

## Studies on the production of probiotic dairy products based on milk and medicinal plant extracts

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### Abstract

Probiotics are a range of functional products that have been attracting more and more consumer interest over the past few years, due to the beneficial way in which they influence the human body. The scope of this study has been the improving of these ranges of products, using medicinal herbs extracts to increase the therapeutic effects. Sensory tests have been performed on samples of a new product, with a different content of liquorice and blueberry extracts.

In this paper we present the manufacturing technology of a new fermented dairy product, made from cow's milk, adding a 6 % liquorice extract and a 6 % blueberry extract, using a mixed thermophilous culture of probiotic ABY 3 bacteria, from the Chr. Hansen collection.

**Keywords:** probiotic products, sensory analysis, medicinal herbs, new product

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### 1. Introduction

In the context of increasing the number of people who suffers from various diseases due to unhealthy diets, in addition to the population guiding in this direction this is necessary the designing of new products that ensure health and prevent illness. Milk and dairy products due to their chemical composition and high degree of assimilation, occupies an important place in rational human nutrition being, one of the most accessible source of animal protein. In generally, traditional fermented dairy products are perceived by consumers as safe and healthy [1, 5].

For centuries it has been considered that a diet based on fermented milk products has a beneficial effect, controlling the development of pathogenic bacteria in the thin intestine, leading to improved overall health, and having as main effect increase life period. Probiotics are living microorganisms that when administered in

adequate amount confer a health benefit on the host [2, 5, 11].

Viability and activity of probiotic bacteria present particular importance, because the bacteria must survive in the product, during the gastrointestinal transit, to be insensible to enzymatic hydrolysis and biliary salts in the thin intestine [14, 16].

Medicinal herbs have represented the most important and curative handy tool that man had provided. Herbs with favorable effect on the human body or with inhibited effect of the pathogens due to their therapeutic value of certain substances [19].

The aim of the research paper was to analyze sensory values, the most important quality aspect for the consumer of probiotic dairy products with added medicinal plants extracts. It was analyzed how the addition of medicinal plants extracts affect the flow properties of probiotic dairy products.

## 2. Materials and Method

- Cow milk purchased from a collecting center in Galati district, featuring the following properties, determinate with Milk Lab equipment: minerals: 0,72 %; nonfat dry substance: 9,08 %; lactose: 4,32 %; protein: 3,52 % fat: 1,5 % and titratable acidity: 20 °T;
- blueberry extract and liquorice extract (blueberry and liquorice powder has been purchased from S.C. Hofigal Export Import S.A.) thus obtained: a known quantity of vegetable material plant has been subjected to an aqueous extraction, at room temperature for 2 hours. Aqueous extracts obtained were filtered through filter paper and then concentrated in a Buchi Rotavapor at 50°C and a pressure of 200 mbar, stored of 4°C until use;

- freeze-dried culture of lactic bacteria ABY 3, made by Chr. Hansen containing *Lactobacillus acidophilus*, *Lactobacillus delbrueckii* ssp. *bulgaricus*, *Streptococcus thermophilus* and *Bifidobacterium* ssp.

Were made 3 types of new product AFINOLACT encoded as following:

- A: milk + 5 % inoculum;
- B: milk + 5 % inoculum + 6 % blueberry extract;
- C: milk + 5 % inoculum + 6 % blueberry extract + 6 % liquorice extract.

To obtain the fermented dairy product – AFINOLACT the technological stages shown in Figure 1 were followed.

