

## РЕЗЮМЕТА

на научните трудове на гл. ас. д-р Николина Найденова Желева, представени за участие в конкурс за „Доцент“ по професионално направление 6.3. Животновъдство, Технология на млякото и млечните продукти, обявен от Тракийски Университет, гр. Стара Загора в Държавен вестник - брой 100/5.12.2014 г.

### **I. Дисертация, автореферат:**

**Найденова, Н. 2005. Биологични и технологични качества на биволското мляко от породата Българска Мурра при производство на млечни продукти.**  
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**Резюме:** Целта на дисертационния труд е да се установят показателите, характеризиращи суровото биволско мляко от новосъздадената порода “Българска Мурра” и технологичните качества на млякото при производство на натурално кисело мляко и бяло саламурено сирене и промените, които настъпват по време на производство, зреене и съхранение.

Проучванията върху биологичните и технологичните качества на биволското мляко от породата “Българска Мурра” са проведени в две ферми през периода май 2002 год. – септември 2003 год. Целогодишно са взимани сборни проби биволско мляко, получено от 110 дойни биволици, основно на 3-та и 4-та лактация със 75% кръвност от породата Индийска Мурра, отглеждани във ферма в с. Горна Росица, община Севлиево, и от 120 дойни биволици, по-голяма част на 2-ра лактация със 75% кръвност от породата Индийска Мурра, отглеждани в с. Димитриево, община Чирпан.

Получените резултати показват, че биволското мляко от породата Българска Мурра е с високо съдържание на незаменими аминокиселини и ненаситени мастни киселини. Киселото мляко, произведено от биволско мляко коагулира при ниска титруема киселинност от 55,9°Т до 58,4°Т, при разрез притежава гладка повърхност със слабо изразен синерезис и ясно изразен млечно-кисел вкус.

Броят на фракциите на  $\alpha_s$ - ,  $\beta$ - и  $\gamma$ - казеина по време на зреене и съхранение до 150-ия ден на биволското бяло саламурено сирене се запазва, но интензитета им на електрофореграмата намалява. С увеличаване срока на съхранение стойностите на протеолитичния коефициент ( $\gamma$ -сн/ $\beta$ -сн) значително се повишават. По време на зреенето и съхранението на бяло саламурено сирене произведено от млякото на биволиците от породата Българска Мурра, не се установиха отклонения в структурата и вкусовите качества на сиренето.

**Найденова, Н. 2005. Биологични и технологични качества на биволското мляко от породата Българска Мурра при производство на млечни продукти. Автореферат, Тракийски университет, Аграрен факултет – Стара Загора, 38 стр.**

**II. Научни трудове, за които е присъдена научна и образователна степен „Доктор“**

**1. Найденова, Н., Т. Димитров, 2003. Технологични качества на мляко от биволици от породата Българска Мурра при производство на кисело мляко. Животновъдни науки, 5, 33-35.**

**Резюме:** Изследвани са технологичните качества на биволско мляко от породата Българска Мурра, отглеждана в две ферми в страната – Горна Росица и Стара Загора при производство на кисело мляко през периода октомври 2002 – април 2003. Суровото биволско мляко, получено от фермата в Стара Загора е с по-високо съдържание на сухо вещество (17.40%), млечна мазнина (7.15%), общ протеин (4.26%) и казеин (3.54%) в сравнение с това, получено от фермата в с. Горна Росица – съответно 14.86%, 5.46%, 3.43% и 2.67%. Произведеното кисело мляко от фермата в с. Горна Росица се характеризира с по-слаба структура на коагулума на 24-ия час от производството, докато това, произведено от фермата в Стара Загора се отличава с по-стегнат коагулум, по-добри вкусови качества и консистенция. След 10-дневно съхранение при 5°C и двете произведени кисели млека, отговарят на изискванията на БС 12-82.

2. Желева, Н., Т. Димитров. 2004. Промени на свободните аминокиселини в бяло саламурено сирене, произведено от биволско мляко по време на зреене. Научна конференция Стара Загора 2004, 3-4 юни, стр. 140-143.

**Abstract:** The free amino acids changes of white brined cheese from buffalo milk were studied during ripening (45<sup>th</sup> day). On 45<sup>th</sup> day White brined cheese showed the highest contents of essential amino acids – leucine, valine and phenylalanine, whereas histidine, tryptophan and methionine were lowest. The content of non-essential amino acids were higher for proline, tyrosine, serine and glutamic acid and lower for ornithin cystine and arginine. The total content of free amino acids increased approximately 5,7 times through ripening.

Key words: free amino acids, white brined cheese, ripening

3. Желева, Н., 2004. Аминокиселинен състав на биволско мляко и на произведеното от него бяло саламурено сирене. Научна конференция Стара Загора 2004, 3-4 юни, стр. 136-139.

**Abstract:** Physicochemical and amino acids composition and properties of buffalo milk from the Bulgarian Murrah breed were analyzed. The total average estimations of dry matter, fat, protein and casein were high. Some amino acids such as glutamic acid, proline and leucine were higher, whereas other amino acids as cysteine, glycine and arginine were lower.

On 21 day white brined cheese the highest content of valine, leucine and phenylalanine, while methionine, cysteine and histidine were lower.

Key words: amino acids, buffalo milk

**III. Научни трудове извън тези, за които е присъдена образователната и научна степен „Доктор”**

- *Публикации в международни научни списания*

4. Dimitrov T., Mihaylova G., Boycheva S., Naidenova N., Tzankova M., 2007. Changes in the amino acid composition of buffalo milk after chemical activation of its lactoperoxidase system, Italian J. Animal Sci., 6, Suppl. 2 – part 2, 1050-1052. (IF-0,172)

**Abstract:** The amino acid content of bulked buffalo milk, collected from 130 buffaloes reared at a buffalo farm in the settlement of Dimitriev, Stara Zagora region, was investigated during the period January-April 2006. The activation of the lactoperoxidase system (LPS) was done by supplementation of sodium percarbonate, providing 16 ppm active oxygen and 10 ppm thiocyanate to 1 l of milk. The amino acid content was assayed by an amino acid analyzer. It was found out that the total content of amino acids in inactivated milk was insignificantly lower than that in activated one. More considerable increase was established for the amino acids valine, methionine, and lysine, but the differences were not statistically significant. The total amount of essential amino acids was higher in the milk with chemically activated LPS. The limiting essential amino acid in the studied buffalo milk was methionine.

