



**DEVELOPMENT OF IR DRYER WITH OPTIMAL SHAPE OF THE CHAMBER**

page 4–9

Using IR technology allows doing the «soft» mode of heat treatment, thereby maintaining the maximum content of bioactive substances in the resultant semi-finished products with simultaneous sterilization. The main problem in the design of IR dryers is to achieve a uniform distribution of heat flow from the source of the IR emitter to the receiving surface and significant power consumption. During the study of the problems associated with the creation of IR dryers for plant material, scientists of the department processes, machines and automation of food production of Kharkov State University of Food Technology and Trade were conducted an experimental investigation on the basis of created and designed models of IR dryers using modern computer, technical, engineering and design programs, whereby designed little energy and metal vertical cylindrical IR dryer having the following advantages: a uniform heat flux throughout the receiving surface of a vegetable raw material (in the troughs and between them) through the shape of the IR dryer and repeating geometry of film heater camera; optimal radiant component of the sources of IR radiation in the process of heat transfer, protecting against overheating, excessive evaporation of moisture and the destruction of the surface layers; film transducer can be considered without inertia, with a monotone transition process, which makes it possible to control the temperature automatically.

**Keywords:** improvement, IR dryer, vegetable raw materials, energy conservation, zero lag.

**References**

- Shazzo, R. I., Ovcharova, H. P. (2005). Produkty detskoho pitannia iz rastitel'noho i miasnoho syr'ia infrakrasnoi sushki. *Khranenie i pererobotka sel'khozsyria*, 1, 50–52.
- Jaros, M., Pabis, S. (2006, January). Theoretical Models for Fluid Bed Drying of Cut Vegetables. *Biosystems Engineering*, Vol. 93, № 1, 45–55. doi:10.1016/j.biosystemseng.2005.08.011
- Lykov, A. (1968). *Theory of Drying*. M.: Energia, 471.
- Kasatkin, V., Shumilova, I. (2006). Drying heat-sensitive materials in a continuous action. *Food and Beverage*, 10, 12–13.
- Aleksanyan, I. Y., Bujnov, A. A. (2004). *High-intensity drying foods. Penosushka. Theory. Practice. Modelling*. Astrakhan: ASTU, 380.
- Pabis, S., Jaros, M. (2002, February). PH-Postharvest Technology. *Biosystems Engineering*, Vol. 81, № 2, 201–211. doi:10.1006/bioe.2001.0015
- Kiptelaya, L., Zagorulko, A. (2014). YK-sushka plodoiahodnoho syria. *Nauchnyi zhurnal NYU YTMO. Seriya Protessy y apparaty pyshchevykh proizvodstv*, 2, 80–86.
- Cherevko, A., Kiptela, L., Zagorulko, A. (26.08.2014). *IR drying of organic plant material*. Patent № 106 461 Ukraine, A23N 8/12 1/00 V01D. № a 2013 14949. Appl. 12/20/2013. Bull. № 16, 3.
- Machkashi, A., Banhidi, L. (1985). *Radiant heating*. M.: Stroyizdat, 464.
- Bramson, M. (1965). *Infrared radiation from hot bodies*. M.: Nauka, 222.

**SCIENTIFIC AND METHODOLOGICAL BASIS FOR THE CREATION OF NATIONAL REGULATORY FRAMEWORK FOR OIL AND FAT INDUSTRY**

page 9–14

The results of the system scientific and methodical research on the national regulatory framework of oil and fat industry are first presented in the article. Based on the analysis of scientific literature and a series of national standards DSTU, DSTU ISO, DSTU Codex Stan, DSTU-P, ISO/TS, DSTU CAC/RCP (total 122 titles), created in the sectoral Ukrainian Scientific Research Institute of oils and fats, its classification is developed and the level of harmonization with European and international standards is defined According to the proposed classification of national standards can be divided into groups: terms and definitions; general specifications; methods of sampling, acceptance rules, methods for determination of organoleptic, physical-chemical, structural and safety performance; standards-orders; system of Standards of Ukrainian Companies of technological documentation.

The features of the development of individual standards, such the use of the author's procedures of determining benzopyrene, waxes, mineral oil contaminants in vegetable oils, glucosinolates, and so on are marked. The level of harmonization of national standards with European and international standards, which is 0,27 and it is below the recommended level by program of integration into the European Union (0,8). The conclusions about the need are given for further review and the creation of new national standards for the oil and fat industry, improve their level of harmonization and the use of research results in the educational process of higher educational institutions on a specialty «Technology of fats and fat substitutes».

**Keywords:** oil and fat industry, national standards, systems analysis, classification, harmonization, international requirements.

**References**

- Ramazanova-Stepkina, E. (2006). Osnovy tehniceskogo regulirovaniia v Ukraine. *Oliino-zhyrovyyi kompleks*, № 4(15), 58–59.
- Pro standartyzatsiiu, tekhnichni rehlymenty i protsedury otsinky vidpovidnosti. (17.05.2001). *Zakon Ukrainy № 2408-III*. Available: <http://www.uapravo.net/akty/laws-resolution/akt9psff1o.htm>
- DSTU ISO 22000:2007. *Systemy upravlinnia bezpechnistiu kharchovykh produktiv. Vymohy do bud-yakyykh orhanizatsii kharchovoho lantsiuha (ISO 22000:2005, IDT)*. (2007). Inducted into 04.02.2007. Kyiv: Derzhspozhyvstandart Ukrainy, 39.
- ISO 22000:2005. *Food safety management systems. Requirements for any organization in the food chain*. Available: <http://dx.doi.org/10.3403/30075591>
- Zelena knyha «Pro polityku adaptatsii natsionalnoho zakonodavstva u sferi tekhnichnoho rehuliuвання ta spozhychoi polityky do Yevropeiskyykh vymoh». (2006). K.: Derzhspozhyvstandart Ukrainy, 88.
- Hryshchenko, F. V. (2008). Tekhnolohiia vyrobnytstva kharchovykh produktiv: porivniálny analiz mizhnarodnoi ta natsionalnoi normatyvnoi baz. *Kharchova promyslovist*, № 7, 5–7.
- Hryshchenko, F. V. (2009). Tekhnolohichni protsesy v kharchovii promyslovosti: zovnishnie porivniannia pokaznykiv rozvytku natsionalnoi normatyvnoi bazy. *Kharchova promyslovist*, № 8, 28–33.
- Rukovodstvo po metodam issledovaniia, tehnikomicheskomu kontroliu i uchetu proizvodstva v maslozhirovoi promyshlennosti. Vol. 1, Iss. 6. (1971). L.: VNIIZh, 166.
- In: Melnykova, V. P., Tkachenko, Yu. V. (2010). *Kataloh normatyvnykh dokumentiv 2010. Vol. 1. Book 2*. K.: Derzh. kom. Ukrainy z pytan tekhnichnoho rehuliuвання ta spozhychoi polityky, 296.
- DSTU 1.0-2003. *Natsionalna standartyzatsiia. Osnovni polozhennia*. (2003). Inducted into 2003-07-01. Kyiv: Derzhspozhyvstandart Ukrainy, 20.
- DSTU 1.2-2003. *Natsionalna standartyzatsiia. Pravyly rozroblennia natsionalnykh normatyvnykh dokumentiv*. (2003). Inducted into 2003-07-01. Kyiv: Derzhspozhyvstandart Ukrainy, 20.
- DSTU 1.5-2003. *Natsionalna standartyzatsiia. Pravyly pobudovy, vykladannia, oformlennia ta vymohy do zakhystu ta oformlennia normatyvnoi dokumentatsii*. (2003). Inducted into 2003-07-01. Kyiv: Derzhspozhyvstandart Ukrainy, 46.
- Prohrama intehratsii Ukrainy do Yevropeiskoho Soiuzu. (14.09.2000). *Ukaz Prezydenta № 1072/2000*. Available: <http://zakon4.rada.gov.ua/laws/show/n0001100-00>

**RESEARCH OF QUALITY INDICATORS OF A BAR MADE FROM BIOLOGICALLY ACTIVATED GRAIN OF WHEAT**

page 15–17

The parameters of biological activation of wheat brains are proposed and grounded. Experimental studies showed that the content of water-soluble vitamins and vitamin E in wheat brains increases significantly in the process of such activation.

