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THE THRESHOLD EMBEDDING ESSENTIAL FATTY ACIDS IN SANA ACID MILK PRODUCT

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Abstract

Buttermilk is a dairy product ferementație acid imp pet long by 16 to 18 hours, and low temperature, 22-25 ° C, the optimal conditions for lactic acid bacteria of the genus Streptococcus and Leuconostoc which develops in addition to lactic acid and flavor substances and other compounds with beneficial role in the human body. Buttermilk contains live lactic bacteria that enrich the gastrointestinal microflora and milk protein is partially denatured and therefore more easily assimilated in the body. Sheep milk is caracterizeă the smaller diameter of the globule of fat and increased levels of saturated fatty acids with a number of carbon atoms less than 10 which leads to improved digestion of fat in the body from composition of sheep's milk. In this study aims to enrich the product with essential fatty acids by adding in fish oil raw sheep's milk and its incorporation into the milk fat globules. It has analyzed three essential fatty acids that are specific for both the fat composition of fish oil and sheep's milk used in manufacturing. Values were obtained following concentration of the fish's sheep's milk raw material, in view of the theoretical saturation threshold of fat cells in the three essential fatty acids to be studied:- linoleic acid saturation threshold is reached to 0.15% fish oil added; linolenic acid-0.650503596; γ-linolenic acid-1.319954937.

Key words: buttermilk, essential fatty acids

INTRODUCTION

Milk quality and heat treatments undergone by particularly affects the lactose in milk composition. The most important changes in the heat treatment of milk and lactose are the Maillard reaction of proteins which take place at high temperatures. Using enzyme fructosaminoxidază gave positive results in slowing these reactions and the formation of amino acids after denaturation of proteins (Antonio Dario Troise, 2016).

They were studied in parallel fatty acids from sunflower oil (rich in oleic acid), canola oil (rich in monounsaturated fatty acids), palm (rich in saturated fatty acids) compared with fatty acids from fish oil. It concluded that fish oil is the most rich in polyunsaturated fatty acids and digested most easily in the human body (Chaiw-Yee Teoh, 2016).

The content of saturated fatty acids can decrease and to increase the concentration in yogurt and in short chain saturated fatty acid when used in the culture of lactic bacteria selected for lactic acid fermentation of milk by Lactobacillus rhamnosus (Ru Jia, 2016).

Fish oils have many dietary benefits, but because of strong odors and rapidly deteriorating, their application in the manufacture of food products is limited. For these reasons, the fish oil used was encapsulated to obtain yoghurt. . The physico-chemical properties of yoghurt, including pH, acidity, syneresis, fatty acid composition, the peroxide value and sensory tests were investigated during storage for three weeks at 4 ° C. It has significantly reduced acidity, syneresis and index of peroxide. The results of chromatographic analyzes showed that after 21 days of storage, yogurt enriched with fish oil encapsulated has a higher content of essential fatty acids than yogurt containing fish oil free and sensory qualities are closer to the yogurt without added fish oil (Tahere Ghorbanzade, 2016).

In natural sheep's milk yogurt has been incorporated to enrich fish oil essential fatty acids. To this end milk mixed with fish oil was subjected to homogenization and pasteurization heat treatment under high. This has a beneficial effect on the formation of the emulsion and does not affect the essential fatty acids (Michelli F. Dario,2016).

The benefits of essential fatty acids in fish oil have been studied in mice and was followed effect on renal functions and obesity. The results were significant (Isabela Coelho, 2016).

Low levels of serum testosterone are typically associated with diabetes, coronary arteriosclerosis, insomnia, rheumatoid arthritis and chronic pulmonary diseases. Testosterone replacement therapy is effective against many of these disorders, indicating the importance of maintaining a healthy level of testosterone. In this regard, we investigated the effects of fish oil on the metabolism of testosterone. Testosterone was evaluated in mice who received the fish oil and it has been concluded that eicosapentaenoic acid is involved in the metabolism of testosterone (Nobuhiro Zaima, 2016).

A high fat diet can lead to obesity, chronic metabolic diseases, and adversely affects the central and peripheral system. Dietary supplements that are rich in omega-3 polyunsaturated fatty acids can decrease or prevent the negative health consequences but importantly is the fact that increases the body's resistance to the harmful effects of cocaine (Katherine M., 2016).