Key words: Buffalo milk, Lactoperoxidase system, Amino acids

**5. Dimitrov, T., L. Sotirov, G. Mihaylova, M. Tzankova, N. Naidenova and G. Beev. 2009. Lysozyme content in buffalo colostrums. Agricultural Science and Technology, 1(2): 51-53.**

**Abstract:** The lysozyme content in buffalo colostrum from Bulgarian Murrah breed was studied. The experiment was conducted during the summer of 2007 at the buffalo farm of Dimitriev (Haskovo area), Bulgaria. The buffaloes selected for evaluation in this study were clinically healthy. They were selected by age, body weight and expected date of calving. All animals were on their first lactation. The diet of the experimental buffaloes was formulated to meet the nutritional requirements. It was established that the highest lysozyme content in colostrum was presented immediately after parturition (1.15 µg/ml,  $p < 0.001$ ). Twenty-four hours later, lysozyme content was reduced by 50% (0.74 µg/ml) after 2 days they were 0.30 µg/ml and by post parturient day 7 – 0.10 µg/ml. Authors recommended newborn buffalo calves to suckle colostrum as early as possible after parturition, in order to receive higher concentrations of lysozyme that would protect them against pathogenic microflora.

**6. N. Dimova, I. Ivanova, M. Mihailova, N. Todorov and N. Naydenova. 2009. Wheat Distiller's Grains as a Source of Protein in Dairy Sheep. Bulgarian journal of agricultural science, 15: 574-582 (IF – 0.186)**

**Abstract:** The aim of the experiment was to test a simple and cheap system of ewe feeding with forages supplemented with dry distiller's grain with soluble (DDGS), as a source of protein and whole grains, as the source of energy, compared with traditional diet of forage plus compound feed. One flock of 202 dairy ewes was divided into two groups, equal in age, live weight, and body condition score (BCS), milk yield, and fertility in previous years of adult sheep. First group of 101 ewes were fed for 195 days, from December 12, 2007 to June 24, 2008, with forages plus compound feed with sunflower meal as protein source. Second group received the same forages plus DDGS and grain. The two diets were approximately equal in energy and crude protein. Lambing was from 4 of January to 13 of February, 2008. Both groups grazed together limited pasture during months May and June and were divided for additional feeding according to the experimental scheme. No significant differences were found in average milk yield (81 vs. 82 kg per ewe, respectively for first and second group), milk composition, wool yield, fertility of lambed ewes (1.42 vs. 1.45) and flock fertility (1.11 vs. 1.10), gain of lambs until weaning and technological characteristics of milk. In conclusion, DDGS plus whole grain is replacing successfully compound feed with sunflower meal in diet of dairy ewes.

Key words: wheat distiller's grain with soluble, dairy ewes, source of protein, systems of feeding, milk yield

**7. Naydenova N., K. Davidova, T. Iliev, G. Mihaylova. 2010. Comparative studies on the fatty acid composition of White brined cheese, marketed in the town of Stara Zagora. Agricultural science and technology, vol. 2, №2, pp. 105-110.**

**Abstract:** The study was carried out in March-April 2009. Ten cheese samples representing different cheese batches were sampled to compositional and fatty acid profile analysis. The palm oil and four white-brined cheeses (2 representing palm oil cheese batches and 2 – free of palm oil cheese batches) were purchased from a commercial manufacturer. Other six cheeses were purchased from the market where they were offered as “free of vegetable oil”. An

extremely high level of saturated (73.55÷75.78%) fatty acids is established for 3 cheese batches due mainly to the higher amount of lauric (34.86÷36.97%), or palmitic acid (30.24÷34.00%). The high levels of the hypercholesterolemic fatty acids of the dairy factory palm oil cheeses and four market batches in combination with the very low or very high n-6/n-3 fatty ratios in these products pose a risk to consumer health. Only one of the all six market cheeses offered as “free of vegetable oil” dairy products does not cause suspicion of added vegetable fat or unfair sale to the customers.

Keywords: cheese, fatty acids, vegetable oil, market

**8. Boycheva, S., N. Naydenova, G. Mihaylova. T. Dimitrov, D. Pavlov. 2010. Quality characteristics of yogurt supplemented with nuts. Agricultural science and technology, vol. 2, №4, p. 221-226.**

**Abstract:** The aim of the present study was to investigate the effects of supplements of pieces of walnuts without and with honey and hazelnuts on the count of lactic acid bacteria, dynamic of acidity, and the syneresis of yogurt. It was prepared yogurt from cow's milk, supplemented by pieces of walnuts, without and with honey and hazelnuts. Our experimental results show that supplements reduced the time for coagulation with 2.3 to 15.7%, and slightly increased the titratable acidity of yogurt during the storage. All supplements lead to increasing of extracted milk serum and syneresis index during the storage. The highest effect was obtained from walnut + honey supplementation. Enrichment of milk with plant biologically active substances has positive effect on the microbial activity.

Total count of lactic acid bacteria increased significantly at coagulum, almost twice - with the supplementation of walnut and hazelnut, and almost three times - with walnut plus honey.

Keywords: yogurt, lactic acid bacteria, titratable acidity, nuts

**9. Boycheva, S., T. Dimitrov, N. Naydenova, G. Mihaylova. 2011. Quality characteristics of yogurt from goat's milk, supplemented with fruit juice. Czech Journal of Food Science, vol. 29, №11, pp. 24-30 (IF – 0.522).**

**Abstract:** Yogurt was prepared from goat's milk, supplemented with aronia juice and blueberry juice. The dynamics of acidification, number of lactic acid bacteria, and fatty acids composition were investigated. Yogurt from goat's milk, supplemented with aronia juice and blueberry juice, coagulated at a lower acidity and faster than natural yogurt. The numbers of lactic acid bacteria in supplemented yogurts were higher compared to control samples. The addition of aronia and blueberry juices increased the amount of unsaturated fatty acids in yogurt by 6.9% and 8.5%, respectively. Polyunsaturated fatty acids increased by 11.2% in yogurt with aronia juice in comparison with natural yogurt.

