

**РЕЗЮМЕТА НА НАУЧНИТЕ ТРУДОВЕ И ПУБЛИКАЦИИ
НА ДОЦ. Д-Р НИКОЛИНА НАЙДЕНОВА ЖЕЛЕВА**

ПРЕДСТАВЕНИ ЗА УЧАСТИЕ В КОНКУРС ЗА ЗАЕМАНЕ НА АКАДЕМИЧНА ДЛЪЖНОСТ ПРОФЕСОР В ОБЛАСТ НА
ВИСШЕТО ОБРАЗОВАНИЕ 5. ТЕХНИЧЕСКИ НАУКИ, ПРОФЕСИОНАЛНО НАПРАВЛЕНИЕ 5.12. ХРАНИТЕЛНИ
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КАТЕДРА „ЖИВОТНОВЪДСТВО – ПРЕЖИВНИ ЖИВОТНИ И ТЕХНОЛОГИИ НА ЖИВОТИНСКИТЕ ПРОДУКТИ“,
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1. Публикувана монография, отнасяща се към група от показатели В от минималните национални и допълнителни изисквания към научната и преподавателската дейност на кандидатите за заемане на академична длъжност "професор"

В.1. Николина Найденова Желева. 2020. Функционални млечни продукти. Печатница Кота, Стара Загора, България, ISBN 978-954-305-547-0.

Резюме: През последните две десетилетия функционалните млечни продукти бяха в центъра на интензивни изследвания и разработване на продукти. Тази информация е събрана в един ресурс, който разкрива ключов напредък във функционалните млечни съставки и продукти и определя посоките за маркетинг и развитие на продуктите.

Монографията „Функционални млечни продукти“ разглежда специфичните съставки на млякото и млечните продукти, въпроси, свързани с безопасността и регулаторната среда на функционалните продукти. Акцентът е поставен върху потенциалния принос на съставките на млякото и млечните продукти за поддържането на здравето и профилактиката на болестите. Състои се от няколко части, предоставящи най-съвременна информация за ползите за здравето на млечните продукти (напр. управление на теглото, детско здраве, въздействие върху гастроинтестиналния тракт), функционални млечни съставки (про- и пребиотици, хипоалергенни хидролизати и растителни стероли и станоли) и др.

Монографията „Функционални млечни продукти“ предоставя на читателя кратък преглед на всичко, познато до момента в тази област. Тази монография следва да бъде от полза за хората, занимаващи се с хранене и здраве, изследвания на функционални храни и разработване на хранителни продукти.

2. Резюмета на научни публикации, в издания реферирани и индексирани в световноизвестни бази данни с научна информация (Web of Science и Scopus), отнасящи се към група от показатели Г от минималните национални и допълнителни изисквания към научната и преподавателската дейност на кандидатите за заемане на академична длъжност "професор".

Г.1. Dimitrova, C., S. Ivanova, S. Stoicheva, P. Zunev, L. Angelov, N. Naydenova. 2017. Trans fatty acids and quality assessment of fatty acid composition in white brined cheese from goat`s milk. Journal of Mountain Agriculture on the Balkans, 20(2), 29-42. 1311-0489, <https://jmabonline.com/en/article/cUznPlaRy2qPI35e5t1q>

Абстракт:

Изследването е проведено с бяло саламурено сирене, произведено от козе мляко от три породни групи – Българска Бяла млечна (ББМ), и кръстоските ѝ с Англонубийска (ББМxАН) и Тогенбургска (ББМxТГ) в хода на лактацията, за да се установи съдържанието на естествени транс мастни киселини (ТМК) и да се оцени качеството на мастнокиселинния състав на продукта, като здравословен източник при храненето на човека. Общото съдържание на ТМК в изследваните бели саламурени сирена от козе мляко при ББМ варира от 2,11 до 2,81 g/100g мазнина, при ББМxАН от 2,05 до 3,04 g/100g мазнина и от 2,47 до 2,97 g/100g мазнина при ББМxТГ, обусловено от съдържанието на транс ваксеновата киселина (45 и 63%) от общото съдържание на ТМК в зависимост от породата. Концентрацията на CLA в изследваните сирена е най-висока при ББМ от 0,58 до 0,64 g/100g мазнина. За качествената оценка на мастната фракция са включени показателите липиден превантивен скор, атерогенен и тромбогенен индекс и съотношението между хипер- и хипохолестеро-лемични мастни киселини. Липидният превантивен скор е най-нисък при сирената произведени от козе мляко на ББМ – 44,22 до 60,46 g/100g продукт, докато атерогенен и тромбогенен индекс са най-ниски при ББМxТГ, съответно от 1,55 до 2,28 и от 2,03 до 2,56 и с най-високо съотношение на хипер- и хипохолестеро-лемични мастни киселини при ББМxТГ от 0,65 до 0,96. Изследваните бели саламурени сирена от козе мляко от различни породни групи се характеризират като хранителен продукт с ниско съдържание на ТМК (от 0,52 до 0,79 g/ 100g млечен продукт) и високо съдържание на наситени мастни киселини (от 15,48 до 21,42g/100g млечен продукт).

