing up to 21 days. Post analysis we established that the 2% kefir starting culture is the variant with the best ratio between the quantity of the kefir grains used for fermentation and the microflora parameters in the process of storage.

22. **Doneva, M.**, S. Dyankova, D. Miteva, P. Metodieva, & I. Nacheva, 2017. The electrophoretic patterns of turkey and buffalo meat. *Journal of Mountain Agriculture on the Balkans*, vol 20 (1) 18-29.

Abstract: Of all range quality indicators of meat, consumers define tenderness as one of the most important factors. In recent years, treatment with exogenous proteolytic enzymes are becoming a very popular method of meat tenderization. The aim of this study is to

assesses the potential impact of the application of plant proteases bromelain and papain on the electrophoretic patterns of turkey and buffalo meat. Experiments are conducted with samples of raw turkey and buffalo meat at three variants concentrations of enzyme solution (50U/ml 100U/ml and 200 U/ml) and in three different times of treatment (24h, 48h, 72h). Electrophoresis in polyacrylamide gel (SDS-PAGE) is performed with the control samples and tenderized meat samples. In all enzyme treated samples establishes a change in the type and number of protein bands relative to controls. A cleavage of high molecular weight proteins is observed, which leads to increase the fractions with higher electrophoretic mobility.

23. **Doneva, M.,** P. Metodieva, I. Nacheva, , & K. Loginovska, 2017. Study of the effects of different temperature regimes on basic physical and chemical parameters of fermented probiotic products from goat milk. *Journal of Mountain Agriculture on the Balkans*, vol 20 (1), 10-17.

Abstract: The basic requirements for probiotics as nutritional and dietary product related primarily to the taste, texture, durability and microbial content. Prolonged storage causes inevitable changes in the composition of the probiotic products. In the present study is detected the effect at three temperature regimes (5, 10 and 15°C) on the parameters - organoleptic assessment, active and titratable acidity, total protein and syneresis of fermented products of probiotic goat milk during storage. The obtained experimental results define the optimal conditions for receiving probiotic products with good flavor receptivity, maximum reserved qualitative parameters and high biological value.

ПУБЛИКАЦИИ В СПИСАНИЯ, КОИТО НЕ СЕ РЕФЕРИРАТ

24. Terziyska, M., Todorov, Y., Nacheva, I., Doneva, M., & Metodieva, P., 2015. Analysis of the particle distribution in granular functional food. *Journal of Technical University, branch Plovdiv, "Fundamental Sciences and Applications"*, 21(1), 361-366

Abstract: In this paper an analysis of the particles distribution in novel granular functional food by using a laser of particle analyzer ANALYSETTE 22 NanoTec plus is studied. The main objective of the investigation is to evaluate the influence of a varying ingredient in the product on its granular distribution. A future work on the basis of the obtained results will be the assessment of the influence of the particle distribution on various physical parameters of the product composition using intelligent modeling techniques.

25. Todorov, Y., Nacheva, I., **Doneva, M.**, & Metodieva, P., 2012. An innovative complex approach for formulation of the content of yoghurt varieties. *Jubilee X International Scientific conference "Management and Engineering 12"*, 1, 450-457.

Abstract: This paper focuses on the potentials of innovative methods based on neural networks, for formulation of the content of yoghurt varieties. A complex socio-economical approach must be adopted at first in order to be identified the consumer needs and expectations, followed by technological experiments and mathematical procedures. The major purpose of the applied methods is to adapt the content of a well known products to the latest tendencies of the healthy nutrition, respecting the consumer profiles and the current market needs.

26. Nacheva, I., Georgieva, L., **Doneva, M.**, Metodieva, P., & Tsvetkov, T., 2013. High technology solutions for production of special purpose foods. *XI International Scientific Conference "Management and Engineering '13"*, 2, 727-733.