Keywords: goat's milk; yogurt; aronia (*aronia melanocarpa* L); blueberry; fatty acids; lactic acid bacteria counts

**10. Panayotov D., T. Iliev, N. Naydenova, D. Pamukova, M. Simeonov. 2011. Study of milk composition in sheep of Pleven black head breed. Agricultural science and technology, vol. 3, №1, p. 47-49**

**Abstract:** The aim of the study was to investigate somatic cell count and milk composition from Pleven Black head breed of sheep. A total of 96 ewes on first lactation were used belonging to the flock of the village of Komarevo, Pleven district. The studied animals - daughters of six rams from 2 lines, were fed year-round in a barn (November-March) and pasture period (April-October). A total of 384 individual milk samples were taken at four selection controls. The milk composition – fat, protein, casein, lactose, solids-non-fat and dry matter was established by Milko-Skan 104 (A/S Foss Elektrik, Denmark). The total number of the somatic cells was established by an Ekoscope SCC automated system (Bulteh 2000, Stara Zagora, Bulgaria). The results of this investigation showed that the studied animals had very good milk quality indices. The milk of line 522 animals had significantly higher dry matter, solids-non-fat, fat, protein, casein and lactose content in comparison to those of line 32. For all studied milk indicators the daughters of ram No.33 in line 32 showed the highest average values whereas those of ram No.321 belonging to the same line had the lowest. The average somatic cell count of the milk in the studied animals was very low – 66 254 cells/ml. Minimum variation was

established in respect to average SCC values of the milk in both lines but very large between the individual rams.

Keywords: sheep milk, milk composition, somatic cells, line, rams

**11. Stancheva N, N. Naydenova , G. Staikova. 2011. Physicochemical composition, properties, and technological characteristics of sheep milk from the bulgarian dairy synthetic population. Macedonian Journal of Animal Science, Vol. 1, No. 1, pp. 73–76**

**Abstract:** A study on the physical and chemical composition, properties, and technological qualities of sheep milk was carried out. Subject of the study was the milk produced during the lactation period of ewes of the Bulgarian Dairy Synthetic Population bred on the farm of the Agricultural Institute – Shumen in 2008. The quality components and the physicochemical properties of the milk of the BDSP are in keeping with the standards of raw sheep milk indicating its pronounced suitability for processing dairy products. The established ratios among the components, representing the nutritive and technological quality of milk, are within the regulation standards.

Key words: dairy sheep; milk composition; technological properties; Bulgarian National Standard

**12. Boycheva, S., N. Naydenova, G. Mihaylova, T. Dimitrov, D. Pavlov. 2011. Fatty acid composition of yogurt supplemented with walnut extract. Agricultural science and technology, vol. 3, №4, p. 384-389**

**Abstract:** The present study aimed to monitor the changes in fatty acid composition of yogurt supplemented with ground walnut extract and stored over 10 days. Fatty acid content of raw and pasteurized milk, of 24-hour yogurt and 10-day yogurt (stored at 4C) was assayed. Total saturated fatty acid content of experimental samples of milk was lower while that of unsaturated fatty acids was higher as compared to control milk, 24-hour and 10-day yogurt samples. Assayed fatty acids exhibited higher differences between control and experimental samples with regard to polyunsaturated (C18:2 and C18:3) fatty acids. The total saturated fatty acid content in pasteurized milk with walnut extract decreased by 11.2% compared to raw milk, while remaining



unaltered in natural pasteurized milk. Pasteurized milk with walnuts exhibited higher polyunsaturated fatty acid content – 2.6 times vs natural and almost 3 times higher than raw milk. Yogurt containing walnut extract contained by 9.25% more unsaturated fatty acids and by 2.3 times more polyunsaturated fatty acids as compared to natural yogurt. During storage of produced yogurt for 10 days, the amount of C18:3 decreased by 46.8% in the yogurt containing walnut extract and by 34.4% in natural yogurt.

Keywords: fatty acids, yogurt, walnuts

**13. Gerchev, G., A. Mileva, N. Naydenova, I. Yankov, G. Mihaylova. 2011. Fatty acid composition of milk from Teteven native sheep in Mountain region. *Biotechnology in Animal husbandry* 27, vol. 4, p. 1837-1843**

**Abstract:** The study was performed on individual milk samples obtained on the monthly basis during the lactation period from 5 Teteven sheep reared in the Sredna Stara Planina mountain region. The fat extraction of milk samples was done by the Rose-Gottlieb method. Fatty acid composition was determined on a gas chromatograph with flame ionization detector and capillary column. The trends in fatty acid concentrations in sheep milk during the lactation were variable. The proportion of saturated fatty acids in Teteven sheep milk during the lactation was relatively high and varied from 70.34 to 72.19%. Variations in myristic acid concentrations by months were not significant (11.49–11.83%). The total amount of polyunsaturated fatty acids in the studied milk was relatively low and with similar values for the 4 months spent on pastures (3.78-4.11%). For this period, monounsaturated fatty acids, represented mainly by oleic acid (C18:1) decreased from 25.76 to 24.20%. The short-chain fatty acid concentrations were the highest in milk samples obtained in April and May, of medium-chain ones – in June and July, whereas long-chain fatty acids concentrations were similar over the grazing period.

