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ANALYSIS MAXIMUM OF EMBEDDING ESSENTIAL FATTY ACIDS FROM GETTING SANE COMPARED SPUN PASTE RIPENESS CHEESE

H îma Elena*

*University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048 Oradea, Romania, e-mail: hilma_elena@yahoo.com

Abstract

In order to increase the biological value of dairy products a comparative study was made on the production of spun paste ripened cheese and an acidic dairy product, sana.

In order to enrich in essential fatty acids, was added to raw sheep's milk fish oil in the progressive concentration of 0,05; 0.10% and 0.015%. During the process of manufacturing the high temperature fish oil went out from the capsule and mixing was wanted to incorporate it into the fat globule molecule in the fat in the milk compositionto prevent both loss of fatty acids during the technological processes but and maintain a high degree of fat assimilation in the human body.

The evolution of the concentration of essential fatty acids in the studied dairy samples was proportional to that added to raw milk.

It has been noticed that in the spun paste ripened cheese the proportion of mono and polyunsaturated acids is higher and it is assumed that lactic bacteria generate these fatty acids at the maturity of the cheese through metabolism.

In the analysis, for comparison, three essential fatty acids were observed which are specific to both the milk composition and the composition of the fish oil: linoleic acid, linolenic acid and γ-linolenic acid.

The analysis resulted in a lower limit of fish oil concentration in milk of 0.9426% for the sana and 0.2601% for spun paste ripened cheese. The superior limit embedding is 1.5210% for the sana and 1.3126 for the spun paste ripened cheese.

Key words: essential fatty acids sana spun paste ripened cheese

INTRODUCTION

Sana is a dairy product obtained from the lactic bacteria which ferments lactose and lactic acid is formed. This creates optimal acidity for the coagulation of proteins by obtaining consistency, taste and specific flavor.

Selected lactic acid bacteria used in the manufacture of acidic dairy products have a beneficial effect both in food and in production. Ochratoxin A (OTA) is a mycotoxin produced by the metabolism of fungi belonging to the genus Aspergillus and Penicillium. The ability of different cultures of lactic bacteria (LAB) to degrade OTA during gastrointestinal digestion is 30-99% (C. Luz, 2018).

Lactic bacteria live much better in aerobiosis (Teresa Zotta, 2018).

Lactic bacteria reduce 72-98% of mercury in the gastrointestinal tract, but only from mushroom consumption and not from fish consumption (C. Jadán-Piedra, 2017).

Fish oil (FO) is rich in omega-3 polyunsaturated fatty acids, which have cardio-protective effects. A study was conducted to evaluate the effects of fish oil on rats. It has come to the conclusion that fish oil has reduced cardiac and oxidative stress, inflammation and myocardial fibrosis. Fish oil could be used in the treatment of diabetes (F. Mayyas, 2018). Also, fish oil has a beneficial effect on lipolytic liver, thrombosis, cardiovascular disease (Adil Haimeur, 2018).

In the case of ripened cheeses, their probiotic effect is of interest. The cheeses used in the selected Lactobacillus Rhamnosus lactic culture were analyzed. Cheeses made with Lactobacillus Rhamnosus had a significantly higher proteolytic activity and significantly higher antioxidant activity ($P < 0.05$) than those without probiotics throughout maturation. After maturation, the number of bacteria in the cheese decreased significantly ($P < 0.05$), but the polypeptide content increased by 37.97%, and the DPPH capture capacity and the reducing power increased by 7.46% and 17.58% (Lu Liu, 2018).

Accelerating the maturing of cheese is of continuing interest to the industry. The high pressure (HP) treatment of S. thermophilus L. lactis: L bugaricus used in the manufacture of cheese offers the possibility to accelerate maturation by increasing intracellular peptidase activity which contributes to the development of the organoleptic characteristics of cheese (Marianna Giannoglou, 2016).

MATERIAL AND METHOD

The raw material milk used to manufacture the products studied was collected from a sheep farm in Bihor during the first lactation period, the animals being fed with green fodder, with grass. Laptele materie primă a fost analizat organoleptic, fizico-chimic iar acizii grași din compoziția laptelui au fost analizați gaz-cromatografic.

