UDC: [636.2.09:618.19-002:577.115]:637.06

FATTY ACIDS OF MILK AND THE INTENSITY OF *S. AUREUS* SECRETION IN COWS WITH SUBCLINICAL MASTITIS IN THE STEPPE OF UKRAINE

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DOI: https://doi.org/10.15673/fst.v16i2.2363

Article history

Received 28.12.2021
Reviewed 12.02.2022
Revised 10.04.2022
Approved 24.05.2022

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Cite as Vancouver style citation

Danchuk V, Midyk S, Danchuk O et al. Fatty acids of milk and the intensity of *S. aureus* secretion in cows with subclinical mastitis in the steppe of Ukraine. Foodscienceandtechnology.2022;16(2):63-70. https://doi.org/10.15673/fst.v16i2.2363

Цитування згідноДСТУ 8302:2015

Fatty acids of milk and the intensity of *S. aureus* secretion in cows with subclinical mastitis in the steppe of Ukraine / Danchuk V., et al. // Foodscienceandtechnology. 2022. Vol. 16, Issue2. P.63-70 https://doi.org/10.15673/fst.v16i2.2363

Abstract. The consumption of raw drinking milk and pasteurised drinking milk is a topic still widely debated around the world. Raw drinking milk, as for its biological safety, can pose a number of hazards to human health. However, pasteurised milk, too, can vary in its biological value. The composition of milk directly depends on the physiological state of the mammary gland. So, taking into account the intensity of fatty acid exchange in this organ, it can be assumed that the physiological state of dairy cows' mammary gland can affect the biological value of the secretion, in particular, its fatty acid composition. The paper shows the changes in the fatty acid composition of milk, depending on how intensely the mastitic lesion of the mammary gland has developed, ranging from the subclinical form of the disease (the signs of the disease are unmanifest) to the clinical form (the signs of the disease are clearly manifest). Cows with the subclinical form of mastitis pose the greatest biohazard: they show no clinical signs of the disease, so raw milk from these cows more easily finds its way onto numerous markets.The research was conducted in 974 dairy cows of various breeds in 6 farms of the steppe zone of Ukraine (Odesa, Mykolaiv, and Poltava regions). Each of the forms of mastitis (subclinical and clinical) has been found in about 20% of the dairy livestock. The main pathogen causing mammary gland infection is *Staphylococcus aureus* bacteria (36.6–47.4%). Changes in the fatty acid composition of milk of cows with subclinical mastitis have been shown. It has been established that the proportion of long-chain fatty acids decreases and the percentage of short-chain fatty acids increases, along with a decrease in mono- and polyunsaturated fatty acids. It has been proved that that the subclinical form of mastitis affects the content of C4:0, C10:0 (η^2_χ=0.90–0.94 arb. units; $p<0.001$), and C18:1n9c (η^2_χ=0.36–0.84 arb. units; $p<0.001$) in cow's milk. With the cows' clinical recovery, the content of all fatty acids in milk does not immediately return to the indicators observed before the disease.

Key words: cows, milk, mastitis, fatty acid composition, *Staphylococcus aureus.*

Introduction. Formulation of the problem

Mastitis is the most common disease in dairy cattle worldwide [1]. This pathology causes, both directly and indirectly, a lot of economic damage to farms [2]. The distribution of mastitis in productive animals in different countries varies greatly and increases with a decrease in the economic development. In particular, in Ethiopia, this is true for 62.6% of the dairy herd, of which, respectively, 59.2 and 3.4% suffered the subclinical and the clinical form of bovine udder disease [3].

Analysis of recent research and publications

The prevalence of mastitis is limited by both endogenous and exogenous factors. Among the exogenous technologies, one should single out the technology of keeping, obtaining raw milk, and feeding. The main endogenous factors of cows' susceptibility to mastitis are the genotype, phenotype, and physiological state of animals [4]. The latest studies have established how the state of the nervous

system tells on the productivity and resistance of animals [5-7].