Key words: sheep milk, milk fat, fatty acids

**14. Atanassova, S., N. Naydenova, T. Kollev, T. Iliev and G. Mihaylova. 2011. Near infrared spectroscopy for monitoring changes during yellow cheese ripening. *Agricultural science and technology*, vol. 3, №4, p. 390.**

**Abstract:** The aim of the study has investigation of the feasibility of Near infrared(NIR) spectroscopy in a diffusion reflection mode as a tool for the monitoring a chemical changes during ripening of Bulgarian yellow cheese from cow milk and classification of cheese according to ripening stage. The cheeses were made according to Bulgarian national standard for Bulgarian yellow cheese from cow milk. Samples for spectroscopic and chemical analysis were taken after 1, 5, 10, 15, 20, 25, 30, 35, 40 and 45 days of ripening. Total protein, water-soluble protein, titratable acidity, dry matter, and sodium chloride content were determined for all samples. NIR measurements were performed by NIRQuest 512 spectrometer (Ocean Optics, Inc.) in the region 900-1700 nm using reflection fiber-optics probe. Partial least square regression with internal cross-validation was used for calibration models development for determination of tested parameters. Soft Independent Modeling of Class Analogy (SIMCA) was implemented to create models of the cheese samples according to maturity stages based on their NIR spectra. Differences in spectral data of cheese samples during ripening were found. The biggest variation in spectral data were observed at 1215, 1350, 1644 nm, region from 1415 to 1470 and 1682-1700 nm. Determination of water-soluble protein, dry matter content and titratable acidity with coefficient of multiple correlation bigger than 0.95 and ratio of standard error of calibration and standard deviation of data set bigger than 3 was excellent. Very good determination was found for maturity rate. Prediction accuracy was good for total protein content and poor for NaCl content of cheese. SIMCA model for discrimination of cheese samples according to ripening stage was developed. We can conclude from obtained results that NIR has a potential for assessing cheese ripening related to changes in the cheese matrix during maturity.

Keywords: Bulgarian yellow cheese, ripening, near-infrared spectroscopy

**15. Stancheva, N., G. Staikova, N. Naydenova, 2012. Physicochemical composition, properties and technological characteristics of sheep milk from the caucasian and the askanian breeds. Macedonia Journal of Animal Science, vol. 2, № 2, pp. 139-142.**

**Abstract:** A study on the physicochemical composition, the properties, and the technological characteristics of sheep milk was carried out. The subject of the study was the milk produced by the Caucasian and the Askanian sheep breeds on the farm of "Kabiuk", near

Shumen, during the lactation period of 2008. It was established that the quality components of the milk of the Caucasian and Askanian sheep are in keeping with the standards for raw sheep milk to be processed to dairy products. The technological characteristics indicate that the Caucasian and the Askanian sheep milk is a favourable environment for the development of the leaven bacteria cultures, rendering it an appropriate source for the Bulgarian Yoghurt industry.

Key words: fine-fleece sheep; milk; composition; properties; technological characteristics

**16. Boycheva S., G. Mihaylova, N. Naydenova, T. Dimitrov. 2012. Amino acid and fatty acid content of yogurt supplemented with walnut and hazelnut pieces. Trakia Journal of Sciences, Vol. 10, No 2, pp 17-25.**

**Abstract:** Amino and fatty acid composition of cow's milk yogurt with pieces of walnut (10%) and hazelnut (10%) added were investigated. The total amount of amino acids in the yogurt with walnut pieces was by 7.8% higher in comparison with raw milk and by 3.9% higher in comparison with natural yogurt. The amount of unsaturated fatty acids in the yogurt with walnuts and hazelnuts was by 39% higher in comparison with natural yogurt. The amount of polyunsaturated fatty acids in the yogurt with walnut pieces was almost three times higher in comparison with control yogurt.

Key words: amino acids, fatty acids, cow's milk, walnuts, hazelnuts, yogurt

**17. Naydenova, N, T. Iliev, G. Mihaylova, S. Atanasova. 2013. Comparative studies on the gross composition of White brined cheese and its imitations, marketed in the town of Stara Zagora. Agricultural Science and Technology, vol. 5 (№2), 221-229.**

**Abstract:** The gross chemical composition of a total of 39 white brined cheese samples and 13 of its imitation products were studied during March 2009–November 2011. Extreme variability of the basic quality parameters of the white brined cheese marketed in the town of Stara Zagora has been established. Dry matter, fat in dry matter and moisture in the non-fatty substance vary in large levels within the range 33.79÷46.18 %, 47.35÷61.24 and 70.83÷83.18%, respectively for all 24 studied unpacked market cheese samples. Fat to protein ratio in these samples was in the range 1.09÷1.82. The values of DM, FDM and MNS in packed market white

brined cheese samples were in the range 35.37÷49.87%; 48.38÷54.72 and 68.67÷78.58%. Fat to protein ratio in these samples was in the range 1.18÷1.48. The ripening index of market packed white brined cheese samples varies widely from 15.12 to 19.00%. Dairy factory imitation palm oil cheeses demonstrate significantly lower short-chain fatty acid (C4:0÷C10:0) levels. The very low values for this group of fatty acids in the imitation cheese demonstrated great substitution of the milk fat and large quantity of the palmitic (C16:0; 44.09÷44.25%) and stearic (C16:0; 38.95÷40.97%) fatty acids in comparison to natural white brined cheeses – 25.43÷29.86% and 6.45÷5.77%, respectively. Fat to protein ratio in the cheese imitation samples was in the range 2.05÷3.90.

Keywords: cheese, cheese imitations, fatty acids, palm oil, market

**18. Naydenova, N, T. Iliev, G. Mihaylova. 2013. Fatty acids and lipid indices of buffalo milk yogurt. Agricultural Science and Technology, vol. 5, №3, pp. 331-334**

**Abstract:** The present investigation had the objective to study the changes in the atherogenic index and the lipid preventive score as nutrition indicators for assessment of the risk of cardio-vascular diseases. The study was performed with buffalo milk, obtained from purebred Bulgarian Murrah buffaloes from II lactation, reared in the herd of the private farm in Dimitriev village. The content of saturated fatty acids in buffalo yogurt is higher than in raw milk at the expense of unsaturated fatty acids. Omega-6/omega-3 ratio varies from 3.58 for yogurt to 4.30 for raw milk, which is within the range of the optimal values for healthy nutrition. The atherogenic index was calculated on the obtained values for the lauric (C12:0), myristic (C14:0) and palmitic (C16:0) acids and the unsaturated fatty acids. The obtained data for the raw milk and yoghurt are 2.68 and 3.24, respectively.

