ABSTRACT AND REFERENCES

TECHNOLOGY AND EQUIPMENT OF FOOD PRODUCTION

MASS FLOW STABILITY METHOD IN THE EXTRACTION PROCESS CALCULATIONS (p. 4-9)

Katerina Georgiesh

Mass flow stability method, allowing to clarify the existing analytical dependences for calculating the target component withdrawal from the classical-shape bodies (unlimited plate, cylinder, sphere) was proposed. On the example of the III class bodies, application of the method is shown. A mathematical model of the target component extraction from the round particle was developed and the dependence to calculate the concentration was obtained. Consideration of the real body shape deviations from perfect in the form of the shape factor allows to refine the design value for the bodies, corresponding to the III class. It was found that the deviation of the concentration values for the perfect body from real would be the greater, the smaller the particle radius. The maximum relative error of calculations is 11.3 %. It is shown that the target component extraction process is rather complicated and depends strongly on a large number of defining physical characteristics: particle size, diffusion coefficient, mass transfer coefficient, temperature, duration.

Keywords: extraction, mathematical model, real-size bodies, target component, concentration, particle size.

References

1. Pluha, S. U. (2012). Razrabotka i naychnoe obosnovanie sposoba ekstragirovaniya iz yachmenya, gelydey i cikoriya gudkim dioksidom ugleroda Voron. gos.univers, 19.
2. Maksudov, R. N., Egorov, A. G., Mazo, A. B., Alyaev, V. A., Abdulin, I. Sh. (2008). Matematicheskaya model ekstragirovaniya semyan maslichnyh kyltur sverchkriticheskim dioksidom ugleroda. Svephc. fluidu: Teoriya i practica, 2, 20–32.
3. Mishenko, E. V., Mishenko, V. Ya. (2011). Modelirovanie processa ekstrakcii pectinovuh veshestv iz sveklichnogo goma s primeneniem vibracionnogo vozdeystviya.Vestnik OrelGAU, 3, 80–82.
4. Beloborodov, V. V. (1999). Ekstragirovanie iz tverduch materialov electromagnitnoum polem sverchvusokich chastot. Ing.-fiz. Gurnal, 1, 141–146.
5. Beloborodov, V. V. (1966). Osnovnue processu proizvodstva rastitelnuch masel. Moscow: Pish. prom, 474.
6. Lykov, A. V. (1978). Teplomassoobmen. Moscow: Energiya, 480.
7. Leont'ev, A. I. (Ed.) (1979). Teoriya teplomassoobmena. Moscow: Vyschayashkola, 495.
8. Chemat, F., Gravotto, G. (2013). Microwave-assisted extraction for bioactive compounds. Theory and practice. New York: Springer, 248.
9. Veynik, A. I. (1959). Pribligennuy raschet processov teploprovodnosti. Moscow: Gos.ener.izd, 183.
10. Lisyanskiy, S. M., Grebenuk, S. M. (1987). Ekstragirovanie v pishevoy promushlenosti. Moscow: Agropromizdat, 182.
11. Potapov, A. N. (2012). Issledovanie diffuzionnyh svojstv ryabiny obyknovennoj (Sorbus AucupariaL.). Tehnika i terhnologiya pishevyh proizvodstv, 4, 1–5.
12. Pushanko, N. N., Kuchar, V. N. (2013). Gidrodinamicheskie usloviya ekstragirovaniya i effektivnost rabotu diffuzionnuch ustanovok, 11, 2–6.

RESEARCH ON THE QUALITY OF MILK AND VEGETABLE MINCE BASED ON THE CONCENTRATE OF BUTTERMILK (p. 10-14)

Tatiana Yudina, Iryna Nazarenko, Radion Nykyforov

The paper presents a complex of data characterizing the quality of the designed milk and vegetable mince. We have identified the shares of the main nutrients in the milk and vegetable mince and found out that the designed mince contains more nutrients than it is required by the standard. Thus, the share of dry matter in the new mince exceeds the standard share by 2.05–6.32 %, fat –by 0.80–0.82 %, carbohydrates, in particular mono- and disaccharides, –by 6.24–6.28 %, pectin –by 0.37–1.63 %, and cellulose –by 0.18–0.53 %, which proves feasibility of combining dairy and plant material. Calculation of the amino acid score for the milk and vegetable mince shows that the mince proteins are free from limiting amino acids, whereas the share of all essential amino acids exceeds the FAO/WHO standards, which proves high biological value of the mince.

The research has proved that the relative biological value (RBV) and the rate of digestion by the main proteolytic enzymes make the designed mince excel the standard. The analysis of the obtained data additionally confirms the physiological phenomenon discovered by O. O. Pokrovsky.

We have proved that vegetable raw materials used as mince ingredients enrich the designed produce with vitamins and minerals. The research shows that the shares of vitamins in the milk and vegetable mince increase (vitamins of group B – 10.35–12.06 times, vitamin A – 4.50–5.50 times, and vitamin C – 5.60–7.02 times) in comparison with the standard while the content of all mineral elements makes the designed mince excel the standard.

Therefore, the designed mince is a promising raw material for manufacturing culinary products, which allows expanding the range of products with a higher nutritional and biological value.

Keywords: milk and vegetable mince, concentrate of buttermilk, nutritional value, biological value.

References

1. Maim, E. (1974). Utilization of milk proteins. Dairy Ind., 10, 379–380.
2. Deinychenko, G. V., Yudina, T. I., Vetrov, V. M. (2010). Novi vydy kopretsypitativ ta yikh vykorystannia v kharchovykh tekhnolohiiakh: monohrafiia. Donets'k: Donechchyna, 176.
3. Lipatov, N. N., Sazhynov, S. Yu., Bashkirov, O. Y. (2001). Sovokupnoe kachestvo tekhnolohycheskikh protsessov molochnoi promyshlennosti i kolichestvennyie kriterii eho otsenki. Khraneniie i pererabotka selchozsyria, 4, 33–34.
4. Shalyminov, O. V., Diatchenko, T. P., Kravchenko, L. O. et. al. (2003). Zbirnyk retseptur natsional'nykh strav ta kulinarnykh vyrobiv: Dlia pidpryiemstv hromad. kharchuvannia vsikh form vlasnosti. Kiev: Vydavnytstvo A.S.K.,848.
5. Maliuk, L. P. (1995). Teoreticheskoie i eksperimentalnoie obosnovaniie tehnologii polufabrikatov mnogofunktsionalnogo naznacheniia iz rastitelnogo syria. H., 317.
6. Martynov, A. V. (2000). Mirovie tendentsii postroeniia assortimentnoi politiki. Molochnaia promyshlennost, 2, 26.
7. Farag, R., Ahmed, F., Abdel, G. J. (1987). Effect of milk processing on the unsaponifiables and phocholipids of milk fractions. Grasos y aceites, 1, 39–44.
8. Nazarenko, T. A., Gavrilova, N. B. (2007). Issledovanie vliianiia rastitelnyh komponentov na biotehnologichesie parametry proizvodstva molochno-rastitelnogo fermentirovannogo desertnogo produkta. Vestnik Innovatsionnogo Evraziiskogo universiteta, 2, 193–200.
9. Golubeva, L. V., Melnikova, E. I., Tereshkova, E. B. (2005). Ispolzovanie rastitelnogo syria v tehnologii molokosoderzhashchih produktov funktsionalnoi napravlennosti. Molochnaia reka, 4, 38.
10. Schenker, S. (1999). Functional foods. Milk Ind. Int., 101 (9), 2A–3A.
11. Yudina, T. I. (2001). Rozrobka molochno-bilkovogo kontsentratu zi skolotyn ta yogo vykorystannia v tehnologiiah produktiv harchuvannia. Kharkiv, 158.
12. Yudina, T., Nazarenko, I. (2014). Biological Value Study for Milk-Plant Minced Masses from Buttermilk Concentrate. The advanced science journal, 2014 (2), 70–73. doi: 10.15550/asj.2014.02.070