Food supplementation with fish oil has been shown to be beneficial in regulating the enzymatic activity with a role in lipid metabolism and decrease body fat (Hossein Zakariapour Bahnamiri, 2016).

MATERIALS AND METHODS

To manufacture dairy product acid, buttermilk, it was used sheep's milk in the first lactation period and that was analyzed, especially in the evoşuţia concentration in essential fatty acids (Mierliță D., 2009), mixed with fish oil.

Sensory analysis of the finished product was performed by five unauthorized persons.

Physico-chemical properties: Determination of the acidity was performed by the method of titratable acidity and expression was made in ° T, ° Sh and g % lactic acid. The fat content of milk and buttermilk was determined by the acid-butirometer and was used Butyrometer type GERBER. The density of milk was analyzed by aerometry with milk densitometer which measures temperature.

Gas chromatographic analysis of fatty acids: Were analyzed fat composition regarding 19 fatty regarding 19 acids in the milk. It was also analyzed fish oil. It took into account the analysis of the evolution of three essential fatty acids that are specific for both sheep milk and oil fish to determine the optimal concentration of fish oil that can encapsulate inside globules of milk fat. Extraction of the fat from buttermilk was carried out by mixing 1 ml of milk yogurt well were well mixed and added 0.6% ammonia solution, 2 ml of ethanol, 4 mL of ethyl ether and 4 ml. hexane after which the mixture was stirred for 3 min. Transesterification of fatty acid methyl esters was carried out by reaction with boron trifluoride / methanol at 80 ° C for two hours in a closed Pyrex glass tube. The content was transferred to a separating funnel. Extraction of methyl esters was performed using 10 ml of hexane. The hexane fractions collected were dried using anhydrous sodium sulfate, filtered, concentrated under a stream of nitrogen and finally taken up in 1 ml of hexane. Gas chromatographic analysis was performed using a Shimadzu gas chromatograph GC-17A equipped with a capillary column Chrompack with a length of 25 m and a diameter of 0.25 mm, stationary phase (a derivative of polyethylene glycol) is deposited in the column form a thin film of 0.2 μm. It used a FID detector and the mobile phase was helium 99.9% purity.

Methods of statistical analysis: for multiple comparisons were used Tukey's test, and Fisher Dukan. For comparison with the control Dunnett's test was used. Limit of embedding of the fatty acids in the fat globule was determined using the ROC curve (Receiver Operator Characteristic), (Teusdea, A. 2008, 2009).

RESULTS AND DISCUSSIONS

Analysis incorporation of essential fatty acids in samples of buttermilk

Values chromatographic of areas of essential fatty sana study of samples with and without added fish oil and, as a result of measurements shown in the chromatograms are shown in table 1.

Table 1

Comparison of areas (ua) chromatographic of essential fatty acids from buttermilk

S005	**S(u.a.)**	**S010**	**S(u.a.)**	**S015**	**S(u.a.)**	**Fish oil**	**S(u.a.)**
Linoleic	41.9709	**Linoleic**	43.8620	**Linoleic**	43.6881	**Linoleic**	64.2705
Linolenic	12.9837	**Linolenic**	16.1073	**Linolenic**	15.0795	**Linolenic**	178.0618
γ-Linolenic	15.2309	**γ-Linolenic**	13.5434	**γ-Linolenic**	12.8500	**γ-Linolenic**	40.2639

The milk used in the manufacture buttermilk was subjected to heat treatment at a high temperature which detetrmină some malfunctions in terms of capture of fat fish oil in the fat globule. It can be seen from Figure 1 the ordering of of areas of essential fatty acids in the milk and buttermilk from fish oil. This just proves embedding these acids from fish oil in the fat globules from buttermilk.