The formulation of a grain bar is developed and samples of this bar are examined in laboratory. Correlation of basic components and energy value of a grain bar is estimated. Daily intake of minerals from 100 g of grain bar is calculated.

Indices of a grain bar microbiological stability during storage under the different conditions are defined.

It is found that the use of plant extracts from horseradish root and a fennel seeds is efficient in sprouting to inhibit growth of microorganisms. Period of storage of biologically activated grain bar under hermetic conditions at 5 degrees °C increases to 10 days.

**Keywords:** health-improvement products, grain, wheat, biological activation, bar, microbiological indices.

#### References

1. Simakhina, G., Mykoliv, T. (2014, September 15). The New Compositional Mixtures of Cereal Cultures. *The Advanced Science Journal*, Vol. 2014, № 10, 33–36. doi:10.15550/asj.2014.10.033
2. Don, R. (2012, June). *Factors affecting wheat seed germination*. Available: <http://www.grainsa.co.za/factors-affecting-wheat-seed-germination>
3. Acevedo, E., Silva, P., Silva, H. (2002). Wheat growth and physiology. *Plant Production and Protection*. Available: <http://www.fao.org/docrep/006/y4011e/y4011e06.htm>
4. Miš, A., Grundas, S. (2002). Wheat grain hardness modified by the laboratory sprouting test. *Agrophysic*, Vol. 16, № 4, 283–288.
5. Buriro, M., Oad, F. C., Keerio, M. I., Tunio, S., Gandahi, A. W., Hassan, S. W. U., Oad, S. M. (2010). Wheat seed germination under the influence of temperature regimes. *Sarhad J. Agric*, 27(4), 539–543.
6. Nyachiro, J. M., Clarke, F. R., DePauw, R. M., Knox, R. E., Armstrong, K. C. (2002). Temperature effects on seed germination and expression of seed dormancy in wheat. *Euphytica*, Vol. 126, № 1, 123–127. doi:10.1023/A:1019694800066
7. Dal Degán, F., Rocher, A., Cameron-Mills, V., Wettstein, D. von. (1994, August 16). The expression of serine carboxypeptidases during maturation and germination of the barley grain. *Proceedings of the National Academy of Sciences*, Vol. 91, № 17, 8209–8213. doi:10.1073/pnas.91.17.8209
8. In: White, J., Edwards, J. (2007). *Wheat: Growth and development*. State of New South Wales through NSW Department of Primary Industries, 104.
9. Essemine, J., Ammar, S., Jbir, N., Bouzid, S. (2007, December 1). Sensitivity of Two Wheat Species's Seeds (*Triticum durum*, Variety Karim and *Triticum aestivum*, Variety Salambo) to Heat Constraint During Germination. *Pakistan Journal of Biological Sciences*, Vol. 10, № 21, 3762–3768. doi:10.3923/pjbs.2007.3762.3768
10. Colmenares De Ruiza, A. S., Bressani, R. (1990). Effect of Germination on the Chemical Composition and Nutritive Value of Amaranth Grain. *Cereal Chemistry*, 67(6), 519–522.
11. Trugo, L. C., Donangelo, C. M., Trugo, N. M. F., Bach Knudsen, K. E. (2000, June). Effect of Heat Treatment on Nutritional Quality of Germinated Legume Seeds. *Journal of Agricultural and Food Chemistry*, Vol. 48, № 6, 2082–2086. doi:10.1021/jf9913920
12. Zieliński, H., Frias, J., Piskula, M. K., Kozłowska, H., Vidal-Valverde, C. (2005, January 15). Vitamin B1 and B2, dietary fiber and minerals content of Cruciferae sprouts. *European Food Research and Technology*, Vol. 221, № 1–2, 78–83. doi:10.1007/s00217-004-1119-7
13. Wang, K.-H., Lai, Y.-H., Chang, J.-C., Ko, T.-F., Shyu, S.-L., Chiou, R. Y.-Y. (2005, January). Germination of Peanut Kernels to Enhance Resveratrol Biosynthesis and Prepare Sprouts as a Functional Vegetable. *Journal of Agricultural and Food Chemistry*, Vol. 53, № 2, 242–246. doi:10.1021/jf048804b
14. Lipiec, J., Janas, P., Barabas, W., Pysz, M., Pisulewski, P. (2005). Effect of oscillating magnetic field pulses on selected oat sprouts used for food purposes. *Acta Agrophysica*, 5(2), 357–365.
15. Kim, Y.-S., Kim, J.-G., Lee, Y.-S., Kang, I.-J. (2005, January 1). Comparison of the Chemical Components of Buckwheat Seed and Sprout. *Journal of the Korean Society of Food Science and Nutrition*, Vol. 34, № 1, 81–86. doi:10.3746/jkfn.2005.34.1.081
16. Sharshunov, V. A., Urbanchyk, E. N., Kasyanova, L. A., Ivanov, P. G., Ageenko, O. V. (2008). Biotechnology techniques for a more efficient use of the cereal resources of Belarus. *Proceedings of the National Academy of Sciences of Belarus. Agrarian Series*, 1, 101–106.
17. Hrehirchak, N. M. (2009). *Mikrobiolohiia kharchovykh vyrobnytstv*. K.: NUKhT, 302.

### THE INFLUENCE OF AGROMETEOROLOGICAL CONDITIONS OF THE VEGETATION PERIOD ON THE TECHNOLOGICAL PROPERTIES OF GRAPES

page 18–21

The article discusses the impact of agrometeorological conditions of the vegetation period on the technological properties of grapes of new domestic breeding in the Odessa region in the last 3 years.

The object of the study was made by the grape of varieties generative selection — Sparkle, Muscat Odessa, Flavored, Zagreus, clonal

selection — Iskorka, Muskat Odesskii, Aromatnii, Zagrey, clone selection — Irsai Oliver, Feteasca Belaya, Telti Kuruk, Sukholimanskii Belyi, Rkatsiteli of harvest of 2012–2014 years. Experimental varieties are the result of breeding department of the NSC «Tairov Wine Making and Wine Growing Institute». These promising varieties and forms of new generation which have high adaptive properties to environmental factors are seen as a potential for the production of a modern white table wines.

The main climatic factors (air temperature, rainfall, amount of active temperatures) during the growing season, their impact on the dynamics of complex carbohydrate-acid grape of harvest of 2012–2014 years are investigated. Dependence of optimum conditions of white grapes from the date of harvest is formulated, are recommendations for high-quality raw materials for the production of dry white wines from the preferred organoleptic properties are given.