RATIONALE FOR THE TECHNOLOGY OF EMULSION SAUCES BASED ON PROTEIN-CARBOHYDRATE SEMI-PRODUCTS (p. 15-19)

Radion Nykyforov, Victoria Gnitsevich

We have rationalized the use of protein-carbohydrate semis in the technology of producing emulsion sauces since a protein-carbohydrate semi-product has high stabilizing and emulsifying properties.

We have determined that to obtain a stable emulsion with high emulsifying properties, the rational stabilizer content should comprise 0.25 %, and the concentration of sugar should not exceed 5 %.

We have researched how the stability of PCS-based systems depends on pH of the environment and the temperature of emulsification and determined that functional and technological properties

of semi-finished products are maximized if the active acidity of the environment ranges from 4.5 to 6.0 units. The rational temperature for obtaining stable emulsion based on a semi-product is 20–35 °C.

The study and experimental research have justified the possibility of designing new technologies for semis-based emulsion products, which allows expanding the range of foodstuffs, increasing their nutritional and biological value, and intensifying the use of nutritional potential of dairy and plant raw material.

Keywords: sauce, protein-carbohydrate semi-product, emulsifying capacity, emulsion stability, guar gum.

References

1. Harrigan, W. F. (1998). Global Environment Outlook 2000. International Journal of Food Science & Technology, 5, 31–34.
2. Vasiukova, A. T., Kliuzov, B. N., Yarosheva, A. I. (2002). Sousy emulsionnogo tipa. Donetsk, 151.
3. Bloomberg, G. (1991). Proteins destaging proteins as emulsions. Food Marhet and technol, 1, 10–15.
4. Glagoleva, L. E. (1993). Calculation of amount natural enterosorbent in food compositions on a dairy basis. Bulletin NCSTU. S. Foodstuffs. Available at: http://www.ncstu/bulletin/foodstuffs.
5. Shiraiwa, M., Yamauchi, F., Harada, K., Okubo, K. (1990). Inheritance of "group A saponin" in soybean seed. Agricultural and Biological Chemistry, 54 (6), 1347–1352. doi: 10.1271/bbb1961.54.1347
6. Murphy, P. (1998). Masgeschneiderte Fettersatzstoffe. Ernahrungsindustrie, 7, 22–24.
7. Nykyforov, R. P. (2010). Tehnologiia napivfabrykativ dlia zbytoi desertnoi produktsii na osnovi nezhyrnoi molochnoi syrovyny. D.: DonNUET, 220.
8. Yudina, T. I. (2009). Nizkokaloriinye maionezy funktsionalnogo naznacheniia. Harchovi dobavky. Harchuvannia zdorovoi ta hvoroi liudyny, 150–152.
9. Surh, J., Decker, E., Mcclements, D. (2006). Influence of pH and pectin type on properties and stability of sodium-caseinate stabilized oil-in-water emulsions. Food Hydrocolloids, 20 (5), 607–618. doi: 10.1016/j.foodhyd.2005.07.004
10. Kliuchnikova, L. V. (2005). Syvorotochnie proteiny v proizvodstve maionezov i spredov. Masla i zhiry, 9, 2–3.
11. Naimushina, E. G. (2004). Razrabotka tehnologii maioneza povyshennoi pishchevoi i biologicheskoi tsennosti. Izvestiia vuzov. Pishchevaya tehnologiya, 2, 55–56.
12. Zharinov, A. I. (2008). Eksperimentalno-kompiuternoe modelirovanie retseptur maionezov, obogashchennyh yodom. Maslozhirovaia promyshlennost, 1, 34–37.
13. Skryabina, N. M. (2007). Issledovanie mehanizma emulgirovaniia pishchevyh produktov. Hranenie i pererabotka selhozsyria, 4, 22–23.
14. Kravchenko, M. F., Antonenko, A. V. (2010). Tehnologiia sousiv na osnovi dietychnyh dobavok. Aktualni problemy bezpeky harchuvannia, 29.
15. Sonntag, H., Ruske, N. (1971). Beitrage zur Wechselwirkung ungleihartiger Teilchen in Flusslgheiten. Colloid Zeitschrift und Zeitschrift fur Polymere, 2, 700–703.

EFFECT OF HEAT TREATMENT WITH ANTIOXIDANTS ON RESPIRATORY SUBSTRATES DURING STORAGE OF CUCUMBERS (p. 19-25)

Olesia Priss

Despite the proven effectiveness of heat treatment and antioxidants to slow down the respiratory metabolism, their combined effect during storage of cucumbers was not considered in this aspect. The paper describes the results of investigating the effect of heat treatment with complex antioxidant on respiration rate and expenditure of solids, soluble solids, sugars and titrated acids during storage of cucumbers.

It was found that heat treatment with antioxidants inhibits the respiration rate and suspends the start of the respiration rate increase by 7 days compared with control fruits. The combination of heat treatment and antioxidants allows to obtain by on average 11 % more solids and 13 % more soluble solids on the 21th day of storage. Cucumbers, treated with antioxidants involve less sugar in the respiratory process. After 21 days of storage, the total amount of sugars in study fruits of the Athena hybrid is higher on average by 12 %, and in Masha cucumbers – by 42 % compared with control fruits. Based on the pair correlation analysis, it was found that acids can be a major respiratory substrate during storage of cucumbers. The combination of heat treatment and antioxidants can be an effective tool to reduce the loss of nutrients during storage of cucumbers.

Keywords: cucumbers, storage, antioxidants, respiration rate, solids, sugars, titrated acids.