Abstract

The study was conducted with white brine cheese produced by goat's milk from three breed groups – White Bulgarian Dairy (WBD) and her crosses with Anglo-Nubian (WBDxAN) and Toggenburg goats (WBDxTG) during the lactation to establish the content of natural trans fatty acids (TFA) and to assess the quality of the fatty acid composition of the product as a healthy source in human nutrition.

The total content of TFA in the examined white brined cheese from goat's milk at WBD ranged from 2,11 to 2,81 g/100 g fat, in WBDxAN from 2,05 to 3,04 g/100 g fat and from 2,47 to 2, 97 g/100 g fat in WBDxTG, conditioned by the content of trans vaccenic acid (45 and 63%) of the total content of TFA depending on the breed. The concentration of CLA in the studied cheese is highest in WBD from 0,58 to 0,64 g/100 g fat. The quality assessment of the fat fraction included indicators lipid preventive score, atherogenic and thrombogenic index and the ratio between hyper- and hypocholesterolemic fatty acids. Lipid preventive score is the lowest in cheeses made from goat's milk WBD - 44,22 to 60,46 g/100 g

product as atherogenic and thrombogenic index are the lowest in WBDxTG, respectively from 1,55 to 2,28 and from 2,03 to 2,56, and the highest ratio of hyper- and hypocholesterolemic fatty acids in the WBDxTG from 0,65 to 0,96. The analysed white brined cheese from goat's milk from different breed groups are characterized as foodstuff with low TFA (from 0,52 to 0,79 g/100 g milk product) and high content of saturated fatty acids (from 15,48 to 21,42 g/100 g milk product).

Г.2. Ivanova S., C. Dimitrova, S. Stoicheva, P. Zunev, L. Angelov, N. Naydenova. 2017. Trans fatty acids, biological active substances and assessment of fatty acid composition in goat milk. *Journal of Mountain Agriculture on the Balkans*, 20(2), 15-28. 1311-0489,
<https://jmabonline.com/en/article/CcJyL0YSoxnjrJnkeJvK>

Абстракт:

Настоящото проучване цели да се установи съдържанието на естествени транс мастни киселини (ТМК), биологичноактивни и антиканцерогенни компоненти в козе мляко от три породни групи – Българска Бяла млечна (ББМ) и кръстоските ѝ с Англонубийска (ББМxАН) и Тогенбургска (ББМxТГ) в хода на лактацията, както и да се направи оценка на мастнокиселинния състав на млечната мазнината, като здравословен източник при храненето на човека. Общото съдържание на ТМК в изследваните млека при отделните породни групи варира от 1,35 до 2,34 g/100g мазнина при ББМ, от 1,24 до 1,86 g/100g мазнина при ББМxАН и от 1,07 до 2,25 g/100g мазнина при ББМxТГ, обусловено от сезонните колебания в съдържанието на ваксеновата киселина (40 и 67%) от общото съдържание на ТМК в зависимост от породата. Концентрацията на CLA в изследваните млека е с най-високо съдържание при ББМ от 0,34 до 0,51 g/100g мазнина. Количеството на омега-3 мастните киселини в козите млека варира от 0,44 до 1,05, а при омега-6 мастните киселини от 1,85 до 2,21 g/100g мазнина при отделните породни групи. Липидният превантивен скор е най-нисък при млякото, получено от ББМ – 9,24 до 11,60 g/100 ml мляко. Млякото, получено от ББМ е с най-нисък атерогенен и тромбогенен индекс, съответно 2,19 до 3,44 и от 2,19 до 3,22 и съотношение на хипер- и хипохолестеролемични мастни киселини от 0,45 до 0,71. Изследваните млека от различни породни групи, се определят като хранителен продукт с ниско съдържание на ТМК (от 0,06 до 0,10 g/100 ml мляко) и високо съдържание на НМК (от 3,2 до 4,56 g/100 ml мляко).

Abstarct:

This study aims to determine the content of natural trans fatty acids (TFA), biological active and anticancer components in goat milk from three breed groups - White Bulgarian Dairy (WBD) and its crosses with Anglo-Nubian (WBDxAN) and Toggenburg (WBDxTG) during the lactation and to evaluate the fatty acid composition of fat as a healthy source in human nutrition. The total content of TFA in the analysed milk in different breed groups vary from 1,35 to 2,34 g/100 g fat at WBD, from 1,24 to 1,86 g/100 g fat in WBDxAN and 1,07 to 2,25 g/100 g fat in WBDxTG, conditioned by the content of trans vaccenic acid (40

and 67%) of the total content of TFA depending on the breed. The concentration of CLA in studied milk is highest at WBD from 0,34 to 0,51 g/100 g fat. The amount of omega-3 fatty acids in the analysed milk from goats ranges from 0,44 to 1,05, and omega-6 fatty acids from 1,85 to 2,21 g/100 g fat in different breed groups. The lipid preventive score is the lowest in the milk from WBD - 9,24 to 11,60 g/100 ml milk. The milk obtained from WBD have a lowest atherogenic and thrombogenic index, respectively 2,19 to 3,44 and from 2,19 to 3,22 and a ratio of hyper- and hypocholesterolemic fatty acids from 0,45 to 0,71. The analysed milk from different breed groups were characterized as foodstuffs with a low content of TFA (from 0,06 to 0,10 g/100 g milk) and a high content of SFA (from 3,2 to 4,56 g/100 g milk).