Milk from various mammalian species is beneficial to human health and has a number of unique characteristicsrelated to many parameters, includingthe nutrients, safety indicators, activity of the lactoperoxidase (antimicrobial) system, immunological and antibacterial characteristics [8-11]. Although the specific and non-specific immunity of the mammary gland and milk against pathogenic microorganisms are quite powerful (Ig A, Ig G; leukocytes, macrophages; lacto peroxidases, lipases, proteases; lactoferrin, lysozyme, k-casein, α, antioxidants, and others) [12-17], the adaptive capacity of individual microorganisms allows them tocircumventit effectively.

The effectiveness of the protection system and safety indicators of milk depends onmany factors, in particular, on the personnel's state of health and professional level, the size of the herd, the keeping and milking technologies, the geographical region, the characteristics of the cow's udder, the breed, the level of productivity, and the physiological state [18,19].

Contamination of milk by microorganisms and consumption of secretions of the mammary gland affected by subclinical mastitis pose a number of threats: worsening of people's health, intake of antibiotics and antibiotic-resistant strains, consuming mammary gland secretion containing many metabolic products formed during the development of the pathology (toxins, end and intermediate products; antibiotics, etc.) [20-22].

Thus, recent research shows that the subclinical form of mastitis affects a significant part of productive animals. However, there are not so many reports of changes in the lipid composition of milk caused by subclinical bovine mastitis. Identification of deviations in the fatty acid composition of the selected milk will prevent it from further use, but this issue needs to be studied in depth [23]. Thus, some researchers indicate that staphylococci-caused intramammal infection may not affect the milk yield or the content of fat, protein, casein, lactose, and other components [24]. Certainly, the main items is in the period of development of the pathology, because clinical signs cannot develop without appropriate metabolic support. On the other hand, one should also take into account how climate influences the fatty acid composition of cows' blood and milk [25].

Research materials and methods

Microbiological monitoring studies of milk and determining the fatty acid composition were carried out in clinically healthy animals and cows with subclinical mastitis in farms in the steppe part of Ukraine (Odesa, Mykolaiv, and Poltava regions).

In total, 974 dairy cows were examined in 6 farms (Ukrainian Red-and-White dairy breed – 203 animals, Ukrainian Black-and-White dairy breed – 202 animals, Red Steppe dairy breed – 569 animals). Of these, two farms from Mykolaiv and Odesa Regions specializing in keeping the Ukrainian Red-and-White and Ukrainian Black-and-White dairy breeds handed over milk of 1 grade to the dairy.

The other farms handed over second grademilk to milk processing enterprises, regardless of the milking system used and the breed of animals.

The state of the lactating animals' mammary gland on the farms wasmonitoredby means of the liquid Test Grene used to test milk for mastitis. The level of somatic cells reached 500,000 to 1,000,000 units.

Microbiological studies of the coca microflora were carried out according to the generally accepted methods (DSTU ISO 6888-1:2003. Microbiology of food products and animal feed. Horizontal method of counting *Staphylococcus coagulasis* (*Staphylococcus aureus* and other species). Part 1: Method ofusing the Baird-Parker agar medium, ISO 6888-1:1999, IDT).

To analyse the fatty acid composition of milk from cows with subclinical mastitis, three groups of cows were selected. Each group numbered 10 animals of the Ukrainian Black-and-White dairy breed, aged 4–5 years, and with a productivity of 8 thousand kg of milk per lactation. Animals of group I were clinically healthy, those of group II were sick with subclinical mastitis, and those of group III were ontheir 3rd day after recovery fromsubclinical mastitis. Milk samples of 1000 cm^3 were taken from all cows for laboratory research. Lipids wereextracted from milk by the Folch method (Folch, 1957). The samples were prepared according to DSTU ISO 5509–2002. Fatty acid methyl esters (FAs) were analysed on a Trace GC Ultra gas chromatograph (USA) with a flame ionisation detector. FAs were identified using the *Supelco 37 Component FAME* Mix standard sample. The FA spectrum of milk lipids was quantitatively assessed by the method of internal normalisation, with determining their percentage. The studies were carried out in three parallels.