References

1. Saltveit, M. E. (2007). Respiratory metabolism. In Gross, K. C., Wang, C. Y., Saltveit, M. (Eds.) Agricultural handbook number 66 : The commercial storage of fruits, vegetables, and florist and nursery stocks. US Dept. Agr., Washington, DC. May. Available at: http://www.ba.ars.usda.gov/hb66/respiratoryMetab.pdf
2. Peiris, K. H. S., Mallon, J. L., Kays, S. J. (1997). Respiratory rate and vital heat of some specialty vegetables at various storage temperatures. HortTechnology, 7 (1), 46–49.
3. Lee, L., Arul, J., Lencki, R., Castaigne, F. (1996). A review on modified atmosphere packaging and preservation of fresh fruits and vegetables: Physiological basis and practical aspects—part II. Packaging technology and science, 9 (1), 1–17. doi: 10.1002/(sici)1099-1522(199601)9:1<1::aid-pts349>3.0.co;2-w
4. Dhall, R. K. (2013). Advances in edible coatings for fresh fruits and vegetables: a review. Critical reviews in food science and nutrition, 53 (5), 435–450. doi: 10.1080/10408398.2010.541568
5. Laamim, M., Lapsker, Z., Fallik, E., Ait-Oubahou, A., Lurie, S. (1998). Treatments to reduce chilling injury in harvested cucumbers. Advances in horticultural science, 12 (4), 175–178.
6. Archbold, D. D., Pomper, K. W. (2003). Ripening pawpaw fruit exhibit respiratory and ethylene climacterics. Postharvest Biology and Technology, 30 (1), 99–103. doi: 10.1016/S0925-5214(03)00135-2
7. Chalmers, D. J., Rowan, K. S. (1971). The climacteric in ripening tomato fruit. Plant physiology, 48 (3), 235240. doi: 10.1104/pp.48.3.235
8. Saltveit, M. E., McFeeters, R. F. (1980). Polygalacturonase activity and ethylene synthesis during cucumber fruit development and maturation. Plant physiology, 66 (6), 1019–1023. doi: 10.1104/pp.66.6.1019
9. Knowles, L., Trimble, M. R., Knowles, N. R. (2001). Phosphorus status affects postharvest respiration, membrane permeability and lipid chemistry of European seedless cucumber fruit (Cucumis sativus L.). Postharvest biology and technology, 21 (2), 179–188. doi: 10.1016/s0925-5214(00)00144-7
10. Saltveit, M. E.; Gross, K. C., Wang, C. Y., Saltveit, M. (Eds.) (2007). Cucumber. Agricultural handbook number 66: The commercial storage of fruits, vegetables, and florist and nursery stocks. US Dept. Agr., Washington, DC. Available at: http://www.ba.ars.usda.gov/hb66/cucumber.pdf
11. Kang, H. M., Park, K. W., Saltveit, M. E. (2002). Elevated growing temperatures during the day improve the postharvest chilling tolerance of greenhouse-grown cucumber (Cucumis sativus) fruit. Postharvest Biology and Technology, 24 (1), 4957. doi: 10.1016/S0925-5214(01)00129-6
12. Moalemiyan, M., Ramaswamy, H. S. (2012). Quality retention and shelf-life extension in mediterranean cucumbers coated with a pectin-based film. Journal of Food Research, 1 (3), 159168. doi: 10.5539/jfr.v1n3p159
13. Eaks, I. L., Morris, L. L. (1956). Respiration of cucumber fruits associated with physiological injury at chilling temperatures. Plant Physiology, 31 (4), 308–313. doi: 10.1104/pp.31.4.308
14. Priss, O. P., Prokudina,T. F., Zhukova, V. F. (2009). Substance for the treatment of fruit vegetables before storage. Pat. 41177 Ukraine, IPC A23B 7/00, A23L 3/34.
15. Dykyi, I. L., Ostapenko, V. M., Filimonova, N. I., Heyderikh, O. H., Kovalov, V. V. (2005). Microbiological study a chlorophyllipt for prepare a soft form of anti-infective drug. Journal of Pharmacy, 4, 73–76.
16. Sanitary rules and regulations on the use of food additives: approved Ministry of Health of Ukraine 23.07.96 № 222. Available at: http://zakon4.rada.gov.ua/laws/show/z0715-96
17. Ben-Yehoshua, S. Rodov, V.; Bartz, J. A., Brecht, J. K. (Eds.) (2003). Transpiration and water stress. Postharvest physiology and pathology of vegetables. Dekker. New York, 111–159.
18. Priss, O. P., Kalitka, V. V. (2014). Reduction of losses during storage vegetables sensitive to low temperatures. Progressive technique and technology of food production and restaurant industry trade, 1 (19), 209–221.
19. Priss, O. P., Kulik, A. S. (2014). Color stabilization of green vegetables at storage. Eastern-European Journal of Enterprise Technologies, 4/10 (70), 5358. doi: 10.15587/1729-4061.2014.26231
20. Priss, O. P. (2015). Firmness and weight loss in stored cucumbers and zucchini. The Bulletin of the National Technical University "Kharkiv Polytechnic Institute" series: "New solutions in modern technologies", 14 (1123), 60–64.
21. Nakamach, A., Yoshikawa, M., Kasai, M., Hatae, K. (2002). Change and distribution of taste components during the storage of cucumber. Journal of cookery science of Japan, 35 (3), 234–241.
22. Handley, L. W., Pharr, D. M., McFeeters, R. F. (1983). Carbohydrate changes during maturation of cucumber fruit implications for

sugar metabolism and transport. plant physiology, 72 (2), 498502. doi: 10.1104/pp.72.2.498
23. McFeeters, R. F., Fleming, H. P., Thompson, R. L. (1982). Malic and citric acids in pickling cucumbers. Journal of Food Science, 47 (6), 18591861. doi: 10.1111/j.1365-2621.1982.tb12899.x
24. Lu, Z., Fleming, H. P., McFeeters, R. F. (2002). Effects of fruit size on fresh cucumber composition and the chemical and physical consequences of fermentation. Journal of food science, 67 (8), 29342939. doi: 10.1111/j.1365-2621.2002.tb08841.x
25. Verheul, M. J., Slimestad, R., Johnsen, L. R. (2013). Physicochemical changes and sensory evaluation of slicing cucumbers from different origins. European journal of horticultural science, 78 (4), 176183.
26. Castro, S. M., Saraiva, J. A., Lopes-da-Silva, J. A., Delgadillo, I., Van Loey, A., Smout, C., Hendrickx, M. (2008). Effect of thermal blanching and of high pressure treatments on sweet green and red bell pepper fruits (Capsicum annuum L.). Food Chemistry, 107 (4), 14361449. doi: 10.1016/j.foodchem.2007.09.074

RESEARCH OF REDUCING AND EMULSIFYING ABILITIES OF VEGETABLE AND FRUIT POWDER (p. 26-30)

Alexandra Niemirich, Oksana Petrusha, Alexander Yasyuchenko, Drozd Drozd

The problem of investigating reducing and emulsifying abilities of cabbage powders, obtained by drying with the mixed heat supply at temperatures of 50 and 70 °C, as well as spinach and banana powders of low temperature drying was considered in the paper. These methods allow to obtain a dried product with a moisture mass fraction of no more than 7 %, maximally preserve the nutritional value of the dried products and reducing ability.

Dispersion of cabbage, spinach and banana powders was determined by a microscopic method. It was shown that the majority of the cabbage powder particles at drying temperatures of 50 and 70 °C have sizes of up to 40 microns – 75...85 % and only about 15...25 % – 60... 100 microns. Powders obtained by low-temperature drying contain medium and large particles (over 40 microns) – 29 % in spinach and 47 % in banana.

The structure of cabbage, spinach and banana powders was investigated using the microscopic method. It was shown that the powder cabbage obtained by MHS-drying at a temperature of 50 °C has more compacted particle structure (at magnification by 1000 times) than at 70 °C. Spinach powder is represented by separate small particles, banana powder – by spherical-shaped particles, uniform throughout the mass.