Г.3. Panayotov, D., N. Naydenova, G. Mihailova, T.Iliev. 2018. Physico-chemical and technological characteristics of Lacaune ewe's milk. Bulgarian Journal of Agricultural Science, 24 (Supplement 1), 101-108, SJR – 0.261. ISSN 1310-0351p <https://www.agrojournal.org/24/01s-15.pdf>

Abstract:

През периода март-август 2016 г. е проучен химичният състав на млякото от овце на породата Лакон. и неговите основни технологични свойства при производството на българско кисело мляко и българско бяло саламурено сирене. Изследваното овче се отличава с високо съдържание на сухо вещество, млечна мазнина и протеин. Средният процент на тези млечни компоненти е съответно 18,84, 7,21 и 6,19%. Установеното време за подсирване (495.0 s – първа поява на малки видими пресечки след прибавяне на сирищния ензим) на млякото при овцете на породата Лакон е в нормалните граници за производство на сирене. Млякото на овцете от породата Лакон е добра и подходяща среда за растежа на *Lactobacillus delbrueckii ssp. bulgaricus* и *Streptococcus thermophilus*. Изследваното българско кисело мляко има плътен, гладък и еднороден коагулум, без отделяне на цвик на повърхността и приятен млечнокисел вкус. Зрялото българско бяло саламурено сирене е 50,22% водно съдържание, 54,66% масленост в сухото вещество, 8,33% сол във водната фаза и 69,06% вода в безмасления остатък. Титруемата киселинност в зрялото сирене достига средна стойност 251,9°Т. Добивът на сирене от млякото на овцете на породата Лакон е много близък до този, установен при по-ранните проучвания на някои български породи.

Abstract:

The chemical composition of the Lacaune ewe's milk and its basic technological properties in production of Bulgarian sour milk and Bulgarian white brined cheese were studied during March-August 2016. Studied Lacaune ewe's milk exhibited high content of total solids, fat and protein. The average percentage of these milk components was 18.84, 7.21 and 6.19%, respectively. The established renneting time (495.0 s - first appearance of small visual flocs) in Lacaune ewe's milk was in the normal limits for cheese-making. Lacaune ewe's milk is a good and suitable medium for the growth of *Lactobacillus delbrueckii ssp. bulgaricus* and *Streptococcus thermophilus*. The studied Bulgarian sour milk had a dense, smooth, uniform coagulum, surface without syneresis and pleasantly sour taste. Matured Bulgarian white brined

cheese had 50.22 % moisture, 54.66 % fat in dry matter, 8.33 % salt in the moisture and 69.06 % moisture in the non-fat substance. The titratable acidity reached average value 251.9 °T. The cheese yield was very similar to that established in studies on the milk of other Bulgarian sheep breeds.

Г.4. Pamukova D., N. Naydenova, G. Mihaylova. 2018. Fatty acid profile and healthy lipid indices of bulgarian goat milk from breeds, pasture-raised in a mountain region. *Trakia Journal of Sciences*, No 4, pp 313-319. ISSN 1313-7050

<http://tru.uni->

[sz.bg/tsj/Volume%2016,%202018,%20Number%204,%20Series%20Biomedical%20Sciences/8.pdf](http://tru.uni-sz.bg/tsj/Volume%2016,%202018,%20Number%204,%20Series%20Biomedical%20Sciences/8.pdf)

Abstract:

The aim of the present study was to characterize the fatty acids profile and the related health lipid indices of goat`s milk from different Bulgarian breeds in order to add information on its nutritional quality. The study was performed with goat milk from a private farm in the Stara Planina Mountain. Milk samples were collected from three breeds – Bulgarian White Dairy Goat, Toggenburg and local goats. The content of saturated fatty acids was the highest in the milk of the local breed – 83.6% compared to for Bulgarian White Dairy Goat - 75.4% and Toggenburg - 75.2%. The atherogenic index was calculated on the obtained values for lauric (C12:0), myristic (C14:0) and palmitic (C16:0) acids and the unsaturated fatty acids. The data for the Bulgarian White Dairy Goat was – 3.12; Toggenburg – 3.14 and for local breed – 5.54. The values of the atherogenic index showed that it is the lowest for the Toggenburg, following Bulgarian White Dairy Goat and local breed. Omega 6/Omega 3 ratio varies from 1.58 for local breed to 2.44 for Toggenburg which is within the range of the optimal values for healthy nutrition.