The values of lipid preventive score calculated on the basis of fat content and fatty acid groups - saturated, monounsaturated and polyunsaturated, showing the degree of preventive effect regarding the risk of cardiovascular disease, are 12.42 for raw milk and 14.52 for the produced yogurt, respectively.

Keywords: fatty acids, buffalo yogurt, atherogenic index, lipid preventive score

**19. Naydenova N., I. Kaishev, T. Iliev, G. Mihaylova. 2014. Fatty acids profile, atherogenic and thrombogenic health indices of white brined cheese made from buffalo milk. Agricultural Science and Technology, vol. 6, №3, pp. 352-355.**

**Abstract:** The present investigation had the objective to study the fatty acids profile and the related health lipid indices of buffalo cheese in order to add information on its nutritional quality. Two distinct indices were investigated – atherogenic and thrombogenic. These indices take into account the different effects that single fatty acids might have on human health. The study was performed with buffalo milk, obtained from purebred Bulgarian Murrah buffaloes from II lactation, reared in the herd of the private farm in Dimitrievo village. The amount of saturated fatty acids in raw milk diminished in the processing and ripening of cheese by 5%. The amount of unsaturated fatty acids increased during ripening by the same percent in proportion to the decrease of saturated fatty acids. The biggest change is in the content of monounsaturated fatty acids in ripened cheese which increased by 4.35% from raw milk. Omega 6/omega 3 varies from 4:1 for raw milk to 7.9:1 for white brined cheese, which is within the range of the values for healthy nutrition. The values of the atherogenic index of buffalo milk change in the range 2.72 for raw milk to 2.16 for matured cheese. The same tendency is observed for the thrombogenic index – it decreased during ripening from 1.74 for raw milk to 1.2 for matured cheese. The values of the received lipid indices, calculated on the basis of single fatty acids and fatty acid groups – saturated, monounsaturated and polyunsaturated, showing the degree of preventive effect regarding the risk of cardiovascular disease, have a low risk factor for human health.

Keywords: fatty acids, buffalo white brined cheese, atherogenic index, thrombogenic index

• *Публикации в български научни списания и сборници*

**20. Димитров Т., С. Бойчева, Т. Илиев, Н. Желева. 2002. Производство на плодово кисело мляко с различни добавки. Сборник научна конференция, т. 2. Аграрни науки, растениевъдство и животновъдство, Съюз на учените, Стара Загора, 321-324**

**Abstract:** Fruit yogurt with different natural juices (chokeberry, strawberry and raspberry) and sugar (4%), honey (4%), synthetic sweeteners (0.01%) was produced and studied for dynamics of acidification, pH, coagulation time, number and correlation of lactic acid bacteria. In the fruit yogurt natural juices was observed higher titratable acidity during the all testing period (5 days) without exceeding of requirements of Bulgarian Standard 12-82. Highest number of lactic acid bacteria as well as rods and cocci, was observed in the yogurt with natural juice from chokeberry – 390 007 800/cm<sup>3</sup> and 780 015 600//cm<sup>3</sup> respectively.

**21. Димитров, Т., С. Бойчева, А. Павлов, С. Славова, Н. Желева. 2006. Съхраняване на биволско мляко чрез активирание на естествената му инхибиторна система (LPS) I. Химично активирание на LPS. Животновъдни науки, № 2, 73-75.**

**Abstract:** The aim of this study was chemical activation of buffalo milk LPS. The raw milk samples were preserved at 18-20 degrees C for 18 h. LPS was activated by adding of 48 ppm sodium percarbonate, proving 16 ppm active oxygen and 10 ppm sodium thiocyanate. In the activated samples there was a decrease of thiocyanate from 11.8 ppm to 11.27 ppm after one hour, and to 9.16 ppm at 18 hours after activation. Significant increase of the total bacteria count was observed in the control sample after 4 h. In the activated sample the total bacteria count and lactic acid bacteria count were unchanged, while colibacteria and psychrotrophs number were reduced 3.75 and 2.9 times respectively. 79.7-fold increase of microorganisms was determined in the control sample after 18 h.

**22. Димитров, Т., С. Бойчева, А. Павлов, С. Славова, Н. Желева. 2006. Съхраняване на биволско мляко чрез активирание на естествената му инхибиторна система (LPS) II. Биологично активирание на LPS. Животновъдни науки, 5, 23-26.**

**Abstract:** The raw buffalo milk samples (control and activated) were stored at 18-20oC for 18 hours. LPS was activated by addition of 0.2% pure culture of *Lactobacillus delbrueckii* ssp. *bulgaricus* - strain b2. In the activated sample the total bacterial count was unchanged after 4 hours, while colibacteria and psychrotrophs counts were reduced 2.4 and 1.6 times respectively. At the same time in the control sample all groups microorganisms increased many times. Colibacteria have increase - 4 times. A significant bacteriostatic effect of activated LPS in the

milk toward total bacterial count and clearly marked bactericidal effect toward psychrotrophs and colibacteria after 4 hours (18oC) was established. When the LPS of the milk was activated by adding of 0.2% pure culture of *Lactobacillus delbrueckii* ssp. *bulgaricus* - strain b2, colibacteria were most strongly suppressed group at 18th hour - 4.4 times.

**23. Михайлова, Г., М. Джорбинева, Т. Димитров, Н. Желева. 2006. Физико-химична и технологична характеристика на овче мляко. Хранително-вкусова промишленост, № 5, 18-21.**

**Резюме:** Проучването беше извършено върху сборно проби мляко, получавано от 2 групи овце майки, представителки на два различни генотипа млечни кръстоски на първа лактация, отглеждани при еднакви производствени условия в Земеделски институт – Стара Загора: I група – подобрени местни старозагорски овце ( $\frac{1}{8}$ - кръвни кръстоски и Източнофрезийски кочове) и II група – трипородни кръстоски на основа местни старозагорски овце с Плевенски черноглави кочове като втора порода и на трето място по Източнофрезийски кочове. Овцете от двете групи бяха изравнени по възраст, време на агнене и брой родени приплоди, вътре в групата и в двете групи. Млякото за анализ е взимано от общото количество (след смесване на вечерното и сутрешното мляко) на всяка група, съгласно правилата за взимане на млечни проби. От млякото на проучваните овце беше произведено бяло саламурено сирене.