Samples for electron microscopic examination were prepared according to the standard method [22-27] in the modification [28], which included: sampling of the cell material; fixation of microorganisms; washing off the fixative; chemical dehydration. The selection of material for research was carried out by washing the culture of *Staphylococcus aureus* from the growth medium with distilled water. After centrifugation, the supernatant was removed, leaving a cell suspension with the volume 1 cm^3. The next step was the fixation of microorganisms with glutaraldehyde on Millonig's phosphate buffer. The *Staphylococcus aureus* culture suspension was mixed with the resulting fixative solution in the classic ratio 1:10. The total fixation time was 1 h 30 min; the fixative was replaced after 45 min. During fixation, the solutions were periodically suspended by shaking the tubes gently. After each change of the fixative, the solutions were centrifuged, and the supernatant was poured off. The centrifugation mode was 1500 rpm, duration 5 min. The fixative was washed off on completion of the contact with the glutaraldehyde solution. The object under study was dehydrated with ethanol of increasing concentration. Carrying out on a series of ethanol's began with a 50% solution. The ratio between the volumes of the

suspension of microorganisms and the dehydrogenating solution was 1:10, and after keeping for 5 min, centrifugation was performed in the mode selected above. After draining the supernatant, the dehydration procedure was similarly repeated with 60%, 70%, 80% ethanol solutions. Next, 96% ethanol was added in the ratio 1:10 and kept for 15 minutes. After centrifuging, absolute (100%) alcohol was added in the same ratio for 15 min. Dehydration with absolute alcohol was repeated twice. After the last centrifugation, a small amount of supernatant was left to obtain a suspension. Suspension drops were transferred by an inoculation loop onto a metal stage with a fixed double-sided carbon tape. The samples were provided with electrical conductivity carried out by sputtering with silver in a multipurpose vacuum unit VUP 5M. Electron microscopy and analysis of the culture of *Staphylococcus aureus* were performed on the device SEM 106 I (the company *Selmy*, 2007). The size and shape of *Staphylococcus aureus* were determined by electron microscopy.

Results of the research and their discussion

The prevalence of mastitis in cows of different breeds of the steppe zone did not allow us to establish significant interbreed differences. The technology of milking and keeping animals was of the greatest importance. It should be noted that the vast majority of the farms surveyed in this study were old dairy facilities reconstructed with different levels of technological modernisation. The frequency of diagnosing subclinical and clinical mastitis in dairy cows is quite high (Table 1). Generalization by individual regions of the Steppe of Ukraine did not reveal significant differences in the spread of udder pathology of cows under the same conditions of keeping. Nevertheless, the southern steppe and its features left their mark on the frequency of detection of subclinical mastitis: 21.47–23.60% of cases. The northern steppe zone was characterised by a somewhat lower level of detection of subclinical mastitis in dairy cows (17.32%).

The use of specialised milking parlours or selection of milk using milk pipelines in stall keeping resulted in better milk and a lower level of mastitis cases diagnosed (subclinical – 17.32–20.7%, clinical – 17.7–19.68%).

The use of manual milking of cows of the Red Steppe breed in one of the studied farms in the Odesa region was not accompanied by significant differences in the frequency of detection of mastitis (subclinical – 21.4%, clinical – 17.0%). In this case, it is rather difficult to explain what these results are due to: the breed and level of productivity of animals (3.7 thousand litres of milk a year) or a positive effect of manual milking on the state of the mammary gland of a lactating cow.

Other farms that used mechanical milking in portable cans, all of them without exception, produced milk of the second grade of quality, and the frequency of detecting mastitis in their lactating livestock was 18.7%–26.5% (subclinical form) and 17.4%–29.3% (clinical form).