**Keywords:** vegetation period, dry wines, harvest, variety, weather conditions, condition of grapes, selection.

#### References

1. Ndou, V., Vecchio, P. D., Passiante, G., Schina, L. (2012). Toward a sectoral system of innovation for local wine sector. *International Journal of Business and Globalisation*, Vol. 8, № 1, 81–94. doi:10.1504/ijbg.2012.043973
2. Mozell, M. R., Thach, L. (2014, December). The impact of climate change on the global wine industry: Challenges & solutions. *Wine Economics and Policy*, Vol. 3, № 2, 81–89. doi:10.1016/j.wep.2014.08.001
3. Anderson, K., Aryal, N. R. (2013). *Which Winegrape Varieties are Grown Where?: A Global Empirical Picture*. University of Adelaide Press, 690.
4. Vlasov, V. V., Muliukina, N. A., Kovaliova, I. A., Chisnikov, V. S., Gerus, L. V. (2012). Rezultaty i perspektivy selektsionnoi roboty NNTs «IViV im. V. E. Tairova». *Vynohradarstvo i vyrobnytstvo: mizhvidomchyi tematychnyi naukovyi zbirnyk*, 49, 220.
5. Tkachenko, O. B., Voloshyna, T. M., Trynkal, O. V. (2013). Vyvcheniia koniunktury rynku vyrobnytstva vynohradnykh vyn v Ukraini. *Ekonomika kharchovoi promyslovosti*, 3, 49–54.
6. Reisch, B. I., Owens, C. L., Cousins, P. S. (2011, November 21). *Grape. Fruit Breeding*. Springer US, 225–262. doi:10.1007/978-1-4419-0763-9\_7
7. Dokuchaeva, E. N. (1986). *Sorta vinograda*. K.: «Urozhai», 272.
8. Tkachenko, O. B.; National Institute of Vine and Wine «Magra-rach». (2010). *Nauchnye osnovy sovershenstvovaniia tehnologiiu be-lykh stolovykh vin putiom regulirovaniia oksislitel'no-vosstanovitel'nykh protsessov ih proizvodstva*. Yalta, 460.
9. Ostrouhova, E. V.; National Institute of Vine and Wine «Magra-rach». (2013). *Sozdanie metodologii upravleniia kachestvom vinograd-nykh vin s ispol'zovaniem fermentativnogo kataliza*. Yalta, 691.
10. In: Gerzhikova, V. G. (2009). *Metody tehnohimicheskogo kontroliia v vinodelii*. (Seria nauch.-tehn. lit. po vinodeliiu). Simferopol': Tavri-da, 304.

### THE USE OF PLANT MATERIAL FOR ENRICHMENT OF FRESH JUICES BY BIOLOGICALLY ACTIVE SUBSTANCES

page 22–25

The fresh apple and orange juice with the use of aqueous extracts of non-traditional plant material such as peppermint, garden sage and lemongrass was developed for restaurants. It was chosen the simplest method of extraction such as maceration for obtaining extracts as a source of biologically active substances due to its ease of implementation at restaurants. The optimal process parameters (temperature, hydromodulus, time) which allow to obtain the extracts out of peppermint, garden sage and lemongrass with a pronounced and harmonious flavour were investigated. The food basis was chosen due to the popularity of fresh juices among the consumers of restaurants as well as availability and nutritional value of plant materials. The fresh apple and orange juice with the extracts of peppermint, garden sage and lemongrass had the original taste and aromatic profile. The biological value of the extracts of peppermint, garden sage and lemongrass was evaluated by the content of such antioxidant as vitamin C and the total antioxidant activity. The increasing of biological activity of the fresh juice with the aqueous extracts of plant materials was detected. It allows positioning the juice like a health drink.

**Keywords:** plant material, peppermint, garden sage, lemongrass, fresh juice.

**References**

- Domaretskyi, V. A., Prybylskyi, V. L., Mykhailov, M. H. (2005). *Tekhnolohiia ekstraktiv, kontsentratio i napoiv iz roslynnoi syrovynny*. Vinnytsia: Nova knyha, 408.
- Zheplinska, M. M., Zotkina, L. V., Bila, H. M. (2011). Vyluchennia biolohichno aktyvnykh rehovyn z likarskykh trav shliakhom ekstrahuvannia ta nastoiuvannia. *Kharchova promyslovist*, 12, 35–41.
- Hoiko, I. Yu., Simakhina, H. O. (2014). Perspektyvy vykorystannia dykorosloi syrovynny dlia oderzhannia bezalkoholnykh napoiv antyoksydantnoi dii. *Naukovi pratsi NUKhT*, 6, 219–226.
- Hoiko, I. Yu., Stetsenko, N. O., Shnaider, N. V. (2012). Rozroblennia bezalkoholnoho napoju ozdorochoho pryznachennia. *Kharchova nauka i tekhnolohiia*, 3(20), 75–79.
- Yasinska, I. L., Ivanova, V. D. (2013). Bezalkoholni sokovi napoi antyoksydantnoi dii z fitoekstraktamy. *Naukovi pratsi ONAKhT*, 44, 55–58.
- Ivanova, V. D., Kariaka, N. S. (2011). Doslidzhennia antyoksydantnykh vlastyivostei ekstraktiv z netradytsiinoi roslynnoi syrovynny. *Naukovi pratsi NUKhT*, 37, 89–95.
- Miron, T. L., Dima, S. (2012). Enriched antioxidant activity of pear juice by supplementation with oregano and wild thyme extracts. *The Annals of the University Dunarea de Jos of Galati Fascicle VI – Food Technology*, 36(2), 81–91.
- Philip, J., John, S., Iyer, P. (2012). Antimicrobial Activity of Aloe vera barbedensis, Daucus carota, Emblica officinalis, Honey and Punica granatum and Formulation of a Health Drink and Salad. *Malaysian Journal of Microbiology*, 8(3), 141–147.
- Halim, J. M., Pokatong, W. D. R., Ignacia, J. (2013). Antioxidative characteristics of beverages made from a mixture of lemongrass extract and green tea. *Jurnal Teknologi dan Industri Pangan*, 24(2), 215–221. doi:10.6066/jtip.2013.24.2.215
- Kusuma, D. S., Santoso, F., Prabawati, E. K. (2013). Characteristics of soymilk added with dragon fruit and eggplant peel extracts. *Jurnal Teknologi dan Industri Pangan*, 24(1), 54–59. doi:10.6066/jtip.2013.24.1.54
- Fikselová, M., Ivanišová, E., Vietoris, V., Mellen, M. (2010). Antioxidant effects of herbal extracts and their food application. *Potravinarstvo*, 4(4), 34–37. doi:10.5219/75
- Rodina, T. G. (2004). *Sensornyj analiz prodovol'stvennykh tovarov*. Moskva: Izdatel'skij centr «Akademija», 208.
- GOST 28562-90. *Produkty pererabotki plodov i ovoshhej. Refraktometricheskij metod opredelenija rastvorimyh suhikh veshhestv*. (1990). Moskva: Izd-vo standartov, 15.
- Orlova, N. Ya. (2008). *Teoreticheskie osnovy tovaroznavstva. Prodovolchii tovary*. Kyiv: KNTEU, 145.
- Hoiko, I. Yu. (2013). Vyznachennia oksylivualno-vidnovliualnoho potentsialu dlia kharakterystyky antyoksydantnoi aktyvnosti netradytsiinoi roslynnoi syrovynny. *Kharchova promyslovist*, 14, 2–3.

**IMPROVEMENT OF PRODUCTION AND QUALITY RESEARCH OF BAKERY PRODUCTS ENRICHED WITH IODINE**

page 26–29

In view of the acute problem of iodine deficiency, which threatens by a number of pathological conditions of person, it is proved a necessity of creating mass consumption food products including bakery products rich in iodine compounds resistant to outside influence. With this purpose it is proposed improvements of bakery using iodine-protein additives containing stable iodine compounds, whose use is safe for the human body. It is proved the rationality of adding 1 % by weight of flour additives in the product that can compensate for 50 % of the daily requirement of iodine. Researches of organoleptic and physical and chemical parameters of quality of bakery products with iodine-protein additive require to carry the product to the rich products of highest grade in accordance with DSTU P-4585:2006 «Rich bakery products. General specifications». Use the iodine-protein additive in content of bakery products allow compensate the lack of iodine and also to ensure high quality of end product.