Г.5. Gerchev G., N. Naydenova, Ts. Dimitrova, G. Mihailova, N. Markov. 2018. Fatty acid composition of milk of Tsigai and Karakachan sheep and meat of their lambs F1 crossbreeds of Awassi. *Journal of Mountain Agriculture on the Balkans*, 21 (4), 15-28, 1311-0489

<https://jmabonline.com/en/article/YVgRW6coklYLhZNOtAcY>

Абстракт:

Целта на изследването е да се изследва мастнокиселинния състав на млечна мазнина на мляко от Цигайски и Каракачански овце и на месото от техни агнета F1 кръстоски на Аваси. Проучването е проведено с две групи от по 6 броя овце с мъжки агнетата в Цигайското и Каракачанското стада. Определен е основният химичен състав на овчето мляко и на месото (*m. Longissimus Dorzi*) от агнетата. Направена е оценка на мастнокиселинния състав на млякото и на агнешкото месо. Наситените мастни киселини в млякото на цигайски и каракачански овце - с къса и средна дължина на веригата, вариращи от 68.06% до 69.72%, са със съдържание на миристинова киселина съответно 9.10 и 8.58%. От наситените мастни киселини в месото с дълга верига с високо съдържание е

палмитиновата C16:0, по-ниско е съдържанието на миристинова киселини (C14:0). Общото количество на полиненаситени мастни киселини в изследваното мляко на двете породи овце е сравнително ниско и с близки концентрации (4.24 - 4.0%). Холеричният тип при каракачанските агнета допринася за завишено съдържание на арахидоновата киселина (C4:0) в месото на каракачанските агнета. Ниски са стойностите на съотношението ПННМК/НМК (0.06- 0.058), докато при месото стойностите на това съотношение са по-високи (1.20-1.27%). Мононенаситените мастни киселини в месото, представени основно от олеиновата киселина (C18:1), варират при двете породи от 21.92 % до 25.32%. Атерогения индекс на млечната мазнина при двете породи овце е в границите на 0.90 и 0.87, докато при агнешкото месото е по-нисък - 0.78 - 0.70. Късоверижните мастни киселини (Σ C4:0-C11:0) в млякото са с близки стойности при двете породи овце. Средноверижните киселини (Σ C17iso- C25:0) са със завишена концентрация в млякото на Каракачанските овце, обратно - при дълговерижните съдържанието им е по-високо в това на цигайските овце.

Abstract:

The aim of the present investigation was to study the fatty acid composition of milk fat of Tsigai and Karakachan sheep and meat from their lambs of F1 crossbreeds of Awassi. The study was conducted with two groups of 6 sheep with male lambs in Tsigai and Karakachan herds. The main milk chemical composition and lamb meat was reported (m. Longissimus, Dorzi). The fatty acid composition of milk and lamb meat was evaluated. Saturated fatty acids in milk of Tsigai and Karakachan sheep are with short and medium chain length ranging from 68.06% to 69.72% with a myristic acid content of 9.10 and 8.58%, respectively. There is a high palmitic acid content C16: 0, which is a part of the saturated fatty acids in meat with a long chain, while myristic acid content is lower (C14: 0). The total amount of polyunsaturated fatty acids in the studied milk of both sheep breeds is relatively low and with close concentrations (4.24 - 4.0%). The choleric type in Karakachan lambs contributes to an increased content of arachidonic acid (C4:0) in Karakachan lamb meat. PUFAs/SFA ratio (0.06-0.058) had low values of, while in the meat these ratio values were higher (1.20-1.27%). Monounsaturated fatty acids in the meat, mainly represented by oleic acid (C18: 1), ranged from 21.92% to 25.32% in both breeds. The atherogenic index of milk fat in both breeds is in the range of 0.90 and 0.87, while in lamb it is lower 0.78 - 0.70. Short-chain fatty acids (Σ C4: 0- C11: 0) are closely related in the two sheep breeds. Medium-chain acids (Σ C17iso-C25: 0) have an increased concentration in the milk of Karakachan sheep, and vice versa, for the longchained ones their content is higher in Tsigai sheep.

Г.6. Panayotov D., N. Naydenova, T. Iliev, G. Mihaylova, 2019. Fatty acid content of Lacaune sheep milk and cheese. Bulgarian Journal of Agricultural Science, 25, pp. 85-90, SJR – 0.191. ISSN 1310-0351

<https://www.agrojournal.org/25/03s-14.pdf>

Abstract:

The objective of the study was to determine the composition of fatty acids in the milk of Lacaune sheep

and produced cheese from it. The study was performed with ewe's milk of Lacaune breed, reared in the herd of the private farm in a village of Yambol municipality. Milk samples were collected in the morning and the evening, proportionally to the milk yield, according to rules for milk sampling. To perform an analysis of the fatty acid composition of the Lacaune sheep milk, three milk samples were collected at three different times from April to June 2017. From the milk samples have been made Bulgarian white cheese. The fatty acid composition of raw milk and cheese samples was determined at 60 day of producing. The most abundant fatty acids in milk and cheese were saturated fatty acids (82.37% and 77.42% in the milk and cheese, respectively). Monounsaturated fatty acids (14.31% for raw milk and 16.54% for white brined cheese) were the most numerous in terms of isomers, but mostly in low concentration. The atherogenic index was calculated on the obtained values for lauric (C12:0), myristic (C14:0) and palmitic (C16:0) acids and the unsaturated fatty acids. The data for the raw sheep milk was – 2.16 and for produced white brined cheese – 1.63. Omega 6/Omega 3 ratio varies from 1.33 for raw milk and 1.00 for white brined cheese, which is within the range of the optimal values for healthy nutrition.