The raw milk was analyzed organoleptically, physicochemically and the fatty acids in the milk composition were analyzed gas-chromatographically.

The sensory analysis of raw milk was based on the appreciation of the appearance and consistency, color, of taste and flavor of both raw milk and pasteurized milk by five unauthorized persons.

Physical and chemical analyzes of raw material milk consisted in the determination of acidity using the titration method, the isometric density and fat concentration determination by the acid-butyrometric method.

For the determination of the proportion of fatty acids in the milk composition, the gas chromatographic method was used, the fatty acids being in advance esterified with methyl alcohol (Mierliţă D., 2009).

The shed was obtained from sheep's milk to which increased proportions of fish oil were added. The manufacturing process was the classic.

The assessment of the quality of the sane has been performed has been performed from the point of view sensory, physicochemical, and the fatty acids in the sample composition were evaluated by gas chromatography.

Organo-leptic analysis was performed by five unauthorized persons. The appearance and consistency of the product was appreciated, but especially the taste and flavor.

Physicochemical analyzes consisted in the determination of titratable acidity and fat concentration by acid-butyric methods.

Gas-chromatographic analysis of fatty acids in the fatty composition was performed after esterification with methyl alcohol.

For making spun paste ripened cheese has been used sheep's milk with progressive addition of fish oil. To incorporate essential fatty acids into the milk fat globule, it was homogenized at 70 °C and the 200 bar pressure in three steps. For the protection of essential fatty acids, acceleration of product maturation was achieved by raising the temperature by 2 °C. The finished product was evaluated organo-leptic and physico-chemical.

From a sensory point of view, the exterior appearanceand, the sectional appearance of the product, the consistency, but especially the taste and flavor of the cheese, were appreciated.

The physico-chemical deterioration of acidity, total dry matter, percentage of fat reported to dry matter and salt percentage.

The fatty acids in the cheese composition were determined by gas chromatography after the fat had been separated, the fatty acids esterified with methyl alcohol and the methyl esters of the fatty acids were isolated.

The results obtained were statistically analyzed with Anova methods using the Dunnet test for comparison with the control sample and the Fisher test for sample comparisons. The minimum and maximum limits of the fish oil concentration added to the milk for the three fatty acids take the analysis were determined using the ROC curves (Receiver Operator Characteristic) (Teusdea, A, 2008, 2009).

RESULTS AND DISSCUSIONS

In this analysis, the limit of incorporation of essential fatty acids from fish oil added in the raw milk to the manufacture of the sana compared to matured spun paste cheese was studied. Increased fish oil concentrations

of 0.05%; 0.10% and 0.15% were used There were three essential fatty acids that are common to sheep's milk and fish oil. They watched three essential fatty acids that are common to sheep's milk and fish oil.

The maximum limits for inclusion of essential fatty acids in the breast and cheese are presented in Table 1.

Table 1

Concentrations of fatty acids at the limit maximum incorporation in a samples from sana and ripened spun paste cheese

Fatty acids	**Concentration of fish oil (%)**		**The threshold asymptotically**
	ripened spun paste cheese	sane	
Linoleic	0.2250	-	of the regression values
Linoleic	0.3250	-	of the regression derived values
Linoleic	0.3652	-	theoretical
Linolenic	1.3741	1.3009	of the regression values
Linolenic	1.3742	1.3011	of the regression derived values
Linolenic	0.4408	0.6505	theoretical
γ -Linolenic	1.3002	1.4090	of the regression values
γ -Linolenic	1.3003	1.4093	of the regression derived values
γ -Linolenic	0.3721	1.3200	theoretical

In the case of fabrication of the lsane, linoleic acid has no limitation of inclusion.

Linolenic acid has a theoretical threshold of embedding bigger into the sane at about 1.2 times that of ripened spun paste cheese, and y-linolenic acid is embedded in thesane, about 4 times more than in cheese.

The fish oil concentrations of raw milk at the maximum incorporation limit of essential fatty acids in the matured cheese samples compared to the sana are shown in Table 2.

