

## Technological variants for the obtaining of a dessert based on fresh probiotic chees

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### Abstract

In recent years an important part of food research has been primarily focused on new probiotic products. The paper is included in this research direction by studying some technological variants for the obtaining of a new dessert based on fresh probiotic cheese.

In order to obtain the fresh probiotic cheese the whole cow milk was matured for 2 hours at 40°C, using a freeze-dried culture of lactic bacteria, La 5, manufactured by Chr Hansen and the enzymatic coagulation process took place at 40°C for 4 hours.

For the manufacturing of the dessert there were also used different proportions of peach paste and cream, in this way obtaining four technological variants of the product.

The whole cow milk, as well as the four variants of the product, was analysed by physical and chemical point of view (the dry matter, the fat content and the protein content were determined) and by rheological and sensorial point of view.

The variant that obtained the best score by sensorial analysis will be considered for future research.

**Keywords:** fresh probiotic cheese, cow milk, rheology, new probiotic dairy product

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### 1. Introduction

Probiotic dairy foods have a high market potential. In an effort to expand the probiotic product range, a number of studies have reported on the development of several different cheese varieties harboring probiotic microorganisms. Among the benefits of probiotics bacteria, scientifically established or clinically proven, there are: the reduction and prevention of diarrhea caused by different origins, diminishing the lactose intolerance, prevention of food allergies, strengthening the immune system and the anti-cancer effects [1].

Fresh cheese in a soft acid or mixed coagulated cheese which is very popular and also used as food ingredient in many applications [2]. The production of fresh acid- or acid/rennet-curd cheeses typically

involves the addition of a starter culture and a relatively small amount of rennet to skim milk. Under these conditions, the milk undergoes slow quiescent acidification resulting in the formation of a gel at a pH value near the isoelectric pH of casein (typically 4.8-4.6) [3]. Some authors [4] think that cheese is an interesting way of supplying probiotic bacteria due to the chemical composition of the raw milk that encourages their growth, metabolism and viability and also due to their relatively low acidity compared to other food products.

Peaches are very much appreciated by consumers, primarily due to their pleasant flavour but also because of their nutritional value. Advantages of peaches are reducing the toxins negative effects on the human body and increase immunity, regulating the functions of the liver and intestines, adjusting the blood pH, etc.

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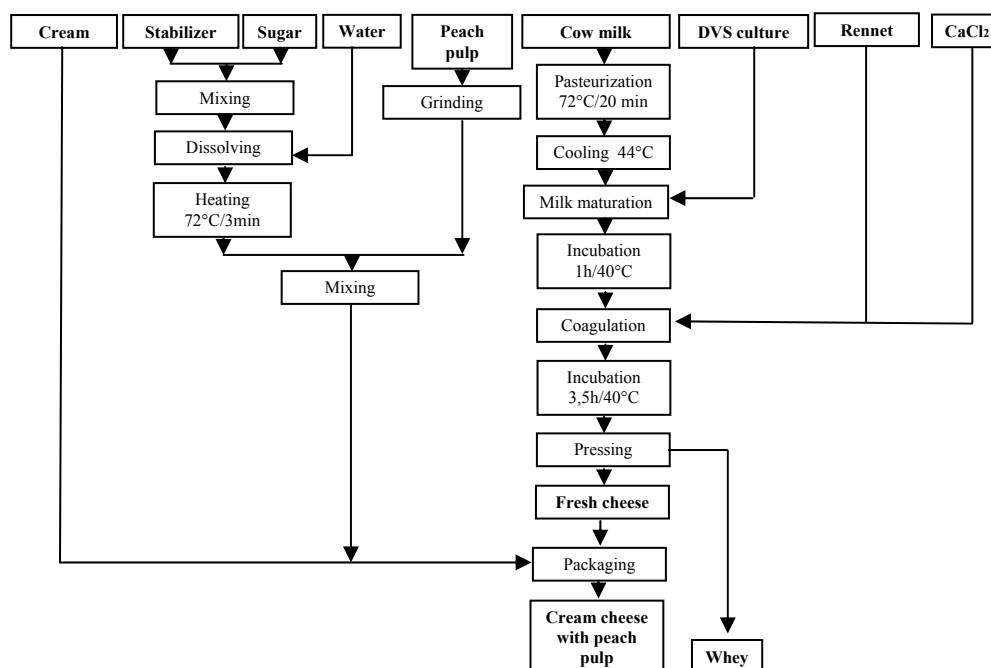
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## 2. Materials and Method

In order to obtain the desert based on fresh cheese and peach pulp the following materials have been used: cow milk, freeze-dried culture of lactic bacteria, coagulant

enzyme, CaCl<sub>2</sub> solution, peach pulp, cream, stabilizer, sugar.

The product has been prepared according to the technology shown in Figure1 [5,6].



**Figure 1** Technological flowchart for manufacturing the new product – Dessert based on fresh cheese and peach pulp

The product was made in four variants, encoded according to Table 1. The proportion of cheese (35%), sugar (7%), water (13%) and stabilizer (1% - for

samples B, C and D) have been kept constant. The other ingredients were added in proportions varying between 20 - 29% peach pulp and 25-15% cream.