Установено е, че млякото от овцете на II група е с малко по-високо съдържание на сухо вещество (16.53%) и млечна мазнина (5.68%) в сравнение с това на I група, съответно 16.21% и 5.37%. Млякото и на двете групи овце има добра подсирваема способност, което го характеризира като подходяща суровина за производство на бяло саламурено сирене. Малко по-ускорен синерезис има млякото от II група, съответно 54.5% отделена суроватка на 3-я час срещу 53.0% при I група. Бялото саламурено сирене произведено от млякото на подобрените старозагорски овце е с малко по-добре изразена степен на зрялост в сравнение с това на трипородните кръстоски.

Ключови думи: овче мляко, сирене, състав, свойства.

**24. Бойчева, С., Т. Димитров, Г. Михайлова, Н. Найденова. 2007. Аминокиселинен, мастнокиселинен и минерален състав на кисело мляко, приготвено от краве и козе мляко с добавка на пробиотични бактерии. Хранително-вкусова промишленост №5, 39-41.**

**Резюме:** Изследван е аминокиселинния, мастнокиселинния и минералния състав на българско кисело мляко, приготвяно от краве и козе мляко с прибавка на пробиотични бактерии. Прибавянето на лактобацили и ентерококи към традиционното кисело мляко увеличава количеството на незаменимите аминокиселини с 4.38% (за *Lactobacillus reuteri* и *Enterococcus faecalis*) и 3.67% (за *Lactobacillus acidophilus*). Количеството на ненаситените мастни киселини в киселото мляко, обогатено с пробиотични бактерии се увеличава със 17.6% в сравнение с пастьоризираното мляко и с 13.5% спрямо натуралното кисело мляко. В киселото мляко с добавка на *Lactobacillus acidophilus* елементите калий, калций, магнезий, желязо и цинк се намират в по-високи концентрации в сравнение с натуралното кисело мляко. Количеството на калция е увеличено с 62% в киселото мляко с *Lactobacillus reuteri* и *Enterococcus faecalis* и с 37% в киселото мляко с *Lactobacillus acidophilus* в сравнение с натуралното мляко.

**Ключови думи:** кисело мляко, пробиотични бактерии, аминокиселини, мастни киселини, минерални елементи.

**25. Панайотов, Д., М. Симеонов, Т. Илиев, Н. Желева. 2008. Проучване върху млечната продуктивност и състав на млякото при овце от Плевенската Черноглава порода, Животновъдни науки, 4, 30-39.**

**Abstract:** The study was carried out with 1039 ewes from the two main breeding flocks of the Pleven Black head (PBH) – at the Institute of Forages – Pleven (IF) and on the village of Komarevo, Pleven district. The phenotypic characteristics of the flocks consisted of the traits lactation length, lactation yield, milk yield for 200 days. The content of milk was determined for 30 ewes (ram-producers) at II lactation.

It was found, that the sheep of Komarevo were with a considerably longer lactation period at I and II lactation compared to their contemporaries in the flock of IF.



The average lactation milk yield for I and II lactation of the ewes in IF was about 192 l and that of the ewes in Komarevo – 199l. The production year as a complex factor caused a very big influence on the phenotypic appearance of that trait especially in the IF flock.

The 200-days milk yield of the ewes in IF for most of the studied years was higher compared to that of the flock in Komarevo. For the 120-days lactation period the superiority (over 20 l in average) was in favour of the Komarevo flock.

The studied ewes excelled with very good characteristics of the milk components. The average fat content was in the range of 5.96 to 7.64%, of the protein – from 5.70 to 6.19% and for the dry matter – from 17.19 to 18.76%, and the three traits followed an increasing tendency with the progress of the lactation. For the lactose and dry non-fat residue the average values were very close – respectively from 4.22 to 4.80% and from 10.89 to 11.30%.

The number of somatic cells in the milk was relatively high – 687.7 thsnds/ml for the first test day, 836.2 thsnds/ml for the third and 424.6 thsnds/ml for the fourth test day (at the end of lactation).

**26. Димитров, Т., С. Бойчева, Н. Найденова. 2008. Значението на млякото и млечните продукти за човешкия организъм. Научни трудове на Русенския университет, т. 47, серия 8, 34-42.**

**Abstract:** The importance of milk and milk products for human health The paper considers the importance of milk and milk products for human nutrition. Milk and milk products are the main part of the so called “functional foods”. They satisfy all human needs of nutrients. The milk proteins and bioactive peptides are used for prevention of many disorders. Lactose and its derivatives control the intestinal microflora. Mineral compounds regulate the salt balance of organism and contribute to prevention of hypertonia. The milk fat contains very important for human health mono and polyunsaturated fatty acids. The presence of omega-3 and omega-6 fatty acids in the diet is a vital necessity for human health. Lactic acid bacteria, used for milk fermentation play very important role too. They produce bioactive substances increasing the favorable effect of the milk.

Key words: milk, yogurt, functional foods, human health

**27. Найденова, Н., С. Бойчева, Г. Михайлова, Т. Димитров, Д. Павлов. 2008. Кисело мляко обогатено с екстракт от орехови ядки. Животновъдни науки, 6, 57-62.**

**Abstract:** Yogurt was made from cow`s milk supplemented with 10% extract of walnuts. The dynamics of acidification, the number of lactic acid bacteria and syneresis were studied. The yogurt of cow`s milk supplemented with 10% extract of walnuts coagulated faster than natural yogurt. The number of lactic acid bacteria in the supplemented yogurt was higher as compared to control sample. The addition of 10% extract of walnuts increased amounts of whey in comparison to the natural yogurt, but the difference decreased when the yogurt was stored at 4-6 °C.