Mastitis of staphylococcal aetiology in productive animals was described as early as the end of the 19th century [29]. Since then, little has changed, because a variety of staphylococci can often be found on the body of a healthy animal, which, under certain conditions, can cause mastitis [30]. Intramammary staphylococcal colonisation is one of the causes of mastitis, which is difficult to treat and can become chronic [31]. There are many known aetiological factors that cause mastitis, but they can be accompanied by a change in the bacterial background. Moreover, in this study, it was coccal microorganisms that were mainly isolated, and less often, mixed pathogenic microflora (Table 2).

Table 1 –Distribution of mastitis in farms of the steppe zone of Ukraine

Steppe regions of Ukraine	Researched		Subclinical mastitis		Clinical mastitis	
	farms	heads	heads	%	heads	%
Odesa	3	512	117	21.47	123	23.83
Mykolaiv	2	335	77	23.60	59	17.55
Poltava	1	127	22	17.32	25	19.68
Total	6	974	194	20.79±2.10	182	20.35±2.02

Table 2 –Results of the bacteriological examination of the secretion from mastitis-affected quarters of the udders of cows from the steppe zone of Ukraine (n=376, M±m)

Type of bacteria	% min	% max	% of the total number of samples
Str. Agalactiae	13.8	23.0	19.9±2.33***
Str. disgalactiae	0	20.7	9.3±4.73***
Staph. epidermidis	15.5	25.6	20.94±2.34***
Staph. aureus	36.6	47.4	43.7±1.92***
Mixed microflora	1.3	9.3	6.16±1.50***

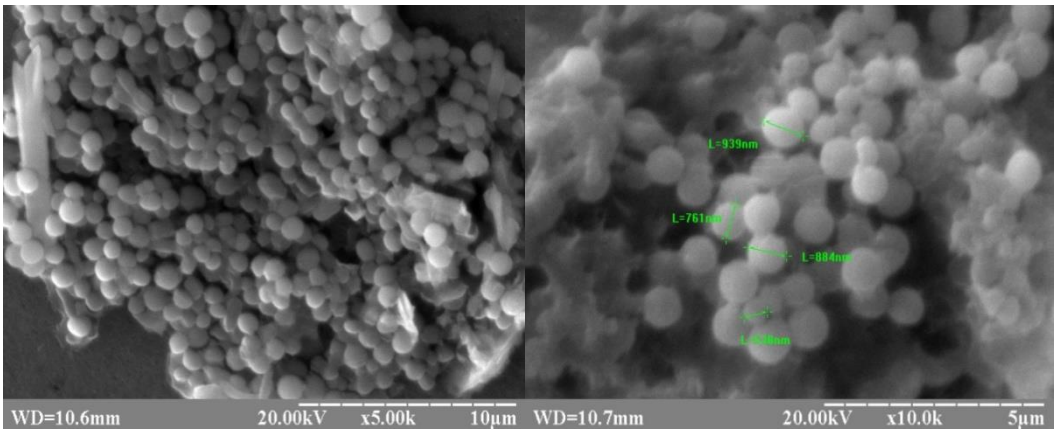
***p<0.001 compared with*Staphylococcus aureus*

Staphylococcus aureus can adhere to mammary epithelial cells and extracellular components, as well as invade into epithelial and other mammary cells [32]. According to some authors, up to 40% of the livestock of dairy cows can be affected by mastitis, moreover, staphylococci isolates are observed in 63.5% of cases [33]. For goats, the literature cites slightly lower figures: 32.3% of goats suffering from mastitis, of which 32.5% infected with staphylococci [34]. Our studies have established that the percentage of pathogenic microorganisms isolated from the secretion of mastitis-affected quarters of steppe-zone cows' udder decreased in the following sequence: *Staph. aureus*>*Staph. epidermidis*>*Str. agalactiae*> mixed microflora. Analysis of the origin of *Staphylococcus aureus* in the milk samples from cows in Ethiopian farms showed that 15.3% of the microorganisms were isolated from udder milk and 25%, 20% and 10%, respectively, from the milkers' hands, the milking bucket, and the drying towel swab [19]. It is not surprising that human hygiene has such a significant impact on the prevalence of microorganisms, since it has been found that *Staphylococcus aureus* effectively colonises the surface of the skin, gastrointestinal tract, and mucous membranes, and it is estimated that up to 20% of the world's population are resistant carriers [35].