The rehydration ability of powders was investigated. It was found that at the process duration of $\tau \leq 10$ min, the behavior of vegetable and banana powders is characterized by intense swelling in water at 20 °C. After 30 min, the swelling process ends up and reaches a maximum value for the cabbage powder at 70 °C – 920 %, for the spinach powder – 380 %, cabbage powder of MHS-drying at 50 °C takes an intermediate value. The banana powder swells least of all.

Powder cabbage of MHS-drying at 50 °C absorbs less water than at 70 °C. Spinach and banana powders have the WA (water amount) value by 2...3 times lower than the cabbage samples.

Structural analysis of IR spectra of fresh vegetable and powders obtained after drying at temperatures of 50 and 70 °C was performed. Studies indicate minor changes in the chemical composition of the raw material during drying at temperatures of 50 °C and 70 °C.

The regularities of increase in water retention, fat retention and emulsifying abilities of cabbage powder of MHS-drying at the process temperature increase was revealed: the sample shows high values of the studied parameters compared to the sample of MHS-drying at 50 °C. Spinach and banana powders show low values of these technological properties.

Keywords: vegetable powders, banana powder, dispersion, rehydration, fat retention, emulsifying ability.

References

1. Pohozhykh, N. Y. (2002) Nauchnыe osnovy teoryy y tekhnyky sushky pyshchevoho syr'ya v massoobmennыkh modulyakh. Kharkiv, 365.
2. Pohozhykh, M. I., Yevlash, V. V., Nyemirich, O. V., Tarasenko, T. A., Havrysh, A. V., Novosad, O. O., Kardavar, K. M. (2013) Patent na vynakhid № 107146 Ukrayiny. Sposib vyrobnytstva sushenoyi kapusty, № a 2013 08406, byul. № 22.
3. Snezhkyn, Yu. F., Boryak, L. A., Khavyn, A. A. (2014). Enerhosberehayushchye teplotekhnolohyy proyzvodstva pyshchevykh poroshkov yz vtorychnykh syr'evykh rseursov. Kyev, Naukova dumka, 227.
4. RST URSR 856-89. Poroshki ovoshhnye iz shpinata, zelenogo goroshka, kabachkov, morkovi, tomatov ili koncentrirovannyh tomatoproduktov. Tehnicheskie uslovija (1989). vved. 1989-01-01. Moscow: Izd-vo standartov, 8.
5. TU U 15.3–05417118.024–2002 Poroshki ovochevi (2002). Vved. 2002-10-02. Kiev: Derzh. komitet Ukraïni po standart., metrol. ta sertif., 38.
6. Antypov, S. T. (2003). Teplo- y massoobmen pry konvektyvnoy sushke v dvyzhushchemsya sloe produkta. Modernyzatsyya sushchestvuyushcheho y razrabotka novykh vydov oborudovanyya dlya pyshchevoy promyshlennosty : Sb. nauch. tr., 13, 6–9.
7. Antipov, S. T. (2002) Vliyanie znacheniy napryazhennosti elektromagnitnogo polya na protsess dielektricheskoy sushki semyan koriandra. Hranenie i pererabotka selhoz. syirya, 9, 50–51.
8. Pavlyuk, R. Yu., Cherevko, A. I., Pogarskaya, V. V. et. al. (2002) Novyie tehnologii biologicheski aktivnyih dobavok s ispolzovaniem v produktah immunomodeliruyuschego i radiozaschitnogo deystviya. Monografiya, K, Hark. gos. akademiya tehnologii i organizatsii pitaniya, 205.
9. Snezhkin, Yu. F. (1993) Nauchnyie osnovyi razrabotki resursosberegayuschih tehnologiy proizvodstva fruktovo-yagodnyih poroshkov. Kiev, 631.
10. Penkin, A. A. (2005) Razrabotka ustroystva infrakrasnogo izlucheniya dlya termicheskoy obrabotki zerna i lokalnogo obogreva. Moscow, 20.

THE APPLICATION OF HIGH PRESSURE AS AN ALTERNATIVE TO THERMAL PROCESSING OF POULTRY MEAT (p. 31-36)

Ludmila Vinnikova, Irina Prokopenko

An innovative technology that allows to get the finished product based on poultry meat by athermal processing method was considered in the paper. Research to determine the effect of high hydrostatic pressure on the total number of microorganisms in the poultry meat, as well as opportunistic pathogenic and pathogenic microflora were conducted. High-pressure processing modes, which involve the acid phosphatase enzyme inactivation, which characterizes the culinary readiness degree of poultry meat were determined. The research results of the organoleptic characteristics of samples subjected to conventional thermal processing and high hydrostatic pressure processing were presented. The changes in the product weight loss during the thermal and athermal processing of meat were shown. Based on the research results, rational modes of the high-pressure processing of poultry meat to achieve a complete culinary readiness, safety and high organoleptic characteristics of the finished product were recommended. It is proved that the application of high hydrostatic pressure is possible as an alternative to thermal processing of meat products.

Keywords: high hydrostatic pressure, thermal processing, poultry meat, culinary readiness.

References

1. Sukmanov, V. A., Hazipov V. A. (2003). Sverchvusokoe davlenie v pishevuch technologiyach. Donetsk: DonGUET, 168.
2. Vinnikova, L. G. (2000). Teoriya I praktika pererobku myasa. Izmail: SMIL, 172.
3. Rogov, I. A., Nekrutman S. V., Lusov, G. V. (1981). Technika sverchvusokogo chastotnjgj nagreva pishevuh produktov. Moscow: Legkaya I pishevaya promushlennost', 200.
4. Shlifera E. D. (Ed.) (1971). SVCh-energetika. Vol. 2. Moscow: Mir, 243.
5. Tumenov, S. N., Gorbatov, A. V., Kosoy, V. D. (1991). Obrabotka myasnuh produktov davleniem. Moscow: Agropromizdat, 205.
6. Arabas, J.; Ludwig, H. (Ed.) (1999). New technique for kinetic studies of pressure-temperature induced changes of biological materials. Advances in High Pressure Bioscience and Biotechnology. Verlag, Heidelberg: Springer, 537–540.
7. Cheftel, J. C. (1995). Effect of high-pressure on meat: a review. Meat Science, 46 (3), 211–236. doi: 10.1016/s0309-1740(97)00017-x
8. Okamoto, A. (2001). Effects of high hydrostatic pressure-thawing on pork meat. Nippon Shokuhin Kagaku Kogaku Kaishi, 48 (12), 891–898.
9. Hoover, D. Cr., Metrick, Caralyn Papineau Anne M. (1989). Biological effects of high hydrostatic pressure on food microorganisms. Food Technology, 43 (9), 99–107.
10. Chlopin, G. W., Tamman, G. Z. (1912). Pressure and temperature induced inactivation of microorganisms. Hygiene Infections krankh, 45, 171–179.