**Keywords:** iodine deficiency, iodine-protein additive, bakery products, quality, health properties.

**References**

- Volkotrub, L. P., Karavaev, N. V., Zinchenko, N. S. et al. (2000). Gi-gienicheskie aspekty profilaktiki iododefitsitnyh sostoianii. *Gigiena i sanitariia*, 3, 28–31.
- Ottavei, P. B. (2010). *Obogashchenie pishchevykh produktov i biologicheski aktivnye doavki: tehnologii, bezopasnost' i normativnaia baza*. Translated from English. SPb.: Professiia, 15–21.
- Spirichev, V. B., Shatniuk, L. N. (2010). Obogashchenie pishchevykh produktov mikronutrientami: nauchnye printsipy i prakticheskie resheniia. *Pishchevaia promyshlennost'*, 4, 20–24.
- Vel'tishchev, Yu. E. (1999). Ekologicheski determinirovannye narusheniia sostoianiiia zdorov'ia detei. *Rossiiskii pediatricheskii zhurnal*, 3, 7–8.
- Nasirova, U. F. (2006). Vlianie defitsita ioda na sostoianie shchitovidnoi zhelezy i nervno-psihicheskoe razvitie detei s neonatal'nykh tranzitornym gipotireozom. *Problemy endokrinologii*, 52(5), 15–17.
- Travers, C. A., Guttikonda, K., Norton, C. A., Lewis, P. R., Mollart, L. J., Wiley, V., Wilcken, B., Eastman, C. J., Boyages, S. C. (2006). Iodine status in pregnant women and their newborns: are our babies at risk of iodine deficiency? *The Medical Journal of Australia*, 184(12), 617–620.
- Delange, F. (2002, August). Iodine deficiency in Europe and its consequences: an update. *European Journal of Nuclear Medicine and Molecular Imaging*, Vol. 29, № S2, 404–416. doi:10.1007/s00259-002-0812-7
- Functional foods. The claims and the evidence. (1999, June). *Food manufacture*, 28–29.
- WHO/UNICEF/ICCIDD. (2007). *Assessment of iodine deficiency disorders and monitoring their elimination: a guide for programme managers*. Ed. 3. Geneva: (Switzerland): World Health Organization. Available: [http://whqlibdoc.who.int/publications/2007/9789241595827\\_eng.pdf](http://whqlibdoc.who.int/publications/2007/9789241595827_eng.pdf). Last accessed 08.09.2014.
- Spiridonov, A. A., Murashova, E. V. (2010). *Obogashchenie iodom produktii zhivotnovodstva. Normy i tehnologii*. SPb.: Beresta, 96.
- Kolinsnychenko, T. O., Arkhipova, A. D. (2011). Vplyv yodovmisnoi dobavky elamin na fizyko-khimichni pokaznyky maionezu. *Mizhnar. nauk.-tekhn. konf. Aktualni problemy kharchuvannia: tekhnolohiia ta obladnannia orhanizatsiia i ekonomika*. Donetsk: Don NUET, 178.
- Golovko, M. P., Golovko, T. M., Serik, M. L., Polupan, V. V., Bakirov, M. P.; In: Cherevko, O. I., Mykhailov, V. M. (2013). *Naukovii osnovy tekhnolohii mineralizovanykh produktiv kharchuvannia. Part 3. Tekhnolohiia zbahachuvallykh bilkovo-mineralnykh dobavok ta produktiv kharchuvannia ozdorochoho pryznachennia z yikh vykorystanniam*. Kh.: KhDUKKhT, 164.

**DEVELOPMENT OF SCHEMES OF PUMP AND GASOLINE-PUMP ABSORPTION WATER-AMMONIA REFRIGERATION MACHINES TO WORK IN A SYSTEM OF WATER PRODUCTION FROM THE AIR**

page 30–37

Perspectives of use of different types of refrigeration units for operation in systems for receiving water from the air in the absence of electrical power sources are analyzed. Such situation with a deficit of water and electric energy is typical for countries in Africa, Southeast Asia, South America. Prospects for use heat absorption water-ammonia refrigeration machines in such systems are analyzed. Solar collector with water as coolant is considered as heat source for the absorption refrigerating units. It is developed an original technique of calculation of the thermodynamic parameters of water-ammonia absorption cycle of refrigeration units, which allows you to determine the energy-efficient modes of operation and the relationship between the temperature of the object cooling, outside air and a source of thermal energy. Modes with maximum energy efficiency in the practical temperature range of the cooling medium (from 20 to 45 °C) and cooling facilities (from –30 to 15 °C) are shown during traditional AWARM cycle, and to achieve such optimum modes it is necessary the combination of the strong WA and temperature of the heating source. It is proposed the AWARM scheme with biasing booster compressor and scheme of pumpless AWARM. Researches are useful for developers of systems of receiving water from the air, particularly in tropical climates and in the absence of electrical power sources, as well as for developers of air conditioning systems.

Developed water-ammonia systems at low outdoor temperature (in spring and autumn) can be used as a cooler of food and raw materials.

**Keywords:** water-ammonia absorption refrigeration machine, water from the air, solar panels, technique for calculation of the thermodynamic cycles.