Abstract: In the publications the authors present the possibilities and the advantages of freeze-drying, as a modern cryobiotechnological method for obtaining of varied in kind, composition and purpose long shelf life lyophilized food concentrates with maximum preserved nutritious qualities and biological value. A great part of these lyophilized bioproducts is included in the First Bulgarian space menu and in the developed special purpose functional foods. Their composition is in conformity with the changes in the metabolite processes, the energy formation, the character of the adaptive changes, of the neural-psychic load and the nature of the complex of harmful factors of the working environment.

27. Nacheva, I., **Doneva, M.**, Metodieva, P., Miteva, D., & Dimov, K., 2014. Using of Immobilized Biological Systems for Formulation of New Functional Products. *XII International Scientific Conference "Management and Engineering"*, 2, 791-797.

Abstract. The immobilization of biological systems is a modern and widely applied method in the contemporary biotechnological industry. In the publication have been studied the possibilities for using of sodium alginate and guar gum serving as matrices for immobilization of enzymes and lactic acid microorganisms with the aim to preserve their structural and catalytic stability. The applied biotechnological approach is appropriate for formulation and obtaining of new functional foods and guarantees their high quality and biological value.

28. Todorov, Y., **Doneva, M.**, Metodieva, P., & Nacheva, I., 2014. An Intelligent Approach for Formulation of The Contents of Novel Functional Food. *IEEE Innovations in Intelligent Systems and Applications, INISTA*, 98-102.

Abstract: This paper describes an applied approach using an Adaptive Neuro-Fuzzy Inference System to formulate the contents of novel dairy functional food. In the development stage for a new functional food, it is required a careful balancing in the product ingredients in order to be achieved not only a healthily effect but an acceptable sensory properties. This impose the solving a multiparametric task how to select an optimal product composition in order to obtain a products with a great percent of consumer acceptability. Since, the main sensory characteristics of the products can be assessed by trained panelists and encoded by a numerical estimates, the task can be solved by a simple fuzzy input-output mapping, in order to conclude how each component of the product affects a selected sensory characteristic.

29. **Doneva, M.**, Metodieva, P., Nacheva, I., Miteva, D., & Dimov, K., 2015. Biotechnological Production of Enzymes – Presents and Prospects. *XIII International Scientific conference "Management and Engineering 15"*, 2, 848-854.

Abstract: Production of microbial enzyme preparations is the main direction in modern biotechnology. Enzymes are a host of new applications, and the market for enzymes is growing fast. The key factors determining continuous increasing share of sales of industrial enzymes are the introduction of new technologies into their production and increase their efficiency and productivity.

30. Nacheva, I., **Doneva, M.**, Metodieva, P., Miteva, D., & Dimov, K., 2015. Cryotechnologies – Contemporary Way to the Market of Probiotics Foods. *XIII International Scientific conference "Management and Engineering 15"*, 2, 841-847.

Abstract: Probiotics are contemporary forms of immunostimulatory products and take increasingly important place in the global preventive health and nutrition. In recent years cryotechnologies imposed by modern biotechnological solution for the production of healthy probiotic products. The publication presents experimental data from the use of sucrose and k- carrageenan as a protective medium (cryoprotectants) upon freeze - drying of probiotic bacteria, providing high survival rate and storage stability. This circumstance defines them as risk-free and extremely attractive for production and realization at the market.

31. Miteva, D., Dimov, K., Nacheva, I., **Doneva, M.**, & Metodieva, P., 2016. Forecasting the effect and effectiveness of medical nutrition with specialist foods. *XIV International Scientific conference "Management and Engineering 16"*, 2, 751-759.

Abstract: Dietary nutrition is a fundamental moment in the complex treatment of patients in stationary conditions. Necessary to use a wide range of food products to be available year round, and so as not to be influenced by the seasons and their storage happens under normal conditions. The aim of the study is to trace the radioprotective effect of two types of specialized meat foods (from Buffalo and Turkey meat) on experimental animals-mice in external irradiation with relatively low doses of radiation to forecasting the effect and costeffectiveness of using them in patients undergoing treatment with radiotherapy. Altitudinal changes in body mass of test specimens at different diets. The comparative research between the two supplements give precedence to the add-in from Buffalo meat, both in terms of the percentage recovery of the weight which gives us reason to recommend it for use in specialized nutrition for patients in recovery period after radiation therapy.