11. Knorr, D.; Gould, G. W. (Ed.) (1995). Hydrostatic pressure treatment of food: microbiology New methods of food preservation, 159–175. doi: 10.1007/978-1-4615-2105-1_8
12. Heremans, K. (1982). High Pressure Effects on Proteins and other Biomolecules. Annual Reviews in Biophysics and Bioengineering, 11 (1), 1–21. doi: 10.1146/annurev.bb.11.060182.000245
13. Karłowski, K., Windyga, B., Fonberg-Broczek, M., Ścieżyńska, H., Grochowska, A., Górecka, K. et. al. (2002). Effects of High Pressure Treatment on the Microbiological Quality, Texture and Colour of Vacuum Packed Pork Meat Products. High Pressure Research, 22 (3–4), 725–732. doi: 10.1080/08957950212424
14. Cruess, W. V. (1924). Commercial fruit and vegetable products: a textbook for student, investigator and manufacturer. New York: McGraw-Hill Book Company, 530.
15. Sushestvuyt li sposobu prodlit' sroki hraneniya ochlagdennogo myasa do 2 mesyazev I vushe? (2013). Myasnoy biznes, 11, 42–44.
16. Shoji, T., Saeki, H. (1989) High pressure using in food. Processing foods, ser food Engineering and manufacturing, 52, 75–83.
17. Antipova, L. V., Glotova, I. A., Rogov, I. A. (2004). Metodu issledovaniya myasa I myasnuch produktov. Moscow: Kolos, 571.
18. Guravskaya, N. K., Alechina, L. T., Otryashenkova, L. M. (1985). Issledovanie I kontrol' kachestva myasa I myasoproduktov. Moscow Agropromizdat, 296.

IMPACT OF ELECTRICALLY ACTIVATED WATER FRACTIONS ON FUNCTIONAL AND PROCESSING PROPERTIES OF BEEF AND PORK (p. 36-43)

Lydmila Vinnikova, Kseniya Pronkina

The article shows the influence of electrically activated water on functional and processing properties of beef and pork. It determines the dependence of pH, water-binding capacity, and losses during heating of test items on induced mixture of electrically activated water fractions. The article establishes that using electrically activated water fractions within ratio range of 30/70 – 100 % catholyte allows to purposefully change the active acidity of minced beef and pork; to change water-binding capacity of beef from 1 % to 8 %, of pork – from 0.7 % to 8.8 %; decrease water loss from heating for beef on 1.6–8.6 %, for pork – from 1.8 to 8.8 %.

The author points out the practical importance of electrically activated water in production of cooked sausage. The article describes the influence of electrically activated water on organoleptic properties of test items. Positive quality attributes of items with electrically activated water fractions were observed within catholyte/anolyte fraction ratio range of 70/30 – 40/60. Their quality attributes are most stable in the storage process. The article determines the most effective ratio of electrically activated water fractions for improvement of beef and pork properties. It is recommended to use electrically activated water with catholyte/anolyte fraction ratio range of 70/30 in the amount of 20–25 % to the mass of meat.

Keywords: electrically activated water, catholyte, anolyte, functional and processing properties of meat, organoleptic properties, minced meat, sausages.

References

1. Feyner, G. (2010). Myasnyie produktyi. Nauchnyie osnovyi, tehnologi, prakticheskie rekomendatsii. SPb: Professiya, 720.
2. Kudryashov, L. S. (2008). Fiziko-himicheskie i biohimicheskie osnovyi proizvodstva myasa i myasnyih produktov. Moscow: DeLi print, 160.
3. Kuznetsova, T. G. (2007). Nauchno-prakticheskie osnovyi strukturoobrazovaniya myasoproduktov iz syirya razlichnogo kachestva v usloviyah napravlennyih biotehnologicheskih vozdeystviy. Moscow, 395.
4. Rogov, I. A., Zharinov, L. I., Voyakin, M. P. (2008). Himiya pischi. Printsipyi formirovaniya kachestva myasoproduktov. SPb.: Izdatelstvo RAPP, 340.
5. Prieto, N., Roehe, R., Lavín, P., Batten, G., Andrés, S. (2009). Application of near infrared reflectance spectroscopy to predict meat and meat products quality: A review. Meat Science, 83 (2), 175–186. doi: 10.1016/j.meatsci.2009.04.016
6. Damez, J.-L., Clerjon, S. (2013). Quantifying and predicting meat and meat products quality attributes using electromagnetic waves: An overview. Meat Science, 95 (4), 879–896. doi: 10.1016/j.meatsci.2013.04.037
7. Li, C., Liu, D., Zhou, G., Xu, X., Qi, J., Shi, P., Xia, T. (2012). Meat quality and cooking attributes of thawed pork with different low field NMR T21. Meat Science, 92 (2), 79–83. doi: 10.1016/j.meatsci.2011.11.015
8. Bahir, V. M., Tsikoridze, N. G., Spekto,r L. E. (1988). Elektrohimicheskaya aktivatsiya vodnyih rastvorov i eYo tehnologicheskoe primenenie v pischevoy promyishlennosti: Obzornaya informatsiya. Tbilisi: GruzNIINTI, 3, 80.
9. Bahir, V. M. Zadorozhniy, Yu. G., Leonov, B. I., Panicheva, S. A., Prilutskiy, V. I., Suhova, O. I.; Bahir, V. M. (Ed.) (1999). Elektrohimicheskaya aktivatsiya: istoriya, sostoyanie, perspektivyi. Akademiya mediko-tehnicheskih nauk Rossiyskoy Federatsii. Moscow: VNIIIMT, 256.
10. Hatsukov, S. M. (2003). Issledovanie svoystv elektroaktivirovannoy vodyi. Mehanizatsiya i elektrifikatsiya selskogo hozyaystva, 3, 14–15.
11. Reznikov, K. M. (2006). Svoystva vodyi i informatsionnyie aspektyi formirovaniya effektov deystviya elektroaktivirovannyih vodnyih rastvorov. Prikladnyie informatsionnyie aspektyi meditsinyi, 9 (1), 3–14.
12. Maevskaya, T. N., Vinnov, A. S., Babkov, N. I. (2012). Ispolzovanie elektroaktivirovannoy vodyi v tehnologii ryibnyih belkovyih mass. Harchova nauka I tehnologIya, 1, 18.
13. Osadchenko, I. M., Gorlov, I. F. (2010). Tehnologiya polucheniya elektroaktivirovannoy vodyi, vodnyih rastvorov i ih primenenie v APK: Monografiya. Volgograd: Volgogradskoe nauchnoe izdatelstvo, 92.
14. Borisenko, A. A., Shamanaeva, E. A. (2004). Issledovanie izmeneniya rN i OVP sredyi posredstvom smesheniya kisloy i schelochnoy fraktsiy elektroaktivirovannoy vodyi . Vestnik SevKav GTU, Prodovolstvie, 1, 7.
15. Plutahin, G. A., Koschaev, A. G., Aider, M. (2013). Praktika ispolzovaniya elektroaktivirovannyih vodnyih rastvorov v agropromyishlennom komplekse. Politematicheskiy setevoy elektronnyiy nauchnyiy zhurnal Kubanskogo gosudarstvennogo agrarnogo universiteta, 09, 497.
16. Aider, M., Gnatko, E., Benali, M., Plutakhin, G., Kastyuchik, A. (2012). Electro-activated aqueous solutions: Theory and application in the food industry and biotechnology. Innovative Food Science & Emerging Technologies, 15, 38–49. doi: 10.1016/j.ifset.2012.02.002
17. Gnatko, E. N., Kravets, V. I., Leschenko, E. V., Omelchenko, A. (2011). Emergence of the Science and Technology of Electroactivated Aqueous Solutions: Applications for Environmental and Food Safety. Environmental Security and Ecoterrorism, 101–116. doi: 10.1007/978-94-007-1235-5_8
18. Podkolzin, A. A. et al. (2001). Effects of Electroactivated Solutions on Antioxidant Enzymes. Bulletin of experimental biology and medicine, 131 (1), 53–55.
19. Zhuravskaya, N. K., Alehina, L. T., Otryashenkova, L. M. (1985). Issledovanie i kontrol kachestva myasa i myasoproduktov. Moscow: Agropromizdat, 296.