Table 2

Concentrations in fish oil of raw milk at the maximum limit of embedding essential of fatty acids in ripened spun paste cheese in brine compared to sane

Fatty acids	**Concentration of fish oil (%)**	
	ripened spun paste cheese	sane
Linoleic	0.3051	-
Linolenic	1.0630	1.0842
γ -Linolenic	0.9909	1.3794

The fish oil concentration at the maximum fat content of the fatty acids is higher for the sana compared to the matured cheese 1.3 times in the case of γ-linolenic acid and about the same for linolenic acid.

The inferior, upper and middle embedding limits are shown in Figures 1, 2 and 3.

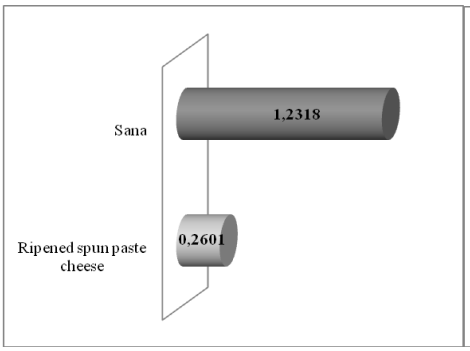

Fig. 1 Concentrations % in fish oil of raw milk at the lower limit of incorporation of essential fatty acids in ripened spun paste cheese samples compared to sane

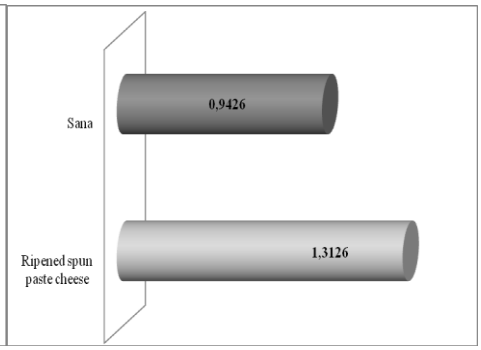

Fig. 2 Concentrations % in fish oil of raw milk at the superior limit of incorporation of essential fatty acids in ripened spun paste cheese samples compared to sane

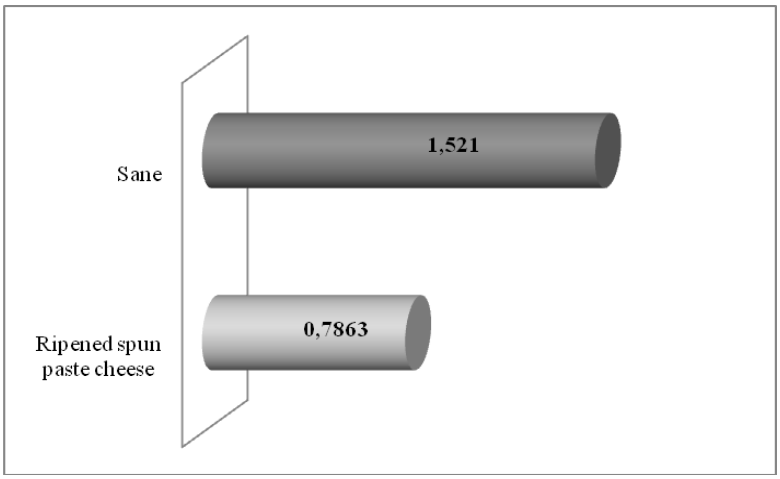

Fig. 3 Concentrations % in fish oil of raw milk at the average limit of incorporation of essential fatty acids in ripened spun paste cheese samples compared to sane

As can be seen from Figure 1, the fish oil concentration at the lower limit of incorporation of the essential fatty acids is greater than about 6 times the sane than the matured cheese, and at the upper limit is lower in the sane than in the cheese. In the case of average values, they are higher in the case of the sane.

CONCLUSIONS

The inclusion of essential fatty acids in the fatty substance of the sana compared to the cheese is, in conclusion, higher in the case of the sana than the ripened spun paste cheese. The differences are relatively small and

this is because the lactic streptococci selected from the selected lactic culture generates essential fatty acids during cheese maturation and the manufacture of the sane (Aldo Prandini, 2011).

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