Г.7. Beev G., T. Kolev, **N. Naydenova**, T. Gospodinov, M. Tzanova, G. Mihaylova. 2019. Physicochemical, sanitary and safety indicators changes during the ripening of Bulgarian white brined cheese from local farms. Bulgarian Journal of Agricultural Science, 25, pp. 109-115, SJR – 0.191. ISSN 1310-0351

<https://www.agrojournal.org/25/03s-18.pdf>

Abstract

The present study aims to determine the physicochemical and microbiological changes of white-brined cheese from local farms during manufacturing and ripening. Milk pasteurization for white-brined cheese production leads to a severe reduction of microorganisms in milk. Thus, after pasteurization the total number of microorganisms decreases from 480 000 to 810 cfu/cm³, *Salmonella spp.* from 800 to 2 cfu/cm³ and *E. coli* from 4000 to 0 cfu/cm³. Ripening processes lead to a drastic reduction of cheese microflora with prevalence of specific lactic microflora (lactobacilli and lactococci) on the 45th day and complete annihilation of *E. coli* and *Salmonella spp.* These changes in the cheese microflora made the final product safe for consumption. On the other hand, the experimental data shows a strong multiplication of *Salmonella spp.* on the 7th day (10 cfu/cm³ at the 24th hour reached 0 cfu/cm³ on the 7th day) and insufficient decrease of the number of other microorganisms, making fresh white-brined cheese at its early ripening stages unsafe for consumption. Ripening of the cheese brings about an increase of the dry matter percentage (from 33.5% at 24th hour to 38.5% at 45th day), the fat content (from 13.3% to 16.4%), salt content (from 4.1% to 5.8%) and total protein content (from 13.7% to 16.7%) and reduction of moisture in non-fat substance (from 76.7% to 73.8%) of the final product. These changes are in accordance with the accepted standards for white-brined cheese production.

Г.8. Gencheva, D., P. Veleva, N. Naydenova, D. Pamukova. 2020. Genetic polymorphism of alpha S1-casein in Bulgarian sheep breeds and its effect on milk composition, Turk J Vet Anim Sci 44:© TÜBİTAK doi:10.3906/vet-2001-102 (Q3 – IF 0.552) ISSN: 1300-0128

<https://journals.tubitak.gov.tr/cgi/viewcontent.cgi?article=1173&context=veterinary>

Abstract:

The genetic polymorphism of the alpha S1-casein (CSN1S1) was investigated in five sheep breeds reared in Bulgaria: Sofia (Elin-Pelin, SEPL), Copper-Red Shumen (CRSH), Local Karnobat (LKNB), Pleven Blackhead (PLBH), and Stara Zagora (STZG) sheep with an aim to establish the possible effect of a particular genotype on ovine milk composition. Based on nucleotide variation in exon III of the CSN1S1 gene, two genetic variants (A and C) and three genotypes (AA, AC, and CC) have been identified using PCR-RFLP analysis on a total of 217 unrelated ewes. The allele frequencies determined a prevalence of the allele C (0.886) over the allele A (0.114) across the studied sheep populations. The homozygous CC genotype was observed in nearly 80% of the studied ewes. The calculated values for observed ($H_o = 0.548$) and expected ($H_e = 0.468$) heterozygosity at CSN1S1 locus indicated a relatively high degree of genetic variability in the Sofia sheep population. The greatest Nei's genetic distance ($DA = 0.080$) was found between the populations STZG and SEPL, while the closest relationship was established ($DA = 0.000$) between PLBH and CRSH, also between STZG and CRSH. The results of the association analysis indicated that CSN1S1 AC genotype was significantly associated ($P < 0.05$) with the highest percentages of the fat, protein, casein, solids-nonfat and total solids in Sofia sheep ewes. The genotype CSN1S1 CC was associated with the highest noncasein protein percentage, while the genotype AA was linked with the highest lactose percentage. The CSN1S1 genotype did not show a significant effect ($P > 0.05$) in the Sofia sheep population in relation to the renneting time. In conclusion, the established single nucleotide polymorphism in the CSN1S1 locus could be used as a potential genetic marker for ovine milk composition traits, as well as for developing an effective conservation strategy towards traditional sheep breeds in the country.

Г.9. Penev T., N. Naydenova, D. Dimov, I. Marinov. 2020. Influence of Heat Stress and Some Related Physiological Indicators on the Content of Long-chain fatty acids in the Milk of Holstein-Friesian cows. Veterinarija iz zootehnika, 77(99), 51-58, (Q4 – SJR 0.13) ISSN: 1392-2130

Abstract.

The aim of the research was to study the effect of heat stress (HS) and associated changes in the rectal temperature and the respiratory rate on long-chain fatty acid (LCHFA) content in the milk of Holstein-Friesian cows. The study included 22 cows on different parities studied in two periods: under thermo-neutral environment conditions (May 2018) and under heat stress (August 2018). The fatty acid content of milk was determined using a chromatograph by the method of Rose-Gottlieb. It was found that HS in dairy cows leads to changes in the content of some LCHFAs (C17:0; C18:0; C18:2 and C18:3) in milk fat.