It should be noted that in all farms of Odesa and Mykolaiv regions,*Staphylococcus aureus* was most often isolatedtoo. Moreover, *Staphylococcus aureus* was isolated seven times more often than mixed microflora was detected ($p<0.001$), and two times more often than *Staphylococcus epidermidis* ($p<0.001$).

Under electron microscopy, staphylococci formed clusters in the form of a bunch of grapes. Their size (L=538 nm, L=761 nm, L=884 nm, L=939 nm) and shape corresponded to those characterisitc of this type of microorganism. On the surface of the clusters, individual spherical cellsare clearly visible, which are associated with cells of the deep layers (Fig. 1).

The development of the subclinical form of mastitis is accompanied by significant changes in the exchange of fatty acids in the secretory tissue of cows' mammary gland [23], which is reflected in the fatty acid composition of milk obtained from these cows (Table 3). Moreover, even on the third day after recovery, the fatty acid composition of milk was somewhat different from that in animals whose mammary gland did not undergo any changes ofits physiological state during the study period. This may be due to a certain metabolic and structural restoration of the gland itself.



A B

Fig. 1. *Staphylococcus aureus* under an electron microscope (x5.00 k, x10.0 k).

Notes: L – size, nm (B); WD – working distance from the focused electron beam to the object, mm (A, B); 20.00 kV – voltage, kV; x5.00k, x10.0 k – magnification, k (A, B) 10 µm, 5 µm – length of the segment length, µm (A, B)

Table 3 – Fatty acid composition of milk of cows with the subclinical form of mastitis (M±m; n=10)

Fatty acid	Healthy	Sick	After treatment
C4:0	3.82±0.11	5.41±0.10***	3.55±0.24^{ooo}
C6:0	2.64±0.14	3.45±0.11***	2.66±0.25^{oo}
C8:0	1.84±0.06	1.94±0.03	1.58±0.31
C10:0	3.31±0.07	4.30±0.10***	2.79±0.42^{oo}
C12:0	3.75±0.08	4.53±0.22**	3.11±0.68
C14:0	12.71±0.16	13.74±0.19***	11.29±1.20
C14:1	1.30±0.05	1.53±0.12	0.95±0.23
C15:0	1.41±0.20	1.18±0.07	1.61±0.29
C16:0	29.34±0.39	30.16±0.70	30.04±1.02
C16:1	1.76±0.06	2.28±0.17**	1.68±0.43
C17:0	0.73±0.06	0.55±0.05*	0.85±0.18
C18:0	10.35±0.46	7.82±0.18***	11.33±1.52^{o}
C18:1n9c	22.68±0.23	20.38±0.31***	24.75±2.71
C18:2n6c	3.87±0.20	2.22±0.29***	3.28±0.41^{o}
C20:0	0.16±0.01	0.08±0.04	0.13±0.04
C18:3	0.25±0.01	0.39±0.05*	0.30±0.11
C22:0	0.09±0.01	0.05±0.02	0.09±0.02

Probable differences, as compared with healthy animals: $p<0.05$–*, $p<0.01$–**, $p<0.001$–***; probable differences, as compared with sick animals: $p<0.05$–^{o}, $p<0.01$–^{oo}, $p<0.001$–^{ooo}

In the milk of cows with signs of subclinical mastitis, as compared with healthy animals, there was some increase in the proportion of FAs with a chain length of 4 to 14 carbon atoms (1.05–1.41 times, p<0.05–0.001), which occurs due to the reduction in the percentage of long-chain FAs. Thus, in patients with the subclinical form of bovine mastitis, the proportion of C15:0 decreases 1.2 times, C17:0 – 1.33 times (p<0.05), C18:0 – 1.32 times (p<0.001), C18:1n9c – 1.11 times (p<0.001), C18:2n6c – 1.74 times (p<0.001), C20:0 –2.0 times, C22:0 – 1.8 times. From the general pattern, only linolenic acid (C18:3 ω-3) stands out: its amount in the milk of cows with subclinical mastitis increases 1.56 times (p<0.05), and in sick animals, its level is slightly highertoo.