#### References

- Mehanizm «OON – vodnye resursy». *Mezhdunarodnoe desiatil'noe deistvii «Voda dlia zhizni», 2005–2015 gody*. Available: <http://www.un.org/ru/waterforlifedecade/unwater.shtml>
- Al' Maitami Valid Abdulvahid Mohammed, Frumin, G. T. (2007). Napravleniia sovershenstvovaniia vodoobespecheniia v stranah araviiskogo poluoostrova. *Modern Problems of Science and Education*, 6(2), 13–17. doi:10.17513/spno.2007.6.2
- Al' Maitami Valid Abdulvahid Mohammed, Frumin, G. T. (2008). Ekologicheski bezopasnye tehnologii vodoobespecheniia v stranah araviiskogo poluoostrova. *Modern Problems of Science and Education*, 3, 111–115. doi:10.17513/spno.2008.3
- Titlov, A. S., Krasnopol'skii, A. N. (2011). Analiz shem polucheniia vody iz atmosfernogo vozduha. *Miasnoe delo*, 6, 28.
- Ishchenko, I. N., Titlov, A. S., Krasnopol'skii, A. N. (2011). Perspektivy primeneniia absorbtionnykh vodoammiachnykh holodil'nykh mashin v sistemah polucheniia vody iz atmosfernogo vozduha. *Zbirnyk naukovykh prats Vinnytskoho natsionalnoho ahrarnoho universytetu. Seriia: Tekhnichni nauky*, 7, 92–97.
- Shelepov, V. A., Melkozerov, M. G. (2012). Poluchenie vody iz atmosfernogo vozduha pri pomoshchi razlichnykh holodil'nykh mashin. *Aktual'nye problemy aviatsii i kosmonavтики*, 8, 74–75.
- Vasylyv, O. B., Kovalenko, O. O. (2009). Struktura ta shliakhy ratsionalnoho vykorystannia vody na kharchovykh pidpriemstvakh. *Naukovi pratsi ONAKHT*, 35(1), 54–58.
- The European Solar Thermal Industry Federation (ESTIF). Available: <http://www.estif.org>
- Thermal solar line. *Rotartica, air conditioning appliances: – Solar Line, single effect 4,5 kW*. Available: [http://andyschroder.com/static/pdf/Rotartica/Rotartica\\_Product\\_Description.pdf](http://andyschroder.com/static/pdf/Rotartica/Rotartica_Product_Description.pdf)
- SorTech. *Innovative Cooling!* Available: <http://www.sortech.de/en/trade/solare-kuehlung>
- Henning, H.-M., Braun, R., Lokurlu, A., Noeres, P. (2005). Solare Kuehlung und Klimatisierung-Belueftung und Warmerueckgewinnung. *Solare Kuehlung und Klimatisierung*. Themen, 45–54. Available: [http://www.fvee.de/fileadmin/publikationen/Themenhefte/th2005/th2005\\_02\\_04.pdf](http://www.fvee.de/fileadmin/publikationen/Themenhefte/th2005/th2005_02_04.pdf)
- SOLID. *Solar Cooling*. Available: <http://www.solid.at/en/references/solar-cooling>
- Doroshenko, A. V., Goncharenko, V. A. (2015). Engineering development of multifunctional solar systems based on the heat-absorption cycle and heat and mass transfer devices with a mobile nozzle. *Refrigeration engineering and technology*, Vol. 51, № 1, 35–46. doi:10.15673/0453-8307.1/2015.36783
- SolarFrost. *Icebook*. Available: <http://www.solarfrost.com/en/ice-book.html>
- Jakob, U., Schneider, D., Eicker, U. (2005). Raumklimatisierung mittels solar betriebener Diffusion-Absorptionskaltmaschine. *Horizonte*, 26, 10–14.
- Tataurov, O. (2009). Holod – Solntse. Dlia izobretatelei i inzhenerov holodil'naia tehnika na al'ternativnykh istochnikah energii – bogateishee pole dlia tvorchestva. *Holodil'nyi biznes*, 7, 18–20.
- Zohar, A., Jelinek, M., Levy, A., Borde, I. (2007, September). The influence of diffusion absorption refrigeration cycle configuration on the performance. *Applied Thermal Engineering*, Vol. 27, № 13, 2213–2219. doi:10.1016/j.applthermaleng.2005.07.025
- Sözen, A., Menlik, T., Özbaş, E. (2012, February). The effect of ejector on the performance of diffusion absorption refrigeration systems: An experimental study. *Applied Thermal Engineering*, 33–34, 44–53. doi:10.1016/j.applthermaleng.2011.09.009
- Osadchuk, E. A., Titlov, A. S. (2012). Poisk energeticheskii effektivnykh teplovykh rezhimov vodoammiachnoi absorbtionnoi holodil'noi mashiny v shirokom diapazone ekspluatatsionnykh parametrov. *Journal of Food Science and Technology*, 4, 79–82.
- Titlov, A. S. (2006). Nauchno-tehnicheskie osnovy energosberezheniia pri proektirovanii holodil'nykh apparatov s absorbtionno-diffuzionnymi holodil'nyimi mashinami. *Naukovi pratsi Odeskoi natsionalnoi akademii kharchovykh tekhnologii*, 29(1), 194–200.
- Baranenko, A. V., Belozero, G. A., Tagantsev, O. M., Smyslov, V. I., Bondarev, V. N. (2009). Sostoiianie i perspektivy razvitiia holodil'noi otrasli v Rossii. *Holodil'naia tehnika*, 3, 20–24.
- Morosuk, L. I. (2014). Development and improvement of the heat using refrigerating machines. *Refrigeration engineering and technology*, 5, 23–29. doi:10.15673/0453-8307.5/2014.28695
- Sathyabhama, A., Ashok, B. (2008). Thermodynamic simulation of ammonia-water absorption refrigeration system. *Thermal Science*, Vol. 12, № 3, 45–53. doi:10.2298/tsci0803045s
- Osadchuk, E. A., Titlov, A. S., Mazurenko, S. Yu. (2014). Determination of power efficient operating conditions of absorption water-ammonia refrigerating machine in the systems for obtaining water from atmospheric air. *Refrigeration engineering and technology*, 4, 54–57. doi:10.15673/0453-8307.4/2014.28054
- Radchenko, N. I., Kononov, D. V. (2008). Holodil'nye teplo-ispol'zuiushchie tsikly s primeneniem efekta teplovoi kompressii. *Aviatsionno-kosmicheskaiia tehnika i tehnologii*, 8(55), 111–115.
- Ishchenko, I. N. (2010). Modelirovanie tsiklov nasosnykh i beznasosnykh absorbtionnykh holodil'nykh agregatov. *Naukovi pratsi Odeskoi natsionalnoi akademii kharchovykh tekhnologii*, 38(2), 393–405.

### PROCESS DESIGN OF UNFERMENTED PUFF SEMI-FINISHED PRODUCTS BASED ON MILK WHEY

page 37–41

It is proposed to use milk whey instead of water and citric acid in technology of unfermented puff semi-finished products, which is a valuable source of essential amino acids and is characterized by low industrial processing. Based on studies it is proved a positive effect of citric acid on the quality indicators of unfermented puff semi-finished products. Prototype has performance similar to semi-finished product using traditional technology in terms of flexibility and stretchability of dough for semi-finished product. The developed semi-finished product has a better performance than the traditional analog in terms of elasticity. Indicators of yield and humidity of ready semi-finished product have values that meet the demands of regulatory documents. Based on the obtained results it is developed the process of unfermented puff semi-finished products based on milk whey, which is characterized by low industrial processing.

**Keywords:** unfermented puff semi-finished product, milk whey, elasticity, firmness, stretchability, yield, humidity.

#### References

- Kuznetsova, L. S., Sidanova, M. U. (2007). *Tekhnologiya prigotovleniya muchnykh konditerskikh izdeliy*. Moscow: Publishing center «Akademy», 320.
- Poliakova, A. V. (2008). *The usage of antioxidant plant supplements in puff pastry production*. Donetsk, Ukraine, 23.
- Andreiev, A. N. (1992). *Sdobnyie bulochnyie i muchnyie konditerskie izdeliya iz sloenogo testa*. Moscow: CNIITEI of bakery, 48.
- Leung, H. K., Matlock, J. P., Meyer, R. S., Morad, M. M. (1984, November). Storage Stability of a Puff Pastry Dough with Reduced Water Activity. *Journal of Food Science*, Vol. 49, № 6, 1405–1409. doi:10.1111/j.1365-2621.1984.tb12808.x
- Andrews, J. L., Blundell, M. J., Skerritt, J. H.; In: Martin, D., Wrigley, C. W. (1991). A simple, high-throughput test for dough strength. *Proceedings of International Conference «Cereals International»*. Melbourne: Royal Australian Chemical Institut, 406–410.
- Davies, A. P., Patient, D. W., Ingman, S. J., Ablett, S., Drage, M., Asquith, M., Barnes, D. J. (1987). Wheat protein properties and puff pastry structure. *Proceedings of the 3rd International Workshop on Gluten Proteins, Budapest, Hungary, May 9–12, 1987*. World Scientific, 466–477.
- Frazier, P. J., Fitchett, C. S., Russell Eggitt, P. W.; In: Fardi, H. (1985). Laboratory measurement of dough development. *Rheology of Wheat Products*, 151–175.
- Hawks, C. L. (1988). Flour protein quality. *Proceedings of the 64th Annual Meetings*, 112–122.
- McGill, E. A. (1975). Puff pastry production. *Baker's Dig.*, 49, 28–38.
- Khramtsov, A. G. (2004). *Tekhnologiya produktov iz molochnoy syivorotki*. Moscow: DeLi, 587.
- Markhel, P. S., Gopshtein, U. L., Smelov, S. V. (1975). *Proizvodstvo pirozhnykh i tortov*. Moscow: Food processing industry, 320.

### MODELING OF DYNAMICS OF HEAT CONDUCTIVITY IN THE PROCESS OF DOUBLE-SIDED FRYING OF MEAT ON THE BASIS OF NONLINEAR OPTIMIZATION

page 41–47

Improvement of processes of meat thermal treatment and their regularities is an important task.