ДОКЛАД ПУБЛИКУВАН В СБОРНИК ТРУДОВЕ ОТ НАЦИОНАЛНА КОНФЕРЕНЦИЯ

32. Дянкова, С., & **Донева, М.**, 2009. Имобилизирание на протеолитични ензими върху оксигелулоза. *Сб. Научна конференция с международно участие "Хранителна наука, техника и технологии"*, 56 (1), 299-304.

Резюме: Изследвано е изменението на протеолитичната активност на ензимите: папаин, трипсин и алкална протеаза, след имобилизирането им върху активиран с натриев перйодат целулозен носител и последващо сублимационно сушене. В крайните лиофилизирани продукти се запазва висок процент каталитична активност на трипсин и алкална протеаза. Наблюдава се пропорционална зависимост между количеството въведени алдехидни групи в носителя и крайната протеолитична активност на получените биологично активни материали и при трите изследвани ензима.

33. Цветков, Ц., Дянкова, С., & **Донева, М.**, 2009. Лиофилизирана колагенова матрица като носител за включване на ензими. *Годишник на ЕАТА*, 76-84.

Резюме: Колагенът като биоматериал намира широко приложение в различни области на медицината, поради разнообразните си биологични ефекти: добър хемостатичен ефект; стимулиране регенерацията на тъканите; практическа нетоксичност; слаба до липсваща алергенност. Значително предимство е и възможността за производство на колагенови продукти от достъпни и евтини суровини.

Качеството на колагеновите биопродукти до голяма степен зависи от степента на пречистване и отстраняване на телопептидите, неколагеновите белтъци, мукополизахариди и липиди. Наличието на множество реакционноспособни функционални групи в колагеновата молекула позволява формирането на устойчиви и/или хелатни комплекси с биологично активни вещества, включително и ензими. Основната задача на изследването бе да се създаде технология за имобилизиране на ензими на лиофилизирана матрица от ателопептиден колаген и да се установи доколко в създадените комплексите запазва активността и се стабилизира ензима. Направен бе сравнителен анализ с други носители - желатина, поливинилалкохол, а също така и след имобилизиране на активирана целулозна тъкан.

Резултатите от биохимичните анализи показаха най-висока остатъчна каталитичната активност на използвания моделен ензим (трипсин), при включване в колагенова матрица. В получения продукт, трипсинът остава стабилен при радиационна стерилизация и при съхранение на стайна температура за значително по-дълъг период в сравнение с контролата.

34. **Донева, М.,** Дянкова, С., & Методиева, П., 2010. Изследване каталитичната стабилност на лиофилизираните протеазни и амилазни ензими при съхранение. *Сб. доклади от научна конференция "Хранителна наука техника и технологии"*, 57(1), 453-458.

Резюме: Представени са промените в каталитичната активност на лиофилизираните образци протеазни и амилазни ензими, в процеса на съхранение. С цел конформационно стабилизиране на ензимните молекули и запазване на ензимната им активност, преди лиофилизационния процес бяха включени в различни по произход, вид и структура хидроколоидни матрици. Остатъчната ензимна активност на лиофилизираните проби бе изследвана периодично, след 3, 6, 12, 24 месечно съхранение.

Получените резултати показаха от 65% до 100% запазване на каталитична активност на лиофилизираните ензимни продукти при съхранение. Основните фактори въздействащи върху стабилността на проучваните ензимни продукти са използваната протектираща среда и приложените режимни параметри на сублимационно сушене.

35. Дянкова, С., & Донева, М., 2010. Каталитична стабилност на протеолитични ензими, имобилизирани на оксигелулоза при радиационно третиране и съхранение. *Сб. доклади от научна конференция "Хранителна наука техника и технологии"*, 57(1), 447-452.

Резюме: Проследено бе влиянието на продължителното съхранение и радиационната стерилизация върху протеолитичната активност на папаин, трипсин и алкална протеаза, имобилизирани на оксигелулоза с различно съдържание на алдехидни групи.