Under conditions of moderate HS (temperature-humidity index over 79), a certain decrease in the content of C17:0 was reported, while in the other three LCHFAs, an increase in their content in milk fat was reported to varying degrees. The strongest effect of HS was reported on the content of C18:0, which was proportional to the levels of HS. With an increasing rectal temperature, an increase in the content of C18:0 was reported, the increase being most substantial at a rectal temperature above 39.5°C.

Г.10. Pamukova D., N. Rusenova, T. Kolev, S. Chobanova, **N. Naydenova**. 2020. Physicochemical and microbiological characteristics of goat milk from animals grown in a mountainous area in Bulgaria, *Agricultural science and technology*, 12, 3, pp 277-281, ISSN 1313-8820

https://agriscitech.eu/wp-content/uploads/2020/09/13_AST_3_September_2020.pdf

Abstract.

The aim of the study was to determine the goat milk quality from animals grown in a mountainous area in Bulgaria based on physicochemical and microbiological parameters. The study was carried out in a farm that breeds local goats and goats of the Bulgarian White Dairy Goat (BWD). Individual milk samples were taken on a monthly basis from morning milking. A total of 100 individual and 10 bulk milk samples were examined for fat, solids nonfat, protein and density. A total of 62 samples were collected at a time to determine the microbiological characteristics of milk. For the period May-September 2017, the percentage of fat in the milk of local goats averaged 3.61% and of goats from BWD goat - 3.54%. The solids nonfat were 8.27% and 8.19%, total protein - 3.13% and 3.10%, and the dry matter - 11.89% and 11.74%, respectively. For the period May-August 2017 the individual constituents of milk changed to varying degrees with the most variable being milk fat (decrease of 0.97% in local goats' milk and 1.09% in milk from BWD goat) followed by solids nonfat (0.56% and 0.7%, respectively). The slightest change was in protein - 0.21% and 0.26%, respectively. Coagulase-negative staphylococci were the predominant bacterial species in the goats' milk samples.

Г.11. Beev G., M. Michaylova, T. Dinev, **N. Naydenova**, M. Tzanova, Z. Urshev. 2021. ARDRA Analysis on Biodiversity of Lactobacilli Isolated from Bulgarian Raw Buffalo Milk. *ACTA MICROBIOLOGICA BULGARICA* Volume 37 / 1, 22-26 (Q4 – SJR 0.12) ISSN 0204-8809

<https://actamicrobio.bg/archive/issue-1-2021/amb-1-2021-article-3.pdf>

Abstract

Lactic acid bacteria are widespread in nature and occur naturally as indigenous microflora in raw milk. Considering that buffalo milk is an excellent medium for the growth of a large variety of lactic acid bacteria, the aim of this study was the isolation of *Lactobacillus* spp. strains from raw buffalo milk originating from different areas and their species identification, using Amplified Ribosomal DNA Restriction Analysis (ARDRA) and a set of five reference strains of the most frequently isolated *Lactobacillus* species. From the analysis of the patterns generated after treatment with *Hae*III it was found that 24 (88.8%) of the isolates had

profiles that matched the reference 16S rDNA of *Lactobacillus casei*. The restriction profiles of the remaining three isolates (12.2%) did not match any of the reference strains and they were identified by API 50 CHL as *Lactobacillus fermentum*. This indicates that *L. casei* is highly adaptive and dominates in raw buffalo milk regardless of the climatic conditions and the method of raising animals.

Г.12. Penev T., N. Naydenova, D. Dimov, I. Marinov. 2021. Influence of Heat Stress and Physiological Indicators Related to It on Health Lipid Indices in Milk of Holstein-Friesian Cows. Journal of Oleo Science, 70, 6, p. 745-755, <https://doi.org/10.5650/jos.ess20251>, IF – 1.304 (2019), 1345-8957

Abstract:

The aim of the survey was to study the effect of heat stress (HS) on health lipid indices in milk of Holstein-Friesian cows. The study was conducted in a cattle farm with Holstein-Friesian cows in the region of Karnobat (Southeastern Bulgaria) in 2018. Cows were housed in semi-open free stall dairy barn, fed year-round ad libitum with a total mixed ration. The study included 22 cows on different parities studied in two periods - at thermo-neutral environment conditions and at heat stress, respectively, May and August. Extraction of milk fat was performed by the Rose-Gottlieb method. Conditions of HS lead to changes in the values of health lipid indices associated with a decrease in the values of Atherogenic index (AI), Thrombogenic index (TI), Lipid Preventive Score (LPS) and Desaturase (18) index (DI 18) and an increase in Health promoting Index (HPI), polyunsaturated fatty acids/saturated fatty acids (PUFA/SFA), unsaturated fatty acids/saturated fatty acids (UFA/SFA), mono unsaturated fatty acids (MUFA), Desaturase (16) index (DI 16) and hypocholesterolaemic/hypercholesterolaemic ratio (h/H). Increasing the Temperature-humidity index (THI) above 72, results in a decrease in the AI values and an increase in those of the PUFA/SFA. The values of health lipid indices showed a moderate positive correlation with those of THI (PUFA/SFA - 0.36) with rectal temperature (h/H, MUFA/SFA, UFA/SFA) r_p from 0.36 to 0.37, and with respiratory rate (h/H, PUFA/SFA), r_p of 0.33 and 0.31, respectively. Under the influence of heat stress, changes in the metabolic processes occur in the body of dairy cows leading to changes in the fatty acid content of milk related to the improvement of health lipid indices in terms of human health due to an increase in UFA and reduction in SFA.