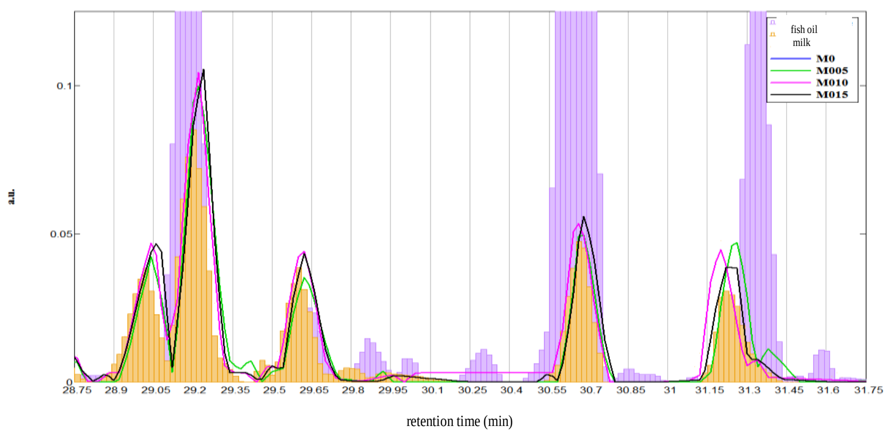

Figure 1 The graph chromatograms overlay samples with and without added buttermilk and fish oil - the detection of essential fatty acids studied

Analysis embedding the linoleic acid in samples buttermilk**:** In the figures 2 and 3 show graphic results.

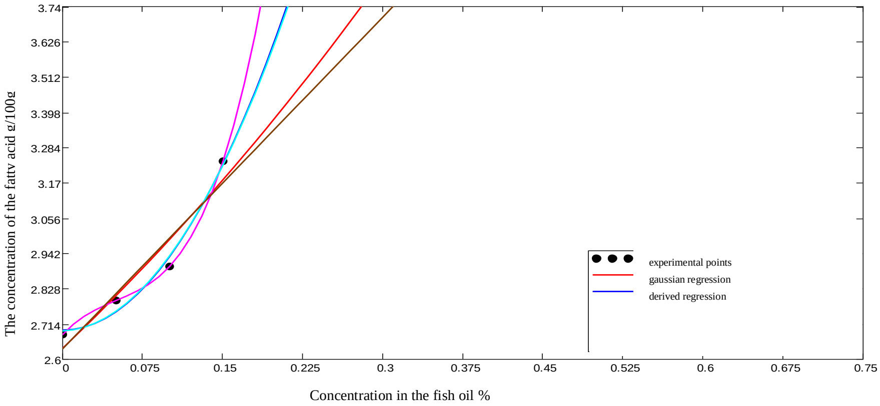

Figure 2 Determination of the threshold of embedding linoleic acid in buttermilk

From the results shown in the graphs of Figures 1 and 2 it is noted that the composition of the fat globule sane linoleic acid does not saturate the addition of fish oil of up to 0.15% sheep's milk raw material. This shows that the globule of fat can incorporate a higher concentration, if this acid, or that part of it is dispersed mass produced due to the high temperature pasteurization that affects the membrane globe fat for protection fat.

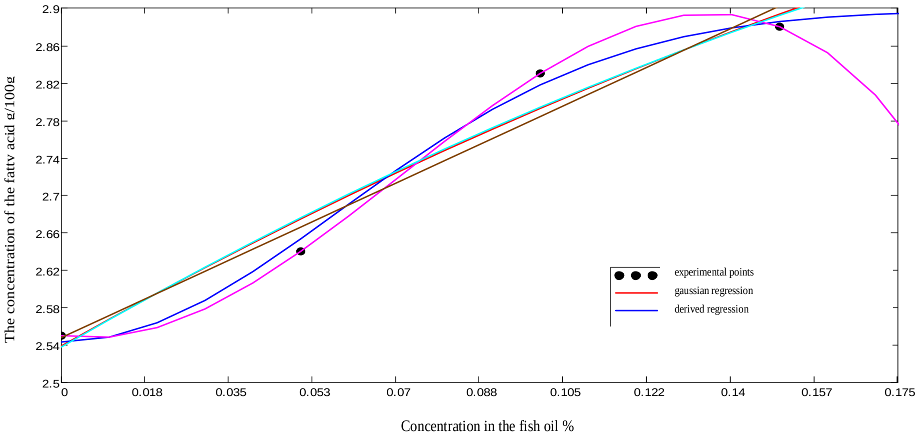

Figure 3 Determination of the threshold of embedding linoleic acid in buttermilk (detail of the preceding figure)

Analysis embedding the linolenic acid in samples sana: Enclosing the asymptotic threshold values of linolenic acid in the buttermilk are presented in table 2.