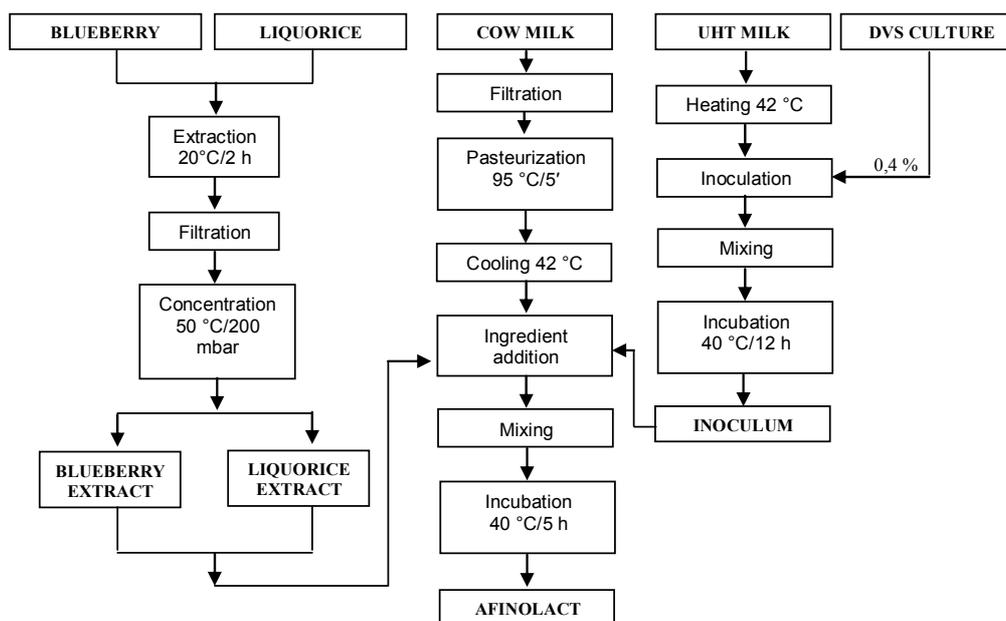


Figure 1. Technological flowchart – Fermented dairy product AFINOLACT

**Sensory Analysis.** A hedonic analytical test was applied, by a classification – directed difference. This type of test falls under the category of subjective tests. The hedonic scale was used to measure the product pleasure degree, because the panel operators resorted to were not properly trained. The Romanian standard SR

6345/95 defines the direction and how to do sensory analysis of milk and dairy products using the scores scale.

**Rheological analysis.** Dynamic viscosity of fermented dairy product was measured at 9 °C using a Brookfield rotational rheometer DV – E, fitted with spindle LV 2 [9].

### 3. Results and Discussion

#### Sensory Analysis

The sensory analysis of the three sorts of fermented dairy product was performed by means of 27 not trained panelists. Each panelist assessed the sensory qualities of the three sorts of fermented dairy product, writing them down in accordance with the score scale shown in the sensory analysis sheet. A score between 1 (very bad) and 5 (very good) was assigned.

The panelists said they were consumers of dairy products, showed much interest in the analysis they carried out, featured concentration capacity, were of 20 to 25 years old, were not tired or cold, were not under a specific treatment likely to affect their sensory perception. In assessing the sensory descriptors in terms of appearance and texture, colour, taste, odour, mouthfeel and aftertaste, the radar chart was made from the scores awarded by the panelists for each sort of fermented dairy product.

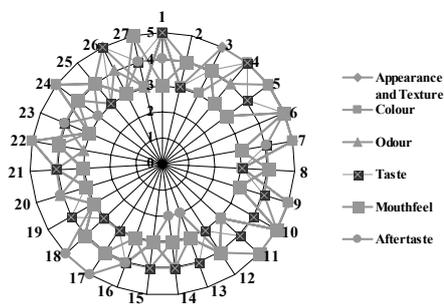


Figure 2. Sensorial profile of sample A

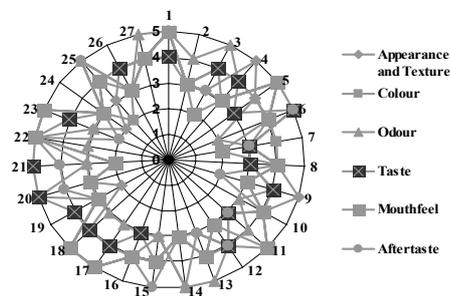


Figure 3. Sensorial profile of sample B

Best appreciated sensory descriptors of sample A was the appearance and texture and taste - each rated with a score that exceeded 100 points. Color was assessed with the lowest score (94 points) because the panelists they felt that sensory attribute may not influence the selection of product.

sample, the most appreciated sensory descriptors were appearance and texture (101 points), taste (104 points) and aftertaste (102 points).