IMPROVING THE EFFICIENCY OF THE APPARATUS WITH COUNTER SWIRLING FLOWS FOR THE FOOD INDUSTRY (p. 43-48)

Marina Savchenko-Pererva, Alexander Yakuba

The tendency for increased process performance, reduced sizes of plants, accelerated processes occurring in them led to the broader study of dust separation equipment concerning the mathematical modeling of the dust particle separation process in the system of counter swirling flows (CSF) as well as the areas of their structural improvement. To eliminate the inhibitory effect of angular momentum in the primary swirler and align relationships with gas flow rates, the angular momentum equation for the new ACSF (apparatus with counter swirling flows), which allowed to find a place for structural improvement was derived.

The dependencies of velocity fields of gas flows and overall efficiency of the apparatus with counter swirling flows before and after the improvement using previously obtained methods for calculating the flow patterns were proposed. The methodology for calculating fractional efficiency for each layer in the apparatus: external, internal and overall effectiveness was developed.

The Walter Bart method for calculating the resistance of an experimental model of the apparatus with counter swirling flows was used. Based on the research, summarized and optimal calculations for finding ACSF pressure losses since it is one of the main characteristics in the energy efficiency evaluation were proposed.

Keywords: dust separator, angular momentum, flow rates, improvement, efficiency, hydraulic losses.

References

1. Pavlyshchev, M. Y., Feshenko V. Z. (1985). Sposob ochystky hazopylevoho potoka y ustroistvo dlia eho osushchestvlenyia. A. s. №1171094 (SSSR). B 04 C. Buil.29.
2. Belousov, A. S. (1996). Struktura vstrechnykh zakruchennykh potokov y raschet efektyvnosty tsentrobezhnoho razdelenyia hazovzvesei. Moscow: MTI, 227.

3. Sazhyn, B. S. (1995). Vykhrevye pyleulovytely. Khymyia, 144.
4. Suhak, E. V.(1999). Modelyrovanye y yntensyfykatsyia protsessov ochystky promyshlennykh hazovykh vybrosov v turbulentnykh hazodyspersnykh potokakh. Krasnoiarsk, 46.
5. Belousov, A. S., Sazhyn, B. S., Otrubiannykov, E. V. (2008). Struktura potokov v apparatakh so vzveshennym sloem. Khymycheskaia tekhnolohyia, 9 (7), 332–336.
6. Sazhyn, B. S., Kochetkov, L. M., Belousov, A. S. (2008). Uderzhyvaiushchaia sposobnost y struktura potokov v vykhrevykh aparatakh. Teoretycheskye osnovy khym. tekhnolohy, 42 (2), 125–135.
7. Yakuba, O. R., Kasianchuk, V. V., Savchenko, M. Y. (2008). Udoskonalennia aparativ iz zustrichnymy zakruchenymy potokamy dlia pylovlovlennia. Visnyk SNAU. Naukovyi zhurnal. Seriia: Mekhanizatsiia ta avtomatyzatsiia vyrobnychykh protsesiv, 2 (18), 85–89.
8. Yakuba, A., Sabadash, S., Savchenko, M. (2009). The investigation and Vorking out of drop- and dust catchers for compressor station . UK «International Conference on Compressors and their Systems». Institution of mechanical engineers. City University London, 421–431.
9. Smulskyi, Y. Y. (1992). Aerodynamyka y protsessy v vykhrevykh kamerakh. VO «Nauka», 301.
10. Belousov, A., Sazhyn, B. (2003). Application of Guided Vortex Breakdown for Drying and Separation of the Powder in Vortex Cyclone. Proceeding of The Second Nordic Drying Conference (NDC-03). Penmark, 1–5.
11. Koval, V. P. (1989). Sovershenstvovanye enerhetycheskykh apparatov s vykhrevoi kameroi. Dnepropetrovsk, 358.
12. Barth, W., Leineweber, L. (1964). Berechnung und Auslegung von Zyklonabscheidern. Staub, 24, 41–52.
13. Azarov, V., Domchenko, B., Koshkarev, S. (1999). Vykhrevoi pyleulovytel. Patent na yzobretenye RUS 2124384.
14. Azarov, V. N. (2004). Kompleksnaia otsenka pylevoi obstanovky y razrabotka mer po snyzhenyiu zapylennosty vozdushnoi sredy promyshlennykh predpryiatyi. Rostov-na-Donu, 356.
15. Maksfyld, B. (2010). Mathcad v ynzhenernykh raschetakh. KORONA, 304.
16. Halich, R. V. (2014). Vplyv vykhidnykh prystroiv na hidrodynamiku i efektyvnist vykhrovykh pylovlovliuvachiv. Sumy,152.

INFLUENCE OF SUCROSE ON STRUCTURAL AND MECHANICAL PROPERTIES OF THE SYSTEM BASED ON «JELLY FORMING SEMI-FINISHED PRODUCT FOR JELLY PRODUCTS» (p. 49-54)

Tetiana Stepanova, Natalia Kondratjuk, Yevgen Pyvovarov

The effect of sucrose on the jelly formation in systems based on the «Jelly forming semi-finished product for jelly products» was investigated. Chemistry and dehydrating effect of sucrose on the pectin-calcium gel system under conditions of controlled acidity (pH=3±0,2) were described and studied accordingly. The sucrose concentrations, at which gels remain flexible and elastic and have high organoleptic properties were determined. The optimal ratio of components in the low-esterified amidated pectin: eggshell powder: sucrose system, at which the syneresis phenomenon does not appear within the time limit, recommended for storage was found. The results ensure high quality indicators of desserts based on the «Jelly forming semi-finished product for jelly products» that greatly expands the range of low-calorie desserts with significant health effect and increases the number of energy- and resource-saving technologies from domestic raw materials.

Keywords: low-esterified amidated pectin, jelly formation, calcium, eggshell powder, low-calorie products, jelly.