It is interesting to note that the animals' recovery from subclinical mastitis is accompanied by anincrease in the relative content of monounsaturated fatty acids (MUFAs) in the secretion of the mammary gland. Moreover, their amount is much higher than it is in the control and sick animals milk.

There are eleven probable differences established in the content of individual fatty acids in the sick animals and in the healthy ones, while between the sick cows and the recovered ones, only five differenceshave beenfound. Obviously, this is due to certain features of the metabolism in the mammary gland at different stages of recovery.

One-way analysis of variance of the data obtained has established a significant effect of the subclinical form of mastitis on the fatty acid composition of cows' milk (Fig. 2). We canobservea significant effect of the pathology on the content of C4:0, C6:0, C10:0, C12:0, C14:0 – η^2_χ = 0.61–0.94 arb. unit (p<0.001) and C17:0, C18:0, C18:1n9c, C18:2n6c, C20:0, C22:0 – η^2_χ = 0.36–0.84 arb. unit (p<0.05–0.001). The development of the subclinical form of bovine mastitis does not significantly affect only the concentration of fatty acids in milk: C15:0 and C16:0 (η^2_χ=0.13–0.15 units).

Correlation analysis has established changes in the ratioof the content of individual fatty acids in milk during the development of the subclinical form of bovine mastitis. Thus, in healthy animals, the percentage of butyric acid (C4:0) in milk is inversely related to the content of caproic acid (C6:0; r =-0.84; p<0.001), while in sick cows, these data are absent. The content of caproic acid in healthy animals' milk is directly related to the content of C16:0 and C18:3 (r=0.65–0.95; p<0.05–0.001) and is inversely related to C18:0 (r=–0.81; p<0.01). However, in sick cows, the content of C6:0 is directly related only to the content of C12:0 and C15:0 (r=0.65–0.86; p<0.001). The content of caprylic acid (C8:0) in healthy animals' milk is directly related to the content of C10:0 and C14:1 (r = 0.74–0.91; p<0.05–0.001) and is inversely related to C15:0, C16 :1, C17:0, and C18:1n9c (r=-0.70–0.95; p<0.05–0.001). The content of capric acid (C10:0) in healthy animals' milk is directly related to the content of C14:0 (r=0.80; p<0.01) and inverselyto C15:0 and C17:0 (r=-0.76–0.78; p<0.05). While in sick cows, these relationships are much wider: the content of this acid is directly related to the content of C12:0, C14:1, C15:0, and C17:0 (r=0.63–0.77; p<0.05) and inversely to C18:0 (r=-0.73; p<0.05). The content of lauric acid (C12:0) in healthy animals' milk is directly related to the content of C18:2n6c (r=0.69; p<0.05) and inversely to C16:0 and C18:3 (r=-0.66–0.67; p<0.05). In sick cows, the content of C12:0 is directly related to that of C14:1, C15:0, and C17:0 (r=0.69–0.88; p<0.05–0.01). Besides, in the milk from cows with subclinical mastitis, the content of linoleic acid (C18:2n6c) is directly related to the content of C20:0 (r=0.69; p<0.05), and the content of the latter correlates with that of linolenic acid (C18:3; r=-0.73; p<0.05).

According to the results of the correlation analysis, the relative increase in short-chain FAs in the milk of cows with subclinical mastitis (compared with the secretion of the mammary gland of healthy cows and recovered animals) may be due to the involvement of these FAs in the process of β-oxidation in mitochondria. During illness, the energy requirement of an organ can increase significantly to ensure the biochemical adaptation of metabolism, a local temperature rise, and ATP synthesis for the needs of tissue defence systems.