Key words: cow`s milk, yogurt, walnuts, lactic acid bacteria

**28. Михайлова, Г., Г. Герчев, Н. Найденова. 2008. Промени в Състава на мазнината в мляко от каракачански овце от района на Средна Стара планина. Юбилейна научна конференция с международно участие – Смолян, 25-26.09, 110-113.**

**Резюме:** Проучването беше извършено върху индивидуални проби овче мляко, получавани ежемесечно по време на дойния период, от 7 каракачански овце, отглеждани в условията на Средна Стара планина. Екстракцията на мазнината на млечните проби е извършена по метода на Розе-Готлиб, а метиловите естери на мастните киселини са анализирани чрез система от два газови хроматографа, позволяващи разделянето на изомери на ненаситените мастни киселини.

Установено е, че за определените мастни киселини на овчето мляко по време на отделните месеци на изследване се наблюдават разнопосочни тенденции на вариране. Общото количество на наситените мастни киселини е по-ниско в млякото на изследваните каракачански овце в началото на пасищния период – м. април (55.49%), а най-високо – през месец юли (67.52%), когато животните са отглеждани на високопланинско пасище. Съдържанието на полиненаситените мастни киселини в овчето мляко, варира от 6.75% през месец юли до 11.77% през месец април. Сумата на късоверижните мастни киселини е най-висока в млякото, получено през месец май (16.73%), на средноверижните – през месец юли (40.13%), а на дълговерижните – през месец април (52.82%).

Key words: sheep milk, milk fat, fatty acids

**29. Петков, П, Т. Илиев, Н. Найденова. 2009. Проучване на трансформиран брой соматични клетки в млякото на крави във връзка с някои фактори. Животновъдни науки, 3, 27-33.**

**Abstract:** The study included 69 cows of the Bulgarian Black-and-white at the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> lactation. They were calved in the period March-September, and the control of their milk productivity was carried out from April 2008 to January 2009. The cows were daughters of 25 bulls and were reared in two farms.

The study aimed to assess the influence of the environmental factors, morphological and functional characteristics of the udders on the log-transformation of the number of somatic cells in the milk and the correlation between the studied parameters.

The animals were reared free-stall in cattle sheds and the milking was with a central milk line or in a milk parlour (2x6).

Of all the eight studied factors the significant ones were the effects of milking system, stage of lactation, quantity of milk per milking and teat shape ( $p < 0.05$  –  $p < 0.001$ ). The average number of logarithmically transformed somatic cells for the model was  $2.91 \pm 0.053$ . A number higher than that was found for the cows with the prolapsed udder (3.13), slightly conic teat (3.19), average milk flow up to 1.5 kg/min (3.04), milking with a central milk line (3.07), milk yield up to 10 kg/milking (3.05), during the first lactation period (3.43), duration of the milking for over 8.1 minutes (2.98) and evening milking (2.99). The log-number of cells decreased as the lactation month increased, for the cows with milk yielded above 12.1 kg/milking and when the average milk flow was above 2.1 kg/min, as well as in cows with cylindrical teats.

The correlation coefficient of the log-transformed somatic cells with the study factors were negative, most of them were around zero and were insignificant. With lactation month, milk yield per milking and average milk flow the correlations were low, highly significant and ranged from -0.149 to -0.167 ( $p < 0.001$ ).

Key words: cows, logarithmic transformation, somatic cells count, milk, duration of milking, shape of udder, shape of teats, milk flow.

**30. Станчева, Н., Н. Найденова, Г. Стайкова. 2009. Физико-химичен състав, свойства и технологични качества на овче мляко от синтетична популация българска млечна. Хранително-вкусова промишленост, 9, 48-51.**

**Резюме:** Извършено бе проучване върху физико-химичния състав, свойства и технологични качества на овче мляко. Обект на изследването бе полученото по време на дойния период мляко на овце от Синтетична популация българска млечна, произхождащи от стадото на Земеделски институт – гр. Шумен през 2008 година.

Установено бе, че млякото от овцете-майки от Синтетична популация българска млечна се отличава с много добри качествени показатели. Установените стойности са в съответствие с изискванията за сурово овче мляко, предназначено за преработване на млечни продукти. Установените съотношения между компонентите, изразяващи хранителната и технологичната стойност на млякото, показват стойности в рамките на необходимите стандарти за преработването.

Ключови думи: млечност, състав на млякото, технологични качества на млякото.

**31. T. Dimitrov, S. Boycheva, N. Naydenova. 2009. Effect of the activated lactoperoxidase system of sheep milk on the quality of white brined cheese. Proceedings IV Balkan conference of Animal Science BALNIMALCON 2009. Challenges of the Balkan animal industry and the role of science and cooperation. 341-344.**

**Abstract:** The technological quality of ewe milk in the white brined cheese production was studied during 4 months. The composition and properties of milk were standard: dry matter 18.33%, fat 7.29%, total protein 5.65%, lactose 4.39%, titratable acidity 22.5°T and renneting time 253.5 s. The dry matter and fat in dry matter of the cheese produced of milk with the activate lactoperoxidase system (45.190 and 56.110%) were a little higher than these of a control milk (44.85 and 54.92%). No differences in the quality and yield of cheese, produced of both milks were determined (24.49 and 24.51 respectively).

**32. P. Petkov, T. Iliev, N. Naidenova 2009. Studying the relationships between peak milk flow, composition and somatic cells count of cows milk. Proceedings IV Balkan conference of Animal Science BALNIMALCON 2009. Challenges of the Balkan animal industry and the role of science and cooperation. 373-377.**

**Abstract:** Sixty-nine cows of Bulgaria Black and White breed in 1<sup>st</sup>, 2<sup>nd</sup> 3<sup>rd</sup> lactation were investigated. The animals - daughters of 25 bulls belonged to 2 farms controlled once a month. The study was carry out since April 2008 to January 2009 with an aim to investigate the relationships among functional and qualitative characteristics of the milk production in cows. Peak milk flow (PMF) of the model is 2.920.07 kg/min. Higher PMF is demonstrated in cows produced milk with SCC less than  $200 \times 10^3/\text{ml}$ , milk fat and protein – over 3.51 and 2.81% respectively and lactose below 4.70%. There exists a reliable relationships between SCC and milk constituent`s fat and protein . Highest SCC (above  $200 \times 10^3/\text{ml}$ ) are established in milk containing milk fat over 4.0%and less than 2,8% protein. LS-mean of the milk fat model is 3.610.0.33%. Higher fat content demonstrate the groups with milk containing high SCC (over  $800 \times 10^3/\text{ml}$ , 4.61%), and protein (over 3.21; 3.83%) as well as lactose (to 4.70, 3.81% fat). It is found reliable difference (0.19%,  $p < 0.01$ ) between the milk fat content of the evening (3.70%) and the morning (3.51%) milking. LS-mean of the milk protein model 3.06.015%. Higher values are observed in cows with PMF to 2.0 kg/min and  $200 \times 10^3/\text{ml}$  SCC , 3.514.0 and above 4.01% fat in the milk as well as evening milking.