References

1. Rjabec, O. Y. (2008) Tehnologija analogu ikry chornoi z vykorystanniam alginatu natriiu [Technology of analogue black caviar with sodium alginate]. Kharkiv, 256. [in Ukrainian].
2. Kondratiuk, N. V. (2012). Tehnologiia solodkyh strav z vykorystannyam kapsulyovanyh produktiv z probiotychnymy organizmamy [Technology of desserts with the use of the probiotic encapsulated microorganisms]. Kharkiv, [in Ukrainian].
3. Phillips, G. O. (2009). Handbook of hydrocolloids. New York, CRC Press.
4. Lootens, D., Capel, F., Durand, D., Nicolai, T., Boulenguer, P., & Langendorff, V. (2003). Influence of pH, Ca concentration, temperature and amidation on the gelation of low methoxyl pectin. Food Hydrocolloids, 17(3), 237–244. doi: 10.1016/s0268-005x(02)00056-5
5. Capel, F., Nicolai, T., Durand, D., Boulenguer, P., Langendorff, V. (2006). Calcium and acid induced gelation of (amidated) low methoxyl pectin. Food Hydrocolloids, 20(6), 901–907. doi: 10.1016/j.foodhyd.2005.09.004
6. Matia-Merino, L., Lau, K., Dickinson, E. (2004). Effects of low-methoxyl amidated pectin and ionic calcium on rheology and microstructure of acid-induced sodium caseinate gels. Food Hydrocolloids, 18 (2), 271–281. doi: 10.1016/s0268-005x(03)00083-3
7. Kondratiuk N. V., Stepanova T. M., Dubovik O. V. (2014). Vivchennia osoblivostei dragleutvorennia v sistemi «NEA pectin-Ca2+» [Study the features of jellation in system «NEA pectin-Ca2+»]. Mizhnarodna naukovo-praktichna konferenciia «Aktualni problemi ta perspektivi rozvitku harchovih virobnictv, gotelno-restorannogo ta turistichnogo biznesu», Poltava, VNZ Ukoopspilki «Poltavskyi universitet ekonomiki ta torgivli», 32–34 [in Ukrainian].
8. Kondratjuk, N., Stepanova, T., Pyvovarov, P., Pyvovarov, Y. (2015). Modelling of low calorie pectin-based product composition. Ukrainian Food Journal, 4 (1), 22–36.
9. Nikitchina T. I., Bezusov A. T. (2014). Vlijanie solej kal'cija na geleobrazovanie biohimicheski modificirovannyh pektinovyh veshhestv [Effect of calcium salts on gelation of biochemical modified pectin]. Harchova nauka i tehnologija, 4 (29), 18–22 [in Russian].
10. Percevoi, F. V., Krapivnicka, I. O., Gurskii, P. V., Botshtein, B. B., Kolesnikova, M. B., Goncharova ,S. B., et al. (2008). Ukr. Patent №200802612.
11. Strom, A., Lundin, L., Morris, E., Williams, M. (2012) Relation between rheological properties of pectin gels and pectin fine structure. Annual Transactions of the Nordic Rheology Society, 20 (1), 159–166.
12. Navarro, P. A., Van Lare, K. M., De Lange, M. J., Minor, M. (2008). Rus. Federation Patent №2004122131/15.
13. Jovbak, U. S., Kyrpichenkova, O. M., Obolkina, V. I., Krapyvnycka, I. O. (2013). Zastosuvannja pektynovmisnoi' ovochevoi' syrovyny pid chas vyrobnyctva kombinovanyh boroshnjanyh kondyters'kyh vyrobiv [Application pectin containing raw materials in the manufacture of composite flour confectionery]. Tematychnyj zbirnyk naukovyh prac'. Serija: Obladnannja ta tehnologii' harchovyh vyrobnyctv DonNUET. 30, 69–75.
14. Pol-Jezhede Glan (2001). Rus. Federation Patent № 94042928/13.
15. King`ori, A. M. (2011). A Review of the Uses of Poultry Eggshells and Shell Membranes. International Journal of Poultry Science, 10 (11), 908–912. doi: 10.3923/ijps.2011.908.912
16. Pyvovarov, Y., Kondratjuk, N., Stepanova, T. (2014). Perspektivy ispolzovaniya yaichnoi skorlupy v tehnologii sladkih blyud na osnove pektina [The prospects of eggshells using in technology of the desserts with pectin based]. Novi rishennia v suchasnyh tehnologiyah, 17, 175–180 [in Russian].
17. Okovytyy, S. I., Pivovarov, P. P., Pivovarov, E. P., Kondratyuk, N. V., Kalashnikova, K. I. (2010). A DFT Study of the Complexation of Alginic Acid with Ca2+ Ions. 10th Southern School on Material Science and Computational Chemistry, 62–63.
18. Imeson, A. (2010). Food Stabilisers, Thickeners and Gelling Agents. London: Wiley-Blackwell, 372.

THE DEVELOPMENT OF TECHNOLOGY OF NANOEXTRACTS AND NANOPOWDERS FROM HERBAL SPICES FOR HEALTHFUL PRODUCTS (p. 54-59)

Raisa Pavlyuk, Viktoriya Pogarskaya, Ludmila Radchenko, Olga Yurieva, Anna Gasanova, Abramova Abramova, Tatyana Kolomiets

The content of biologically active substances in industrially dried natural spices has been studied and the technology of nanoextracts from them has been developed. The nanoextracts were obtained with the use of cryogenic mechanical fine-dispersed processing of raw materials before extraction as modification that allowed to increase getting of healthful extractive substances during water-spirit extraction (1,5...2 times) and reduce the term of extraction in 4...5 times due to quick diffusion of soluble substances from destroyed cells and their direct dissolving. It has been shown that natural spices and nanoextracts from them differ with the high content of biologically active substances such as essential oils, phenolic compounds, tannic compounds, which can also be natural antioxidants, possess detoxic and preservative effects and can be used in fortification of wide assortment of food healthful products with long term of storage in particular: nanodrinks, milk-herbal cocktails, phitosyrups, curd desserts, creams, sauces-dressings, dips, mayonnaises, snacks, pastes, hummus, confectionery fillings, bread and flour products, melted cheeses, curd products, products of individual nutrition, and etc.

Keywords: natural spices, biologically active substances, additives, nanoextracts, healthful products.

References

1. Pavlyuk, R., Pogarskaya, V., Yurieva, O., Pavlyuk, V. et. al. (2014). Cryogenic and mechanical chemistry in food technologies. Kharkiv: Phinart, 260.
2. Pavlyuk, R., Pogarskaya, V., Pavlyuk, V., Barestovaya, A. (2014). Cryogenic mechanical chemistry in nanotechnologies of food products. Kharkiv: Phinart, 260.
3. Pavlyuk, R., Pogarskaya, V., Janickiy, V., Pavlyuk, V., Sokolova, L., Korobets, N., Maximova, N. (2013). Merchandizing and innovative technologies for processing of drug-technical herbal raw materials. Kharkov State University of Food Technology and Trade; Kharkov Trade and Economic Institute of Kyiv National Trade and Economic University. Kharkov, 429.
4. Pavlyuk, R. Yu. (1994). Development of technology of canned vitaminous phytonutrients and their use in food products of preventive action [Razrabotka technologii konservirovannih vitaminnih fitodobavok i ih ispolzovanie v produktah pitaniya profilakticheskogo deistviya]. Odessa, ONAFT, 446.
5. FAO/WHO (2012). Policy measures to ensure food security in the region: problems and prospects – Food Forecast to 2050. Twenty-eighth FAO Regional Conference for Europe, 25.
6. Dyachok, V. V. (2010), Scientific-Theoretical fundamentals of extraction of starting materials of herbal origin [Naukovo-teoretychni osnovy ekstrahuvannya likars'koyi roslynnoyi syrovyny]. Kiev, 384.
7. Mal'ovanyy, M. S., Dyachok, V. V. (2010). The extraction of mixture of herbal raw materials. Process calculation. Chemical Industry of Ukraine, 4, 17–21.
8. Osypova, L. A. (2006). Scientific substantiation of technology of canned carbonated juice flavored drinks. Kharkiv National Technic University of agricultural industry named P. Vasylenko, Kharkiv, 45, 285–292.
9. Osypova, L. A., Kaprel'yants, L. V. (2007). Functional drinks based on spiced-aromatic raw materials. Food industry, 9, 74–75.
10. Kovalenko, E. A. (2007). Scientific-Theoretical fundamentals of processes of low-temperature separation of liquid systems of food industries [Naukovo-teoretychni osnovy protsessov nyzkotemperaturnoho razdelenyya zhydkykh system pyshevyh proizvodsts]. Odessa, 516.