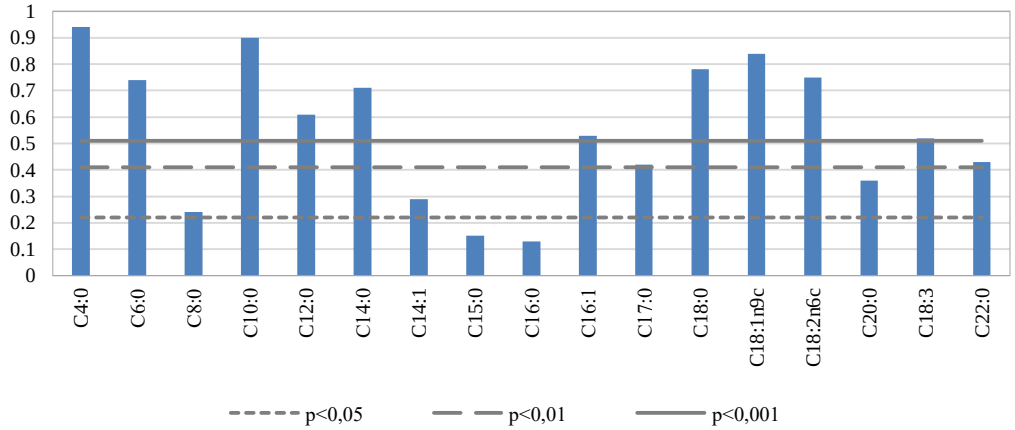


Fig. 2. Indicator of the effect (η^2_χ) of the subclinical form of mastitis on the fatty acid composition of cow's milk (n=10)

Since SFAs contain more energy, their use for energy needs changes their ratio in the mammary glandsecretion.

Interesting and informative is the study of the ratio of individual milk fatty acids according to their individual characteristics, depending on the research conditions (Table 4).

Withthe subclinical form of mastitis, a decrease in the content of PUFAs in milk can result from the intensification of their peroxide oxidation in the breast tissue under pathological conditions. Moreover, the indicator Σ C4:0–C12:0+ΣPUFA during the intensification of β-oxidation and peroxidation in milk of the cows with subclinical mastitis was the highest, especially in comparison with the recovered animals, where the balance shifted slightly towards PUFAs. It is very interesting to note that the intensity of secretion of fatty acids ΣC4:0–C12:0 from sick animals' mammary gland decreased by 1.43 times, compared with the animals with subclinical mastitis, and by 1.12 times, compared with the healthy animals. Certainly, a slight decrease in the ΣUFA/ΣUFA ratio in the milk of the recovered animals is also due to the processes taking place duringrestoration of the secretory function of the mammary gland.

It should be noted that it is the processes of milk lipid peroxidation that have a very large impact on the physiological state and viability of newborns [36]. This may be due to the physiological significance of PUFAs, because they regulate the physicochemical characteristics and membrane permeability, affect various physiological mechanisms, are precursors of bioactive substances, and some of them are not synthesised in the body at all, therefore, in our opinion, such processes are natural [37].

The ratio of the amount of fatty acids in the milk of animals significantly depends on their physiological state. It should be noted that a chromatogram of the raw milk of recovered animals is, by its indicators, intermediate between those of healthy and sick animals. Biochemical recovery of the functional activity of the synthesis and secretion of individual milk components must take a certain time, even if the animal is already clinically healthy according to the physiological criteria. In our opinion, metabolic transformations do not run as quickly as clinical signs of the mammary pathology disappear.

Table 4 – Ratio of fatty acids in the milk of cows with subclinical mastitis (%, n=10)

Indicator	Healthy	Sick	Recovered
[a] SFAs:MUFAs:[b] PUFAs	70.15:24.44:4.12	73.21:22.66:2.61	69.03:30.01:3.58
ΣC12:0–C16:0	47.21	49.61	46.05
ΣC4:0–C12:0	15.36	19.63	13.69
ΣC4:0–C12:0+Σ PUFAs	19.48	22.24	17.27
ΣSFAs/ΣUFAs	2.46	2.90	2.30

[a] SFAs – saturated fatty acids; [b]PUFAs – polyunsaturated fatty acids

Conclusion

The prevalence of various forms of mastitis in dairy cows in the farms of the Ukrainian steppe zone varies about 20% of the dairy herd, and does not significantly depend on the technology of milking and keeping animals, but, to a certain extent, is associated with their location. Thus, in the farms of the southern steppe of Ukraine, the frequency of detecting subclinical mastitis was 21.47–23.60%, and in the northern steppe zone,it was 17.32%.