Table 2

The threshold values of embedding linolenic acid in buttermilk

precision	saturation threshold (of regression values)	saturation threshold (of derivative regression values)	saturation threshold (theoretically)
0.0001	1.300946251	1.301057958	0.650503596

Although the three values are not equal, it can be seen that the two values are very close and numerically determined from Figure 4 have the clearance graphics. This interval is marked (dashed line) and in the graph in Figure 4.

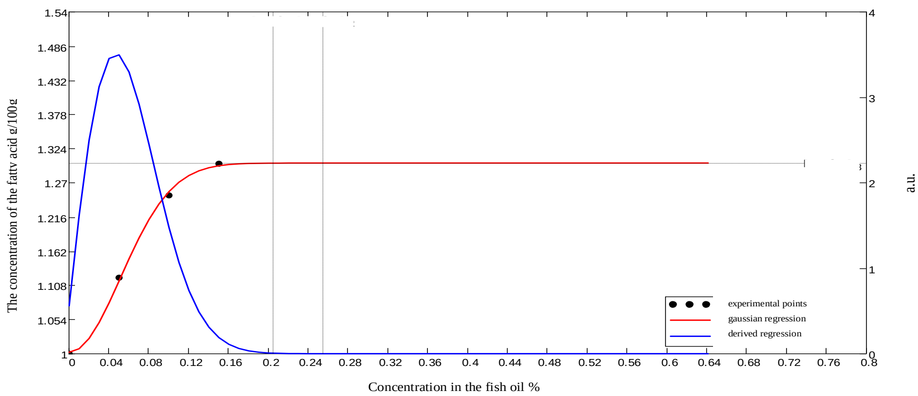

Figure 4 Determination of the threshold of embedding linolenic acid in buttermilk

γ-linolenic acid embedding the analyze the samples san: In the table 3 shows the threshold values asymptotically γ-linolenic acid incorporation in buttermilk with added fish oil, the accuracy of 0.0001%.

Table 3

The threshold values of embedding γ-linolenic acid in buttermilk

precision	saturation threshold (of regression values)	saturation threshold (of derivative regression values)	saturation threshold (theoretically)
0.0001	1.409025827	1.409296716	1.319954937

Although the three values are different, it is noted that the numerically determined second values are very close and in Figure 5 have the clearance graphics. This interval is marked in the graph in Figure 5.

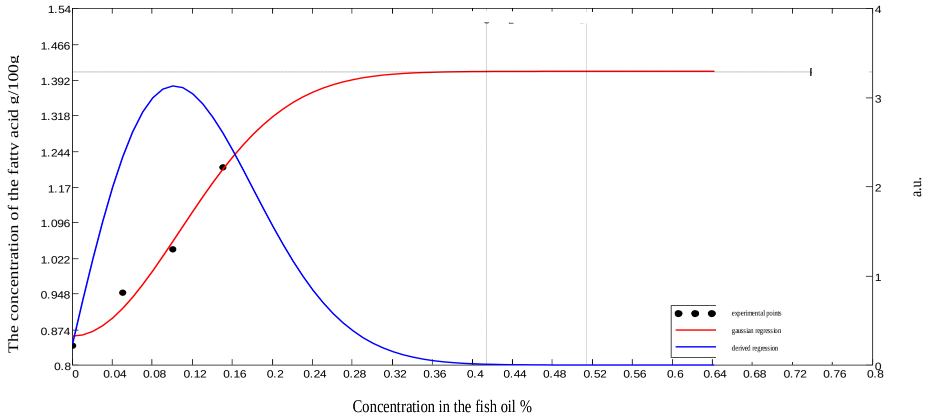

Figure 5 Determination of the threshold of embedding γ-linolenic acid in buttermilk

CONCLUSIONS

Differences clearly insignificant between samples buttermilk with and without the addition of fish oil in the raw milk demonstrates the capture of fat in oily fish globule of fat products, which protects it during the technological process and decrease the inconvenience of taste and aroma specific fish.

I proposed the addition of fish oil doses of 0.05% ÷ 0.15%, lower than the optimal fatty acid incorporation maximum size is limited to the addition of flavoring fish printing finished products.

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