**33. Найденова, Н. 2010. Сравнителни изследвания на кисело мляко, предлагано в търговската мрежа на Стара Загора. Хранително-вкусова промишленост, 3, 52-55.**

**Резюме:** Българското кисело мляко заема най-голям дял от ферментиралите млечни продукти у нас. Качеството на киселото мляко варира в зависимост от суровината и от технологията, коато прилагат производителите. Един от начините за окачествяването му, е да се анализират различни проби, предлагани в търговската мрежа, което гарантира оценка на реалната ситуация на пазара и правата на потребителите.

Изследвани са 5 марки кисели млека, предлагани в търговската мрежа на Стара Загора. Анализирани са както показателите, отбелязани на етикетите (сухо вещество, млечна мазнина, общ белтък, въглехидрати и енергийна стойност), така и съдържанието на сух безмаслен остатък, титруема киселинност, брой млечнокисели бактерии и съотношението между тях. Установено е, че реалния физико-химичен състав се различава от обозначеното на етикета при всички изследвани марки кисели млека. Киселите млека се отличават с ниска титруема киселинност и сравнително нисък брой млечнокисели бактерии, които се променят в различна степен след 14-дневно хладилно съхранение.

Ключови думи: кисело мляко, качество, физико-химичен състав, млечнокисели бактерии, търговска мрежа.

**34. Atanassova, S., N. Naydenova, S. Ribarski, G. Jeliakov, T. Dimitrov, G. Mihaylova. 2011. Nondestructive detection of cheese and meat quality by portable fiber-optics near-infrared instrument. 15-th International Conference on Near Infrared Spectroscopy 13-20 May, Cape Town, South Africa**

**Abstract:** The aim of this work was to assess the feasibility of a portable fiber optic NIR instrument for pork meat and white brined cheese authentication. Difference were observed in NIR spectra of dairy and meat products that differed in authenticity or quality: natural white brined cheese and cheese analogues with vegetable fat, fresh and frozen-then thawed meat; normal and PSE pork meat. Portable fiber optic NIR instrumentation could be used for fast and non-destructive determinations of cheese and meat quality.

**35. Найденова Н., Г. Михайлова, Т. Илиев, С. Бойчева. 2014. Млечните продукти като функционални храни: Производство на кисело мляко, обогатено с екстракт от билки и мед. Екология и бъдеще, №3, 71-75.**

**Abstract:** The objective of this study was to investigate the effect of the herbs *Sambucus ebulus*, *Astragalus glysyphillos* and honey on the physic-chemical, microbiological and sensorial characteristics of Bulgarian yogurt. Yogurt, supplemented by herbs and honey coagulated at a highest acidity and for a shorter time than natural yogurt did. The data of the lactic acid bacterial

counts in yogurt supplemented with herbs and honey showed that by the time of coagulation , lactic acid bacteria were the most numerous in the sample containing *Sambucus ebulus* and honey (1 057 cfu/cm<sup>3</sup>), followed by the sample with *Astragalus glysyphillos* and honey (864 035 cfu/cm<sup>3</sup>). The results showed that the addition of herbs and honey improves considerably the quality of pasteurized milk as a medium for the development of lactic acid bacteria.

Key words: yogurt, *Sambucus ebulus*, *Astragalus glysyphillos*, honey, lactic acid bacteria.

**36. Naydenova, N. 2014. Critical Control Points on the production of Bulgarian white brined cheese. Ecology and future, vol. XIII, №3, pp. 65-70.**

**Abstract:** This paper examines the factors, which influence the safety characteristics of Bulgarian white brined cheese. The study revealed that the Critical Control Point (CCPs) for Bulgarian white brined cheese were raw milk, milk pasteurization, cheese ripening and final product storage. Critical factors and limits for CCPs were determined and were proposed preventive and corrective actions. This paper focuses on the flow diagrams based on the production lines of a small dairy company in Bulgaria (Smolyan region), and presents an analysis of the hazards and of the critical control points (CCP).

Key words: Hazard analysis critical control points, Bulgarian white brined cheese, food safety

**37. Найденова Н., Т. Илиев, Г. Михайлова. 2014. Сравнителни изследвания на мастнокиселинния състав на кисело мляко, предлагано в търговската мрежа на Стара Загора. Екология и бъдеще, №4, 39-45.**

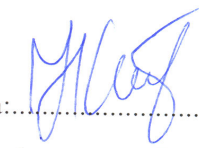
**Abstract:** Bulgarian yogurt has the largest share of fermented dairy products in the country. The quality of yogurt varies depending on the raw materials and the technology applied by manufacturers. Five brands of yogurt commercially available in Stara Zagora were examined. Their fatty acid composition was analyzed, on which basis some health indices (atherogenic and thrombogenic) were calculated. These indices can be used for evaluation of the preventive quality of food. All the tested brands of yogurt had a relatively high content of mono- (from 34.5 to 37.32%) and polyunsaturated fatty acids (from 2,16 to 4.28%) . 80% of the brands showed

omega-6/omega-3 ratio between 2.71:1 and 4.53:1, which is the optimal value according to modern notions of rational nutrition.

The values of the atherogenic and thrombogenic indexes of commercially available yogurt are relatively low – respectively from 1.6 to 2.09 and from 1.37 to 1.69.

Key words: yogurt, quality, fatty acid composition, index of atherogenicity, index of thrombogenicity

Изготвил справката:.....



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