При съхранение на стайна температура за период от 1 година, имобилизираните ензими запазват висока каталитична стабилност. Най-висока остатъчна активност бе отчетена при носителите, третирани с натриев перйодат. Гама-облъчване с дози до 30 kGy не повлиява значително активността на имобилизираните ензими за разлика от изходните ензимни препарати. Високата стабилност при съхранение и радиационна стерилизация на тези варианти биоматериали дава възможност те да бъдат предложени като биоактивни превръзки за третиране на проблемни рани.

36. Дянкова, С., & Донева, М., 2011. Скринингово изследване ефективността на нови биоактивни превързочни материали с включени протеолитични ензими. *Сб. Научна конференция "Хранителна наука, техника и технологии"*, 58(2), 213-218.

Резюме: Чрез *in vitro* модел бе изследвана ефективността на нова серия биологично активни превързочни материали с имобилизирани протеолитични ензими (папаин, трипсин, алкална протеаза). В проведеното скринингово изследване като субстрати бяха използвани овнешка кръв и нативна и термично денатурирана лиофилизирана свинска кожа. Степента на хидролиза под въздействие на различните варианти биоматериали, бе установена чрез определяне на тоталното количество освободени аминокиселини.

Установено бе, че и трите ензима хидролизират успешно белтъчната компонента на кръвта. Фибринолитичната активност на получените биоактивни превързочни материали дава основание да се очаква, че те ще осигурят добро почистване на раната от фибринови налепи, по-слабо ще прилепват към раневата повърхност и ще са атравматични при смяна на превръзката.

Резултатите от действието на изследваните биоматериали върху колагенов субстрат (нативна и термично денатурирана свинска кожа) показаха, че имобилизираните ензими проявяват много по-високи нива на активност към термично денатурирания колаген. Ето защо и трите варианти биологично активни превързочни материали са подходящи за осъществяване на ензимна некректомия при рани от изгаряния.

37. **Донева, М., & Тодоров, Я., 2012.** Анализ на активността и стабилността на лиофилизирани протеолитични ензими при използване на хидроколоидни полизахариди. *Сборник доклади- Десета национална младежка научно-практическа конференция, 277-281.*

Резюме: В този доклад е представено изследване на стабилизиращият ефект на група хидрокоидни полимери върху каталитичната активност и стабилност на лиофилизирани образци протелитични ензими (химозин, бромелин и папаин). Чрез включването на ензимите в хидроколоидни носители с последващо замразяване и сублимационно сушене се осигурява висок процент остатъчна ензимна активност, на изследваните ензимни проби. Получените резултати доказват и по-висок процент остатъчна активност на опитните образци при лиофилизация, проведена след бързо замразяване в сравнение с пробите замразени при -30°C .

38. **Донева, М., 2013.** Технология за получаване на нов лиофилизиран полиензимен биопродукт. *Сборник доклади - Единадесета национална младежка научно-практическа конференция, 55-59.*

Резюме: В доклада е представен биотехнологичен подход за получаване на нов лиофилизиран полиензимен комплекс. В състава на новият биопродукт са включени протелитични, амилаолитични и липолитични ензими, както и растителни биологично активни вещества. Оптимално са подбрани технологичните параметри на процеса сублимационно сушене. Установено е, че приложението на хидрокоиди от полизахаридно естество (Na-КМЦ и гуарова гума) в качеството им на матрици и протектиращи среди за активните компоненти, води до запазване на каталитичната активност на ензимните субстанции и получаването на краен продукт, отговарящ на предварително програмирани показатели.