Г.13. Naydenova N. 2021. Evaluation of fatty acid profile and naturalness of butter marketed in Bulgaria. Agricultural science and technology, 12, 3, pp 313-319, ISSN 1313-8820
https://agriscitech.eu/wp-content/uploads/2021/09/18_AST_3_September_2021.pdf

Abstract:

The predominant influence on the structural-mechanical characteristics (hardness, brittleness, etc.) and the chemical parameters (acidity, oxidation-reduction potential, etc.) of butter is exerted by its lipid composition. The aim of the study was to establish the fatty acid composition of some Bulgarian brands of

butter and those imported from abroad, offered in the trade network of Bulgaria, in connection with their naturalness and health indicators. Five brands of butter produced in Bulgaria and imported from countries in the European Union were tested three times. The content of saturated fatty acids in the studied Bulgarian brands of butter varied from 66.16 to 75.15%, and for brands of butter imported from EU countries they varied in a significantly narrower range - from 67.51 to 72.49%. The amount of short-chain saturated fatty acids is higher for EU-imported butter brands. The data for the identification characteristics of all tested samples from the trade network of the country meet the requirements for naturalness of butter. The atherogenic index of butter varied from 2.56 to 3.26 for the imported brands of butter and from 2.41 to 3.70 for the Bulgarian ones, and the thrombogenic index from 1.49 to 2.36 for the imported brands, and from 1.44 to 2.17 for the Bulgarian ones, respectively.

Г.14. Beev, G., S. Lazarov, T. Dinev, **N. Naydenova**. 2022. Nutritional evaluation of yoghurt prepared by lactobacilli isolated from apis mellifera Guts and mountain anthill, Journal of Hygienic Engineering and Design, Vol. 39 (Q4, SJR -0.16), ISSN 1857-8489

<https://keypublishing.org/jhed/wp-content/uploads/2022/09/03.-JHED-Volume-39-Full-paper-Georgi-Beev.pdf>

Abstract:

The use of different lactic acid bacteria with desired technological and probiotic characteristics requires their isolation from different sources. The aim of this study was to determine the influence of newly isolated lactobacilli from promising natural sources (bees and ants) on the quality of buffalo yogurt. A total amount of 7 strains, isolated from bee guts (6) and alpine anthill (1), were tested as a starter culture for yoghurt preparation. Yoghurt was produced with the addition of 10% starter culture from the isolated strains. The titratable acidity ($^{\circ}\text{T}$), coagulation time (min), macro- and microelement composition (by atomic absorption spectrometry), fat- and aminoacid composition (by gas chromatography), and the organoleptic properties of the yoghurt were studied. The titratable acidity of the experimental yoghurt – 110°T for *Lactobacillus casei* B4 (isolated from bee gut) and 116°T for *L. casei* A1 (isolated from alpine anthill) was lower than the control value (139°T). The coagulation time was the shortest in the control (168 minutes), followed by yoghurt with strains A1 (198 minutes) and B4 (240 minutes). The content of P, Zn and Cu was higher in the milk produced by the newly isolated strains A1 and B4. The atherogenic index ranged from 2.72 for raw milk to 2.47 for yogurt produced by B4, 2.28 for yoghurt with A1, and 2.27 for control value. The same trend is observed in the thrombogenic index - from 1.74 for raw milk it decreases to 1.51 for B4, 1.42 for control and 1.04 for A1. The three types of yogurt were characterized by a firm, tight coagulum with a granular structure and a pleasant lactic acid aroma.

In conclusion, from the 6 tested strains of *L. casei* and 1 of *Lacobacillus rhamnosus*, only A1 and B4 are suitable for production of high quality yoghurt, which in terms of beneficial effects on consumers' health should be not inferior to conventional yoghurt.

Г.15. Gencheva D., D. Pamukova, **N. Naydenova**, P. Veleva, and M.Tzanova. 2022. Alpha S1-casein genetic variations in Bulgarian sheep breeds and significance on milk casein fractions, Bulgarian Journal of Agricultural Science, 28, 3, pp. 526-533, (Q3, SJR -0.25), ISSN 1310-0351

<https://www.agrojournal.org/28/03-24.pdf>

Abstract:

Single nucleotide polymorphism (SNP) of the exon III at CSN1S1 gene encoding alpha S1-casein (α S1-CN) was investigated by means of the PCR-RFLP analysis in two sheep breeds – Bulgarian Dairy Synthetic Population (BDSP, n = 89) and Pleven Blackhead sheep (PLBH, n = 38) with an aim to establish the possible effect of a particular genotype on the casein content and distribution of milk fractions. The homozygous CC genotype was observed in 63.2% of the studied ewes, while the homozygous AA genotype was established in 4.5 % of the individuals. The calculated mean values of observed ($H_o = 0.323$) and expected ($H_e = 0.321$) heterozygosity at CSN1S1 locus indicated a moderate degree of genetic variability in the examined sheep populations. The estimated negative values of the coefficient ($F_{is} = -0.001 \div -0.006$) showed a low level of inbreeding. The results of the associative analysis indicated that CSN1S1 genotypes were significantly associated with the milk α S1-CN in the BDSP 2 population ($P < 0.05$). The highest casein percentage in this population (35.24 ± 3.96) was associated with ewes carrying the heterozygous AC genotype. No significant differences ($P > 0.05$) were established for CSN1S1 genotypes in terms of casein content in the studied PLBH sheep population.