**Table 1:** Variants of the new product – Dessert based on fresh cheese and peach pulp

Version Component	A		B		C		D	
	%	g	%	g	%	g	%	g
Fresh cheese	35	52,5	35	52,5	35	52,5	35	52,5
Cream	25	37,5	25	37,5	20	30	15	22,5
Sugar	7	10,5	7	10,5	7	10,5	7	10,5
Water	13	19,5	13	19,5	13	19,5	13	19,5
Peach pulp	20	30	19	28,5	24	36	29	43,5
Stabilizer	0	0	1	1,5	1	1,5	1	1,5

The fresh cheese was made from cow milk purchased from a collecting centre in the county of Braila, featuring the following properties: dry matter 11,07%, minerals 0,69%, fat 3,5%, lactose 4,43%, proteins

3,55% and acidity 20 °T. Milk was subjected to a pasteurization operation at a temperature of 72 °C for 20 minutes and then was cooled to a temperature of 40 °C to further add lactic bacteria for the

maturation. Is was used of a freeze-dried culture of lactic bacteria, La 5, manufactured by Chr Hansen - the culture is Nu- Trish probiotic containing *Lactobacillus acidophilus*. A mixed coagulated milk was obtained by adding a coagulant enzyme Fromase 50 (Paramedical SA, France from *Rhizomucor miehei*, acquired from SC Liliput SA Constanta) and a solution of calcium chloride 40%, and maintaining the milk at a temperature of 40 °C for 3,5 hours. This coagulation variant was chosen because a firm structure of the coagulated was needed. The manual pressing operation was then performed to eliminate the whey.

The peach pulp from canned fruit (Olympia brand acquired from the market) was minced using a blender type Mixsy made by Zepter company, then was mixed with solution of sugar, stabilizer and water according to the use instructions for the stabilizer Bekaplus Q2 (purchased from SC Liliput SA Constanta). Peach pulp related to sample A (without stabilizer) was mixed only with a solution of sugar and water.

To improve the creamy appearance of the product cream was added as well (Tnuva, 20% fat, from the market).

Packaging was done manually, in polyethylene packages of 200 ml, the product components (fresh cheese, shredded peach pulp and cream) being arranged in successive layers.

The obtained product was analyzed from the physical, chemical and rheologic points of view. The analysis was performed both for dessert and for each component separately. The physical-chemical analysis was applied to: the dry matter – by the classic method of drying in the drying stove as per standard AOAC 925.23 Ch. 33.2.09 (a Memmert drying stove was used), minerals - by burning in an electric furnace at a temperature of 400 °C, using AOAC 945.46 Ch. 33.2.10, fat - using the acid butirometric method, acidity - by titration with NaOH 0,1 n, according to STAS 9535/1987 and pH with a pH meter InoLAB 730, after calibration with standard solutions of pH 4, 7 and 9. Rheological analysis consisted in determining the product's shear stress using a Rheotest viscose-meter.

### 3. Results and Discussion

The results of the physical chemical analysis are given in Table 2.

**Table 2:** Physical chemical characteristics of the new product – Dessert based on fresh cheese and peach pulp

Characteristic	A	B	C	D	Cream	Peach pulp
Dry metter, %	34	33,9	33,6	33,2	26	23,1
Minerals, %	2,1	2	2,1	2,3	-	0,6
Fat, %	10,4	10,4	9,7	9,1	20	-
Proteins, %	11,3	11,3	11,1	10,9	1,2	0,9
Acidity, °T	87	87	90	97	80	42
pH at 20°C	6,5	6,5	6,3	6	4,4	6,6

The dry matter in the peach pulp was 23,1%, in the cream was 26% and in the desert ranged from 33,2% for variant D and 34% for variant A. The variation of the dry matter is in good agreement with the amount of peach pulp added: the higher the pulp added, the lower the dry matter, which is accounted for by the higher pulp moisture.

The mineral parameter varied between 2% (for sample B) and 2,3% (for the D),

revealing in this case too a correlation between the parameter value and the amount of peach pulp.

For fat, values between 9,1% (for the D) și 11,3% (for samples A and B) were reported.

In the case of desert, acidity varied between 87 °T (for sample A) and 197 °T (for D).

The results of the physical chemical analysis show that the variants of the new

product feature a balance between the principles of nutrition, which recommends the product for consumption under a rational diet.

The rheologic behaviour of the four types of variants was examined because we considered that they define the creamy taste, property which significantly influences consumers' choice of a dairy dessert. The newly prepared product - dessert based on fresh cheese and peach pulp - feature a complex rheologic behaviour provided by the flowing properties of the different components (fresh cheese, peach pulp and cream). It was intended to achieve a creamy product

able to include in its structure the minced peach pulp and fat globules from the cream. That is why we considered necessary to use a stabilizer in the manufacturing process.