The purpose of the article is to present the results of research and the solution of the equation of non-stationary heat conductivity in the process of meat double-sided frying in the condition of compression.

In the article computer analytical research of dynamics of distribution of temperatures in pork meat is conducted at double-sided frying in the condition of compression, and possibilities of finding common decision for the equation of non-stationary heat conductivity are analyzed. Dynamics of temperatures change in meat is experimentally defined at double-sided frying in the condition of compression.

The thermal model of double-sided frying process in the condition of compression on the basis of a nonlinear method of the generalized lowering gradient which is used for smooth nonlinear tasks is for the first time offered.

**Keywords:** double-sided frying, meat, dynamics model, nonlinear optimization, heat conductivity.

#### References

1. Brazhnykov, A. M. (1987). *Theory of heat treatment of meat products* [Teoriya termicheskoi obrabotki miasoproduktov]. M.: Ahropromydat, 271.
2. Molchanova, N. Yu., Dorokhin, V. O., Skrypnyk, V. O. (2005). Analytical justification of improvement of process жариння meat products on a heating surface [Analytychne obgruntuvannia vdoskonalennia protsesu zharinnia m'iasnykh produktiv na nahrivalnii poverkhnii]. *Scientific bulletin of PUCCU*, 3(16), 87–90.
3. Skrypnyk, V. O., Herman, N. V., Molchanova, N. Yu. (2013). Analytical research the heat-exchanging and the mass-exchanging of processes at double-sided frying in functionally closed capacities [Analytychne doslidzhennia teplomassoobmennykh protsesiv pry dvostoronnomu zharenii u funktsionalno zamknutykh yemkostiakh]. *Analele Stiintifice ale Universitatii Cooperatist-Comerciale din Moldova/MOLDCOOP*, Vol. XII, 198–202.
4. Tykhonov, A. N., Samarskiy, A. A. (1977). *Equations of mathematical physics* [Uravneniya matematicheskoi fizyky]. M.: Science, 735.
5. Vladymyrov, V. S. (1981). *Equations of mathematical physics* [Uravneniya matematicheskoi fizyky]. M.: Science, 512.
6. Mykhailov, V. M. (2003). *Scientific justification and development of progressive processes and equipment for production of fried culinary products* [Naukove obgruntuvannia i rozrobka prohresyvykh protsesiv ta obladnannia dlia vyrobnytstva zharennykh kulinarnykh vyrobiv]. Kharkiv, 371.
7. Ramazanov, S. K. (2014). The dynamic nonlinear operated model of efficiency of development in difficult integrated systems [Dynamicheskaia nelyneinaia upravliaemaia model efektyvnosti razvitya v slozhnykh yntehrakhnykh sistemakh]. *Materialy V Mizhnarodnoi naukovykh konferentsii «Modeliuvannia ekonomiky: problemy, tendentsii, dosvid», 2–3 October 2014, Lviv*. Lviv: LNU n. a. I. Frank, 30–32.
8. Ramazanov, S. K., Velyhura, A. V., Yvanovskaia, M. V., Serhyenko, A. V.; In: Ponomarenko, V. S., Klebanova, T. S. (2014). *Mykro-y makromodely ekoloho-ekonomicheskoi y sotsyo humanytarnoi dynamyky: obzor, analiz y nekotore rezultati. Modelyrovanye y ynfarmatsyonnie tekhnolohyy v yssledovanyy sotsyalno-ekonomicheskyykh system: teoriya y praktyka*. Berdiansk, 604.
9. Ramazanov, S. K., Velyhura, A. V., Yvanovskaia, M. V. (2014). Problem of creation of the integrated automated system of an assessment and management of processes of life cycle [Problema sozdaniya yntehyrovanoi avtomatyzirovanoi systemy otsenky y upravleniya protsesamy zhyznennoho tsykla]. *Zbirnyk Naukovykh prats V Mizhnarodnoi NPK, 31 bereznia – 07 kvitnia 2014 r., London (Anhliia)*. Luhansk: LNU n. a. V. Dalia, 132.
10. Dorokhin, V. O., Sheliakov, O. P., Skrypnyk, V. O. (15.06.2004). Method of double-sided frying of meat and meat products under axial pressure [Sposib dvostoronnoho zharinnia m'iasa i m'iasoproduktiv pid osovym tyskom]. *Patent of Ukraine № 36799, MKV A 22 S 18/00*. Appl. № 2000020729; Filed 10.02.2000. Bull. № 6, 6.
11. Skrypnyk, V. O. (2002). *Research of process and improvement of the equipment for double-sided frying of meat under axial pressure* [Doslidzhennia protsesu ta vdoskonalennia obladnannia dlia dvostoronnoho zharinnia m'iasa pid osovym tyskom]. Kharkiv, 18.
12. Dorokhin, V. O., Herman, N. V., Sheliakov, O. P. (2004). *Thermal equipment of the enterprises of food* [Teplove obladnannia pid-priyemstv kharchuvannia]. Poltava: EPD PUCCU, 583.

### INVESTIGATION OF FOOD MEAT VALUE OBTAINED FROM BULL-CALVES OF POLISSYA MEAT BREED WITH DIFFERENT TYPES OF HIGHER NERVOUS ACTIVITY

page 47–50

Meat productivity of cattle is formed by wide range of morphological, biological, physiological characteristics, which depend on the species, genotype of animals, environmental conditions, type of higher nervous activity, diet and usefulness is measured by such indicators as the cost of feed per unit increase; body weight, absolute and relative growth rates, carcass yield, meat quality. Therefore, the study of biochemical processes in fattening bull-calves of Polissya meat breed, depending on the type of higher nervous activity and the effect of feeding feed additive «Mikrolipovit» on the main indicators of metabolism and meat productivity is extremely important.

The increase in the above parameters and urea indicates the enhancement of protein metabolism in calves, glucose, carbohydrate metabolism and total lipids resulting in increased meat productivity, improved slaughter performance and meat quality characteristics. Based on the data content and the ratio of essential nutrients, biological value of meat its technological properties must be concluded that the meat of calves of different types of higher nervous activity, characterized by optimum chemical composition and high usefulness protein that is fully consistent needs of consumers.

Maximizing productivity of fattening bull-calves, compared to other research groups, found in animals such as inert strong equilibrium type of higher nervous activity (3rd group).