Г.16. **Naydenova N.** 2022. Bioactive component in donkey milk. Food Science and Applied Biotechnology Food Science and Applied Biotechnology, 5(2), 219-231

<https://www.ijfsab.com/index.php/fsab/article/view/212>

Abstract:

Recently, donkey milk has received a lot of interest due to its similarity to human milk in terms of protein, lactose and milk fat content. The purpose of this review is to summarize the knowledge of research done on the composition of milk, including its functionality and potential therapeutic use. Donkey milk is suitable for use in children who are allergic to cow's milk. The bioactive components contained in donkey milk have antibacterial, antiviral and antifungal effects, as well as anti-inflammatory and antioxidant properties.

Г.17. **Zheleva N., M. Tzanova, M. Lazarova.** 2023. Quality characteristics of yogurt from buffalo milk supplemented with aronia (*aronia melanocarpa*) juice. Scientific Papers. Series D. Animal Science. Vol. LXVI, No. 1, 515-522

https://animalsciencejournal.usamv.ro/pdf/2023/issue_1/vol2023_1.pdf

Abstract:

Yogurt was prepared from buffalo milk supplemented with 3% and 5% Aronia (*Aronia melanocarpa*) juice. The mineral and fatty acid composition, free amino acid composition, vit. B1, B2, B6 and antioxidant activity were investigated. Buffalo yogurt produced with 3% aronia coagulated in a shorter time (135 min) compared to natural (control) yogurt and the one produced with 5% aronia (158 min). Buffalo yogurt produced with 5% aronia juice has the highest content of potassium (1004 mg/kg) and zinc (5.28 mg/kg) and the lowest of calcium, magnesium and manganese compared to the control yogurt and yogurt with 3% aronia addition. Aronia supplementation increased the amount of unsaturated fatty acids in buffalo yogurt by 5.7% (3% aronia) and 7.3% (5% aronia), respectively. Polyunsaturated fatty acids increased by 15.7% in 3% aronia yogurt and 22.6% in 5% aronia yogurt respectively, compared to natural buffalo yogurt. Yogurt produced with 5% aronia juice has the highest antioxidant activity and also has a higher content of vitamins B1, B2 and B6 compared to the control yogurt and yogurt with 3% aronia.

3. Научни публикации в нереферирани списания с научно рецензиране или в редактирани колективни томове.

18. Kolev, T., G. Dicheva, T. Angelova, S. Laleva, **N. Naydenova**. 2019. Method of determination of water-soluble protein in Bulgarian semi-hard yellow cheese, Proceeding of International conference on agronomy and food science & technology 20 – 21 June, Istanbul, Turkey, www.agrofoodconference.org

Abstract:

The aim of the present study is to develop a laboratory method for determining the content of water-soluble protein in Bulgarian semi-hard yellow cheese. The method will be used to verify the duration of the ripening period with regard to the possibility of using raw cow's milk not meeting the criteria laid down in Regulation (EC) № 853/2004 and proving the biological value of the product after the ripening period. Raw cow's milk, obtained in four farms for one year, was used. A total of 80 samples of raw cow's milk were analyzed from which 80 batches of cheese were produced. The results from the application of the developed laboratory method show that it can be applied in the control of manufactured products from raw cow's milk not meeting the criteria laid down in Regulation (EC) № 853/2004 and biological value of the product.

19. Lazarova M., N. Naydenova. 2022. Dynamics of fatty acids in the production of traditional Bulgarian dairy products, Journal of Intelligent Animal Husbandry, 1, ISSN: 2815-4193

<https://joiah.eu/wp-content/uploads/issues/2022/1/Dynamics-of-fatty-acids-in-the-production-of-traditional-bulgarian-dairy-products.pdf>

Abstract:

Recently, the fatty acids which are the main component of milk fat have been a subject of extensive

scientific studies due to their potential positive and negative effects on human health. The purpose of this research is to investigate the dynamics of fatty acids in the production of traditional Bulgarian dairy products - white brined cheese and yellow cheese, obtained from cow's milk. During the process of manufacturing and ripening, a general decrease in the amount of saturated fatty acids was found, more obvious in the white brined cheese - by 3.44% and insignificant in the yellow cheese - by 0.59%. There was also a minimal decrease in the level of polyunsaturated fatty acids - by 0.37% in white cheese and by 0.8% in yellow cheese. At the same time, there was a raise in the amount of monounsaturated fatty acids by 3.81% in the mature white cheese and by 1.46% in the mature yellow cheese, and a particularly large increase in the amount of linolenic acid, which turned out to be 54 times more in ripened white cheese and 40.5 times more in ripened yellow cheese.