39. **Дянкова, С., Донева, М., & Солак, А., 2014.** Сравнителен анализ на съдържанието на хлорофил и негови деривати в екстракти от замразени и изсушени растителни суровини. *Сборник доклади - Национална конференция с международно участие на тема: „Биологични растениевъдство, животновъдство и храни“, 198-203.*

Резюме: Към настоящия момент пигменти от различни видове и под различна форма се използват като оцветители в хранително-вкусовата, козметичната и фармацевтичната промишленост. Установените здравословни проблеми от синтетичните оцветители (включително, карциногенност и хронична токсичност) доведоха до подновяване на интереса към естествени оцветители, получени от

различни източници (растения, гъби, микроорганизми и животни). Растенията са достъпни и евтини суровини за получаване на пигментни вещества с различна структура, цвetoва характеристика, разтворимост и стабилност, които освен това проявяват и благоприятен ефект върху здравето. Като основен фотосинтетичен пигмент, хлорофилът е широко разпространен и е с интензивен зелен цвят поради силна абсорбция в червената и синята част на спектъра. Основно негово предимство като естествен оцветител е липса на токсичност и алергенност и добрия детоксикиращ ефект върху организма.

Целта на изследването бе да се направи сравнителен анализ на съдържанието на хлорофил и негови деривати в замразени или изсушени растителни суровини - зелени микроводорасли (*Chlorella vulgaris*), спанак (*Spinacia oleracea*), коприва (*Urtica dioica*) и трева (*Grass mixture*). Изследванията с SDS-PAGE показаха наличие на белтъчни фракции с молекулни маси от 28 000 до 19 000 Da, които съответстват на различните хлорофил-протеинови комплекси (ЛНС). Най-многобройни фракции бяха наблюдавани при пробите от листа на спанак и коприва. Проведеният TLC - анализ на ацетонови екстракти от различните суровини показва наличие на хлорофил а и b, следи от феофитин и феофорбид и ксантофили. Отчитат се разлики в състава на екстрактите в зависимост от предварителната обработка на суровината. По-добри резултати за стабилизиране на хлорофилния екстракт се наблюдават при работа със замразена суровина.

40. **Донева, М.,** Начева, И., Вълчков, А., Методиева, П., & Логиновска, К., 2015. Влияние на скоростта на замразяване върху преживяемостта на млечнокисели бактерии. *Сб. доклади от научна конференция "Хранителна наука техника и технологии"*, 62, 114-117.

Резюме: The effect of the 5-speed freezing - 0.3, 1.5, 15.0, 30.0 and 400°C/min on survival of *Lactobacillus delbrueckii* ssp. *bulgaricus* strain 1381 and *Streptococcus thermophilus* strain 1374 was investigated. As a cryoprotectant medium were used solutions of sucrose and chitosan. Experimental data obtained show that the tested strains had the highest survival rate for freezing by immersion in liquid nitrogen. In the samples without the protective environment it is in the range from 35 to 53%. In variants including cryoprotectants survival of *Lactobacillus bulgaricus* 1381 reaches 72%, and of *Streptococcus thermophilus* 1374 - 80%.

В. МОНОГРАФИЧЕН ТРУД

1. Начева, И., **Донева, М.** & Методиева, П., 2017. Хидроколоидите като криоконсерванти. София: Велес Консулт ЕООД.

Резюме: Разгледани са основни теоретични принципи за дълготрайно нискотемпературно и сублимационно консервиране (лиофилизация) на различни щамове млечнокисели бактерии и ензими. Посочени са основните фактори и механизми, влияещи върху криорезистентността на изследваните биологични обекти, както и въздействието и ролята на криопротекторите при криоконсервиране. Обобщени са досегашните знания за криопротекторите и механизма на тяхното действие в биологични системи. Представени са резултати от експериментални изследвания върху различни по строеж и структурни особености хидроколоиди, в качеството им на криопротектори при замразяване и лиофилизация на различни щамове млечнокисели бактерии, смесени бактериални култури, протеазни и амилазни ензими. Установено е, че проучваните хидроколоиди, приложени в качеството им на матрици, оказват стабилизиращо действие на биологичните молекули и допринасят за запазване на тяхната структурна и каталитична стабилност. Приложеният съвременен подход на криоконсервиране е подходящ за формулиране и разработване на нова генерация функционални продукти на млечнокисела основа и стабилни ензимни препарати и има потенциала да отговори на новите предизвикателството на пазара на биопродукти.