COMPARATIVE QUALITY ASSESSMENT OF NOR, PSE AND DFD BEEF (p. 59-63)

Maria Paska

Comparative quality assessment of meat with NOR, PSE and DFD attributes was given in the paper. Application of NOR, PSE and DFD beef indicators in the industry was substantiated. The basic causes of attributes with the specific autolysis development were analyzed and it was found that these are age peculiarities, improper preparation of animals for slaughter and violation of their feeding and keeping. As a result, meat with deviated development of autolytic processes, including the emergence of NOR, PSE and DFD attributes may be observed. For this purpose, organoleptic quality assessment of the NOR, PSE and DFD meat in different age periods was conducted. It was found that the pigmentation in beef has directly proportional dependence on the age and sex of slaughtered animals and the meat color. The pigmentation in DFD meat was higher compared to NOR meat from bulls aged 18–24 months – by 85.9 % ($p<0.001$); bulls aged 24–36 months – by 86.8 % ($p<0.001$); cows – by 74.8 % ($p<0.001$). Least pigments are contained in PSE beef: from bulls aged 18–24 months – 1.88 mg/cm^3, bulls aged 24–36 months – 2.09, cows – 2.71 mg/cm^3, so pale pink color is typical for such meat.

Keywords: meat technology, pigmentation, meat from animals of all ages.

References

1. Cibul'skaja, S. A. (2003). Pishhevaja cennost' mjasa. Mjasnoe delo, 7, 24–25.
2. Vinnikova, L. G. (2000). Teorija i praktyka pererobky mjasa. Izmai'l: SMYL, 172.
3. Klymenko, M. M. (Ed.) (2006). Tehnologija m'jasa i m'jasnyh produktiv. Kiev: Vyshha osvita, 640.
4. Kravciv, R. J., Paska, M. Z., Lychuk, M. G. (2008). Himichnyj sklad jalovychyny funkcional'nogo pryznachennja. Suchasni problemy pidvyshhennja jakosti, bezpeky vyrobnyctva ta pererobky produkcii' tvarynnyctva. Vinnycja, 34 (1), 236–240.
5. Loseva, N. S., Dardik, M. I., Shumkova, I. A., Bushkova, L. A. (1991). Vlijanie svojstv DFD govjadiny na cvetoobrazovanie. Kachestvo syr'ja, vetsanjekspertiza i sanitarno-mikrobiologicheskie osnovy proizvodstva mjasoproduktov, 37–45.
6. Meller, Z. (2008). Jakosc miesa w zalesnosci ad stopnia uniesniemia I otluscenia tncznikou. Zootechnika, 10, 3–48.
7. Antipova, L. V., Glotova, I. A., Rogov, I. A. (2001). Metody issledovanija mjasa i mjasnyh produktov. Moscow: Kolos, 376.
8. Misyk, A. T., Belova, S. M. (1986). Spravochnyk po kachestvu zhyvotnovodstva. Moscwo: Agropromyzdat, 238.
9. Bogatko, N. M., Kasjanchuk, V. V. (2002). Vzajemozv'jazok velychyny rN z dejakymy biohimichnymy pokaznykamy jalovychyny pry i'i' dozrivanni ta zberiganni. Visnyk Bilocerkiv. derzh. agrar. un-tu: 36. nauk, prac', 21, 94–99.
10. Belk, K. E., George, M. H., Tatum, J. D. (2002). Volatile production in irradiated palesoft exudative (PSE) and dark firm dry (DFD) beef under different packaging and storage conditions. J. Animal Science, 79 (3), 688–697.

DEVELOPMENT OF COATINGS FOR MEAT SHELF LIFE EXTENSION BASED ON SODIUM ALGINATE (p. 63-70)

Lydmila Vinnikova, Andrey Kishenya

As a result of theoretical research on the protection and shelf life extension of meat and meat products, it was found that one of the promising areas is using protective coatings based on natural biopolymers. As the main components of film-forming protective coatings, hydrocolloids were used. Works on studying physical and mechanical properties of protective coatings were conducted, comparative description of their properties, application impact on the quality characteristics of meat was given. As a result of the studies, the optimum composition of the film-forming coating based on sodium alginate with added carboxymethyl cellulose and glycerol was developed. The interaction nature and mechanisms of film-forming coating components and changes in the quality characteristics of meat were analyzed and theoretically explained. Directions for further research of protective coating properties, possibilities of their improvement, development of technologies and equipment for their use were determined.

Keywords: packaging, meat protection, film-forming protective coatings, hydrocolloids, sodium alginate, gelling.

References

1. Snezhko, A. G., Fedotova, A. V., Evstaf'eva, E. A. (2008). Sovremennaja upakovka mjasa i mjasnyh produktov. Mjasnaja industrija, 5, 40–43.
2. Kozeeva, O. V. (2008). Proektirovanie mjasokombinatov po mezhdunarodnym standartam GMP. Mjasnaja industrija, 2, 53–54.
3. Snezhko, A. G., Fedotova, A. V., Evstaf'eva, E. A. (2008). Novye upakovochnye nanomaterialy i perspektivy ih ispol'zovanja. Mjasnaja industrija, 8, 20–21.
4. Fillips, G. O., Vil'jams, P. A.; Kochetkova, A. A. (Ed.) (2006). Spravochnyk po gidrokolloidam. SPb.: GIORD, 536.
5. Hamnaeva, N. I. (2006). Osobennosti sanitarno-mikrobiologicheskogo kontrolja syr'ja i produktov pitanija zhivotnogo proishozhdenija. Ulan-Udje: Izd-vo VSGTU, 136.
6. Pérez-Gago, M. B., Krochta, J. M. (2002). Protein-Based Films and Coatings Gennadios. CRC Press, Boca Raton, FL, 159–180. doi: 10.1201/9781420031980
7. Krochta, J. M. (2002). Protein-based Films and Coatings Gennadios. CRC Press, 1–41.
8. Lide, D. R. (2007). Handbook of Chemistry and Physics. CRC Taylor and Francis, 10–19.
9. Ritala, M., Leskela, M. (2002).Handbook of Thin Film Materials. Vol 1. Academic Press, San Diego, CA, 103.
10. Enrione, J. I. (2005). Mechanical Stability of Intermediate Moisture Starch-Glycerol Systems. Division of Food Sciences. Nottingham, The University of Nottingham, 153.
11. Sperling, L. H. (2006). Introduction to Physical Polymer Science. New York, NY, USA: John Wiley & Sons, Inc, 11–15.