**Keywords:** meat, bull-calves, Polissya meat breed, types of higher nervous activity, meat productivity.

#### References

1. Karpovskiy, V. I. (2010). Funktsionuvannia systemy hemostazu u koriv ryznykh typiv vyshchoi nervovoi diialnosti za umov stresu. *Biolihiia tvaryn*, 12(2), 132–138.
2. In: Baumgartner, W. (2005). *Klinische Propädeutik der inneren Krankheiten und Hautkrankheiten der Haus- und Heimtiere*. Hersteller: Parey Verlag, 220–240.
3. Zhukorskiy, O. M. (2009). Ratsionalnyi vypas i miasna produktyvnist anhuskykh buhaisiv. *Tvarynnystvo Ukrainy*, 7, 26–28.
4. Dutka, V. R. (2008). Khimichnyi sklad i enerhetychna tsinnist miasa kastrovanykh i nekastrovanykh buhaisiv. *Naukovyi visnyk Lvivskoho natsionalnoho universytetu veterynarnoi medytsyny ta biotekhnolohii imeni S. Z. Gzhytskoho*, 10(2), Part 5, 56–58.
5. Huziev, I. V., Marchenko, N. I., Tkachuk, V. P. (2003). Deiaki zabiini pokaznyky ta kontsentratsiia nukleinovykh kyslot u naidovshomu miazii spyny i vnutrishnykh orhanakh buhaisiv ryznykh henotypiv. *Rozvedennia i henetyka tvaryn*, 37, 73–78.
6. Vdovychenko, Yu., Vyshnevskiy, V., Speka, S. (2007). Poliska miasna: formuvannia i perspektyvy. *Tvarynnystvo Ukrainy*, 2, 58–60.
7. Blaster, K. L. (2007). *The energy metabolism of ruminants*. Ed. 2. London: Hutchinson scientific and technical, 456–500.
8. Melnyk, Yu. F. (2008). Khimichnyi sklad ta kulinaro-tekhnolohichni yakosti miasa buhaisiv molochnykh, kombinovanykh i miasnykh porid u riznomu vitsi. *Materialy Mizhnar. nauk.-prakt. konf., 4–6 veresnia, 2008 r. «Novitni tekhnolohii skotarstva»*. Mykolaiiv, 4–20.
9. Paska, M. Z., Romashko, I. S. (2012). Bilkovo-yakisnyi pokaznyk yalovychny zbahacheni biolohichno-aktyvny my rechovnyamy. *Zbirnyk naukovykh prats Vinnytskoho natsionalnoho ahrarnoho universytetu. Seriya «Tekhnichni nauky»*, 3, 170–175.
10. Kokorina, E. P. (1986). Rol' tipa nervnoi systemy v povyshenii produktivnosti korov pri intensifikatsii zhivotnovodstva. *VII Vsesoiuznyi simpozium po fiziologii i biokhimiilaktatsii. Part 1*. M., 109–110.
11. *Metodyky doslidzen z fiziolohii i biokhimiil silskohospodarskykh tvaryn*. (1998). Lviv, 131.

12. Antipova, L. V., Glotova, I. A., Rogov, I. A. (2001). *Metody issledovaniia miasa i miasnykh produktov*. M.: Kolos, 376.
13. Plohinskiy, N. A. (1978). *Rukovodstvo po biometrii dlia zootehnikov*. M.: Kolos, 256.

### INVESTIGATION OF THE EMULSIONS BASED ON FUNCTIONAL FOOD COMPOSITIONS CONTAINING PROTEIN

page 51–55

The increasing deficit of raw meat and its quality reduction necessitates the improvement of existing technologies that would allow not only the rational and efficient usage of raw meat, but also other sources of food proteins.

Effective ingredients that can improve the unstable functional-technological properties of raw meat are zoogenic and phyto-genic protein substances and hydrocolloids.

After analyzing the literary sources rational balance of food additives was chosen to create a functional food compositions. For recipes of created compositions indicators of emulsion sustainability and emulsifying ability were examined, what enabled to determine the ability to create a composition to absorb and store fat in its structure. Taking into account high stability indicators of the emulsion (45–18%), and emulsifying ability (91–53%) recipe number 3 is the best.

Positive impact of food additive E551 (silica) on these indicators was proved, because the stability of the emulsion and emulsifying ability increased by an average 3–5%.

**Keywords:** emulsifying ability, hydrocolloids, soy isolate, emulsion stability, animal proteins, silica.

#### References

1. Semenova, A. A. (2009). O tehnologicheskoi praktike primeneniia pishchevykh dobavok v miasnoi promyshlennosti. *Vse o miasе, 1*, 17–24.
2. Potipaeva, N. N., Gurinovich, G. V., Patrakova, I. S., Patshina, M. V. (2008). *Pishchevye dobavki i belkovye preparaty dlia miasnoi promyshlennosti*. Kemerovo, 101–158.
3. Ivanov, S. V., Pasichnyi, V. M., Strashynskiy, I. M., Fursik, O. P. (2014). Vplyv nanokompozitu na funktsionalni pokaznyky bilkovykh preparativ roslynnoho pokhodzhennia. *Tekhnolohiia vyrobnytstva i pere-robky produktii tvarynnystva, 2*(112), 74–78.
4. Prabhu, G. A., Doerscher, D. R., Hull, D. H. (2004, June). Utilization of Pork Collagen Protein in Emulsified and Whole Muscle Meat Products. *Journal of Food Science, Vol. 69, № 5*, 388–392. doi:10.1111/j.1365-2621.2004.tb10703.x
5. Ivanov, S. V., Pasichnyi, V. M., Strashynskiy, I. M., Fursik, O. P. (2014). Vplyv nanokompozitu na funktsionalni pokaznyky bilkovykh preparativ tvarynnoho pokhodzhennia. *Naukovyi visnyk Lvivskoho natsionalnoho universytetu veterynarnoi medytsyny ta biotekhnolohii imeni S. Z. Gzhytskoho, Vol. 16, № 3(60)*, 57–61.
6. Williams, P. A., Phillips, G. O. (2009). Introduction to food hydrocolloids. *Handbook of Hydrocolloids*. Elsevier, 1–22. doi:10.1533/9781845695873
7. In: Imeson, A.; Translated from English: Makarov, S. V. (2012). *Food Stabilisers, Thickeners and Gelling Agents*. SPb.: ID «Professiya», 408.
8. Wielinga, W. C.; In: Phillips, G. O., Williams, P. A.; Translated from English: Kochetkova, A. A., Sarafanova, L. A. (2006). Galactomannans. *Handbook of hydrocolloids*. Saint Petersburg: GIOR, 183–202.
9. International Risk Governance Council (IRGC). (2009). *Appropriate Risk Governance Strategies for Nanotechnology Applications in Food and Cosmetics*. Geneva, Switzerland. Available: [http://www.irgc.org/IMG/pdf/IRGC\\_PBnanofood\\_WEB.pdf](http://www.irgc.org/IMG/pdf/IRGC_PBnanofood_WEB.pdf)
10. *Market Attitude Research Services, Australian Community Attitudes about Nanotechnology – 2005 to 2009*. (2009). Australia: Department of Industry, Innovation, Science and Research. Available: <http://fr.slideshare.net/dabydeen/australian-community-attitudes-held-about-nanotechnology>
11. Antipova, L. V., Glotova, I. A., Rogov, I. A. (2001). *Metody issledovaniia miasa i miasnykh produktov*. M.: Kolos, 376.
12. Ivanov, S., Pasichnyi, V., Strashynskiy, I., Marinin, A., Fursik, O., Krepak, V. (2014). Polufabrikaty iz miasa indeiki s ispol'zovaniem tekstuformiruiushchih napolnitelei. *Himiia i tehnolohiia pishchi, 48*(2), 74–78.

### ENRICHMENT OF BAKERY PRODUCTS WITH BIOGENIC MINERALS

page 55–59

The paper presents the study of the mineral composition of bakery products balance, production of biogenic minerals.

A method of production of biogenic metals Mg and Mn colloids suspensions during electric spark dispersion in water has been presented.

Physicochemical properties of received colloids suspensions have been defined.

The possibility of integrated colloid suspensions of biogenic metals Mg and Mn for use in the baking industry has been studied.

It is proved that the use of suspensions of colloids of biogenic metals Mg and Mn has reduced the duration of proofing dough pieces, improved crumb color of finished products and extended duration of stale.

Also, along with the organoleptic and physicochemical indicators mineral content of bakery products has been improved, which enables directional regulation of the chemical composition of finished products.