A bacteriological study of the secretionfromthe mastitis-affected quarters in the cows' udder has shown that the main pathogen causingstaphylococcal infection is *Staphylococcus aureus*(36.6–47.4%).

With bovine mastitis, changes in lipid metabolism occur in the secretory tissue of the mammary gland, which is reflected in the fatty acid composition of its secretion. It has been established that in the milk of these cows, the proportion of long-chain and shorter-chain FAs is smaller. This occurs against the background of a decrease in the particles of mono- and polyunsaturated fatty acids. The subclinical form of mastitis has a significant effect on the content of C4:0, C10:0 (η^2_χ=0.90–0.94 arb. unit; $p<0.001$), and C18:1n9c (η^2_χ=0.36–0.84 arb. units; $p<0.001$), which allows using them as diagnostic markers.

Financial support. This research was performed within the National Project of the Ministry of Education and Science of Ukraine 110/16-pr-2020: "Scientific basis of criteria for assessing the quality and safety of raw milk – harmonisation with international requirements."

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ЖИРНІ КИСЛОТИ МОЛОКА ТА ІНТЕНСИВНІСТЬ ВИДІЛЕННЯ *S. AUREUS* У КОРІВ З СУБКЛІНІЧНИМ МАСТИТОМ СТЕПУ УКРАЇНИ

Анотація. У світі і досі триває широка дискусія щодо споживання питного сирого молока та питного пастеризованого молока. Питне сире молоко, з точки зору його біологічної безпеки, може нести цілий ряд загроз для здоров'я людини. Однак, і пастеризоване молоко може мати різну біологічну цінність. Склад молока на пряму залежить від фізіологічного стану молочної залози. Тому, враховуючи інтенсивність обміну жирних кислот у даному органі, можна припустити що залежно від фізіологічного стану молочної залози лактуючих корів, може змінюватись і біологічна цінність секрету, зокрема його жирнокислотний склад. У статті показано зміни жирнокислотного складу молока залежно від інтенсивності розвиту ураження молочної залози маститом від субклінічної форми, (ознаки хвороби скриті), до клінічної форми, (ознаки хвороби чітко виражені). Найбільшу біологічну небезпеку несе сире молоко від корів з субклінічною формою маститу, адже відсутність клінічних ознак хвороби сприяє його потраплянню на численні ринки. Дослідження проводили на 974 дійних коровах різних порід у 6 господарствах степової зони України (Одеська, Миколаївська та Полтавська області). Встановлено, що поширення субклінічної та клінічної форм маститів поголів'я дійного стада коливається в межах 20% кожний. Основним збудником інфекції молочної залози є бактерії виду *Staphylococcus aureus* 36,6-47,4%. Показано зміни жирнокислотного складу молока корів за субклінічного маститу. Встановлено зменшення частки довголанцюгових і зростання відсотку коротколанцюгових жирних кислот на тлі зниження кількості моно- та поліненасичених жирних кислот. Встановлено достовірний вплив субклінічної форми маститу на вміст С4:0, С10:0 (η^2_χ = 0,90–0,94 ум. од.; p<0,001) та С18:1n9c (η^2_χ = 0,36–0,84 ум. од.; 0,001) у молоці корів. Клінічне одужання корів не супроводжується одразу поверненням вмісту усіх жирних кислот в молоці до показників, що спостерігались до хвороби.

Ключові слова: корови, молоко, мастит, жирнокислотний склад, *Staphylococcus aureus*.