The choice of the component proportions of the new product has been suggested by preliminary researches focused on obtaining an optimal creamy taste.

From the analysis of the four variants in the Figures 2,3,4 and 5 it is found a rheologic behaviour close to that of Newton's fluid for sample A (without stabilizer). Consequently, with this sample it was observed almost linear dependence between shear stress and the shear rate.

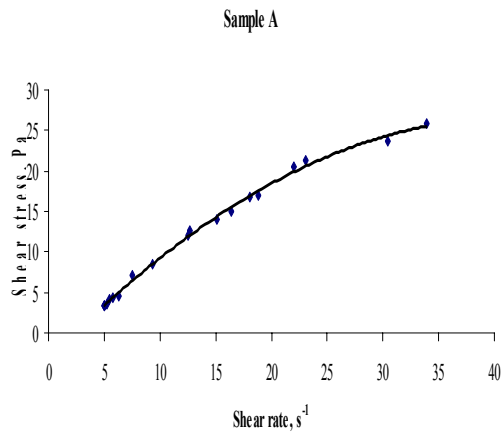


Figure 2: Rheogram (the shear stress depending on the shear rate) for sample A

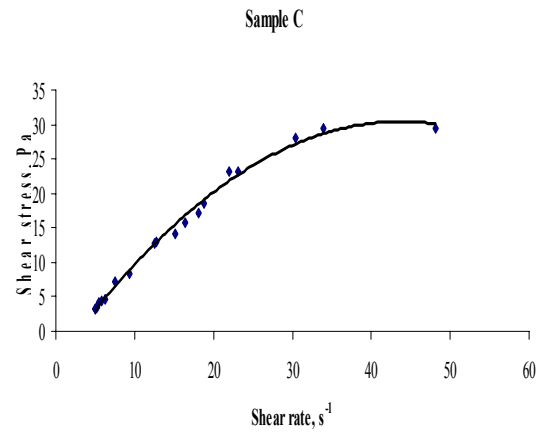


Figure 4: Rheogram (the shear stress depending on the shear rate) for sample C

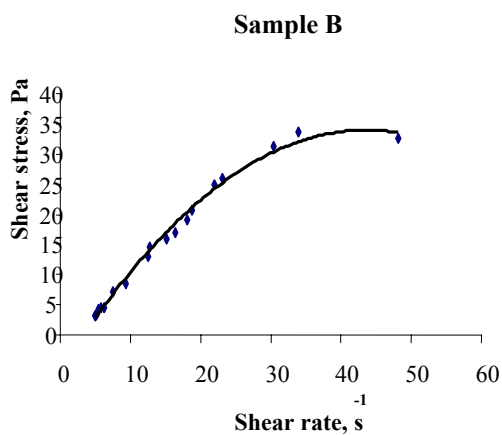


Figure 3: Rheogram (the shear stress depending on the shear rate) for sample B

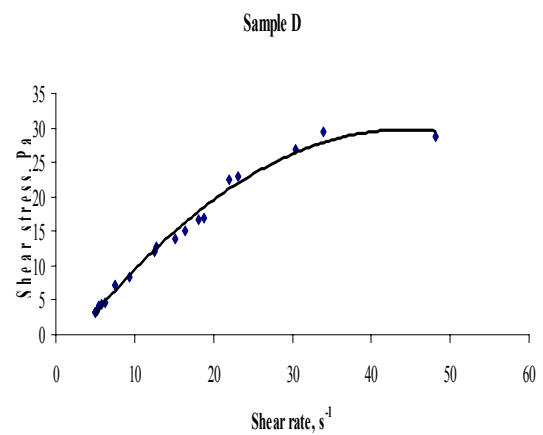


Figure 5: Rheogram (the shear stress depending on the shear rate) for sample D

For samples B, C and D it can be assessed that their rheologic behaviour is similar to that of non Newtonian fluids, independent of time, which is called pseudo-plastic behaviour. Calculating the viscosity, it can be noticed that this may increase in a linear or nonlinear fashion with a transition from Newtonian to non-Newtonian behaviour as the total solids concentration is increased. This change occurs because lower water content causes an increase in volume fraction of dispersed particles and increases the particle interactions as the distances between the particles become smaller [7] It has also been observed that a higher quantity of added peach pulp results in decreasing of the viscosity.

#### 4. Conclusions

Creating new products based on milk and milk products is a priority in guiding consumers' preferences for a sensible diet. On the market there are few dairy desserts of Romanian origin. To encourage and promote the consumption of dairy products among young people it is necessary to diversify the range of dairy dessert.

The study conducted managed to characterize from the physical chemical and rheologic point of view the new type of dairy dessert based on fresh cheese and peach pulp. It may be noted that the physical chemical characteristics of the four product variants are comparable with those of similar products.

Rheologically, the product falls under the category of time independent non Newtonian fluids of pseudo-plastic behaviour. This behaviour is specific to creamy products but consumers' perception of consistency must be verified by conducting studies on the sensory characteristics.

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