**Keywords:** mineral composition, bakery products, a colloid suspension of biogenic metals Mg and Mn.

#### References

1. Spirichev, V. B. (2003). Vitaminy i mineral'nye veshchestva v kompleksnoi profilaktike i lechenii osteoporoza. *Voprosy pitaniia, 1*, 34–43.
2. Drobot, V. I. (1984). *Povyshenie kachestva hlebobulochnykh izdelii*. K.: Tehnika, 191.
3. Shatniuk, L. N., Spirichev, V. B. (2003). Opyt obogashcheniia zhelezom i vitaminami pshenichnoi muki, hlebobulochnykh izdelii i drugih pishchevykh produktov. *Pishchevaia promyshlennost', 8*, 92–94.
4. Berkowitz, A. E., Hansen, M. F., Parker, F. T., Vecchio, K. S., Spada, F. E., Lavernia, E. J., Rodriguez, R. (2003, January). Amorphous soft magnetic particles produced by spark erosion. *Journal of Magnetism and Magnetic Materials, Vol. 254–255*, 1–6. doi:10.1016/s0304-8853(02)00932-0
5. Shcherba, A. A., Zaharchenko, S. N., Lopat'ko, K. G., Shevchenko, N. I., Lomko, N. A. (2010). Razriadno-impul'snye sistemy proizvodstva nanokoloidnykh rastvorov biologicheskii aktivnykh metallov metodom OEID. *Trudy instituta elektrodinamiki NAN Ukrainy, 26*, 152–160.
6. Lopat'ko, K. G., Aftandiliants, E. G., Shcherba, A. A., Zaharchenko, S. N., Pobedash, K. K., Sviatnenko, V. A. (2010). Sintez ul'tra i nanorazmernih chastits biogenykh metallov metodom obiemnogo elektroiskrovogo dispergirovaniia. *Naukovyi visnyk Natsionalnoho universytetu bioresursiv i pryrodokorystuvannia Ukrainy, Vol. 144, Part 2*, 40–48.
7. Shcherba, A. A., Zaharchenko, S. N., Lopat'ko, K. G., Aftandiliants, E. G. (2008). Analiz metodov povysheniia effektivnosti elektroerozionnoi koaguliatsii pri oshistke vodnykh sred. *Tekhnicheskaiia elektrodinamika. Tematicheskii vypusk. Silovaia elektronika i energoeffektivnost', 2*, 120–125.
8. Lopat'ko, K. G., Olishevskii, V. V., Marinin, A. I., Aftandiliants, E. G. (2013). Obrazovanie nanorazmernoii fraktsii metallov pri elektroiskrovoy obrabotke granul. *Elektronnaia obrabotka materialov, 49*(6), 80–85.
9. Berkowitz, A. E., Walter, J. L. (1987, April). Spark erosion: A method for producing rapidly quenched fine powders. *Journal of Materials Research, Vol. 2, № 02*, 277–288. doi:10.1557/jmr.1987.0277
10. Lopatko, K. H., Aftandiliants, Ye. H., Shcherba, A. A., Zakharchenko, S. M., Yatsiuk, S. A.; assignee: National Agricultural University. (12.01.2009). Prystrii dlia otrymannia koloidnykh rozchyniv ultradyspersnykh poroshkiv metaliv. *Patent UA 38461, MPK (2006) B22F 9/08*. Appl. № u200810312. Filed 12.08.2008. Bull. № 1. Available: <http://uapatents.com/4-38461-pristriij-dlya-otrimannya-kolodnikh-rozchyniv-ultradispersnikh-poroshkiv-metaliv.html>
11. Drobot, V. I., Arsenieva, L. Yu., Bilyk, O. A., Dotsenko, V. F. et al. (2006). *Laboratnyi praktikum z tekhnolohii khlibopekarskoho ta makaronnoho vyrobnytstva*. K.: Tsentrvavch. lit-ry, 341.

**COMPARATIVE TESTING OF WOMEN'S TIGHTS, WHICH ARE REALIZED IN THE UKRAINIAN MARKET**

page 59–63

Assortment of women's tights represented on the Ukrainian market is diverse: medical and corrective tights, classic thin and warm, simple and exclusive, ornamental and sports, for pregnant women and moisturizing effect. The size, density, pattern, material composition, visual appearance, matching fashion trends, colors, pricing policy — all these are criteria for the selection of women's tights.

With such huge and diverse range of women's tights in the Ukrainian market, the problem of quality is especially important to meet the needs of potential customers. One of the most effective mechanisms for informing consumers about the quality of products, developed in the international and European community, are comparative testing of products and services.

The feasibility of an independent comparative testing of women's tights argued providing information to help potential customers make a rational choice between the brands that are present in the Ukrainian market, without undermining the position of producers. To achieve this goal in the complex it is necessary: to make the program and define test procedures with women's tights, to conduct laboratory research; to evaluate the results of the comparative testing; to inform potential customers about the results of comparative testing of women's tights.

As a result of comparative testing of samples of women's tights it is obtained next result: a sample of TM «Violetta», Ukraine — 4,5 («excellent»); sample of TM «Conte», Belarus — 4,0 («good»); sample of TM «Glamour», Italy — 4,0 («good»).

**Keywords:** assortment, quality, comparative testing, consumer, women's tights, laboratory tests, marking.

**References**

1. Tsitovich, I. G., Maliuta, V. V., Tsitovich, G. I., Galushkina, N. V. Novyi uroven' razvitiia tehnologii i assortimenta chulochno-nosochnyh izdelii. *Rossiiskii delovoi zhurnal «Bel'e i kolgotki»*. Available: <http://www.biko-info.ru/article0008.php#>. Last accessed 08.05.2015.
2. Materialy kolgotok i chulok. *Internet-zhurnal dlia zhenshchin «Chulki i kolgotki»*. Available: [http://www.finevom.ru/usefull\\_info/9\\_material\\_lingerie\\_lycra\\_Microfiber\\_Tactel\\_slim](http://www.finevom.ru/usefull_info/9_material_lingerie_lycra_Microfiber_Tactel_slim). Last accessed 27.04.2015.
3. Materialy i tehnologii. Tovarnye marki volokon, ispol'zuemyh v kollektsiiah firmy Vogue Group Oy. *Moio bel'e*. Available: [http://mialino.ru/menu/5/vogue\\_group\\_oy](http://mialino.ru/menu/5/vogue_group_oy). Last accessed 27.04.2015.
4. Which? exists to tackle the issues that matter to all consumers. *Which?* Available: <http://www.which.co.uk/about-which/who-we-are/overview/>. Last accessed 27.04.2015.
5. Es begann mit Rührgeräten und Nähmaschinen. *Stiftung Warentest*. Available: <https://www.test.de/unternehmen/chronik>. Last accessed 27.04.2015.
6. Kontsepsiia razvitiia v Ukraine nezavisimogo sravnitel'nogo testirovaniia tovarov i uslug dlia potrebitelei. *Portal spozhyvacha*. Available: <http://www.consumerinfo.org.ua/testing/comparative-testing-concept.php>. Last accessed 27.04.2015.
7. Sravnitel'noe testirovanie. *Portal spozhyvacha*. Available: [http://www.consumerinfo.org.ua/must\\_know/quality/detail.php?ID=4289](http://www.consumerinfo.org.ua/must_know/quality/detail.php?ID=4289). Last accessed 27.04.2015.
8. Kobryn, V., Olkhovska, V. (2013). Independent benchmark testing is a guideline for Ukrainian consumers at the market of goods and services. *Eastern-European Journal Of Enterprise Technologies*, 2(10(62)), 7–9. Available: <http://journals.uran.ua/eejet/article/view/12621>
9. Testirovanie (sravnitel'nye ispytaniia). *SMI «Rossiiskii institut potrebitel'skih ispytaniia»*. Available: <http://www.ripi-test.ru/23-testirovanie-sravnitelnye-ispytaniya>. Last accessed 08.05.2015.
10. Rall, G. (2011, September 27). Die teuren Strumpfhosen halten am längsten. *Saldo*, 15. Available: <https://www.saldo.ch/artikel/d/die-teuren-strumpfhosen-halten-am-laengsten/>. Last accessed 08.05.2015.
11. Kolgotki. *Product-test*. Available: <http://product-test.ru/kolgotki>. Last accessed 08.05.2015.