For assessing the sensory descriptors of sample B: Appearance and texture, color, odour, taste, mouthfeel and aftertaste was realize radar chart in Figure 3. For this

In figure 4 is presented the radar chart for sample C, where the most appreciated sensory descriptors were appearance and texture, colour and taste. Least appreciated descriptor was the mouthfeel who obtained the lowest score, 98 points.

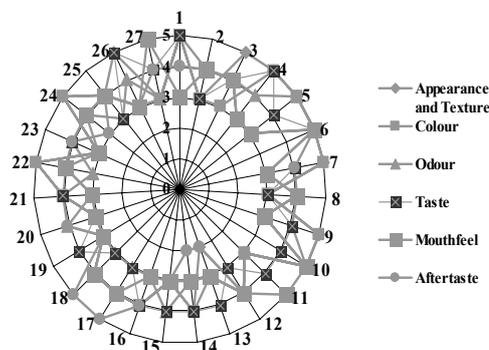


Figure 4. Sensorial profile of sample C

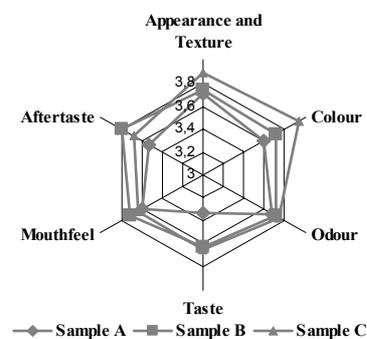


Figure 5. Sensorial radar chart for sample A, B and C depending on level appreciation

From the analysis of the data supplied by the panelists and the radar chart in Figure 5 the conclusion is reached that the most appreciated type of fermented dairy product is sample C (milk + 5 % inoculum + 6 % blueberry extract + 6 % liquorice extract) which was appreciated as "good".

Concluding, we remark that all three types of fermented dairy product were appreciated by the 27 panelists. Obtained scores were close in terms of general appreciation. Although the panelists were not specialists, they could express an objective opinion on the sensory attributes

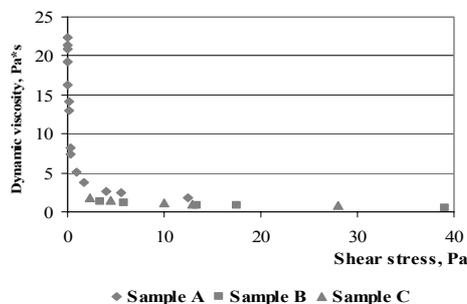


Figure 6. Variation of dynamic viscosity depending on shear stress

For A, B and C samples, it can be assessed that their rheologic behavior is similar to that of Newtonian fluids, independent of time, which is called pseudoplastic behavior. Characteristic of a fluid with such behavior is the decreased resistance to flowing due to the increased shear rate of the fluid. For all samples it was noted that at low shear rates, the variation of tangential shear stress depending on shear rate is linear (regression coefficient values  $R^2$  varies between 0,957 and 0,9889).

#### 4. Conclusion

Depending on the analyzed sensory characteristics can be remarked the following conclusions for assortment of fermented dairy product produced:

- all chooses of the fermented dairy product obtained were assessed in terms of the sensory panelists;

of three samples of fermented dairy products, performing an analysis of consumer's preferences with a certain age.

#### Rheological analysis

In figure 6 is presented the variation of dynamic viscosity of the three fermented dairy products depending on shear stress, in figure 7 can be observed the variation of shear rate depending on shear stress. Depending on the mode variation of this parameters we settled the rheology of fermented milk products manufactured.

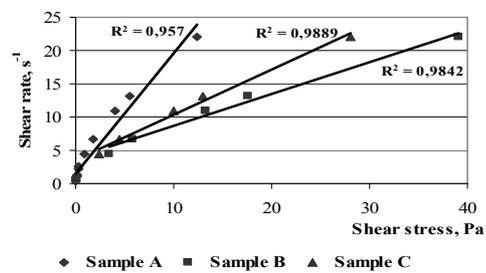


Figure 7. Variation of shear rate depending on shear stress

- prior conclusion allow further research by complex characterizing the fermented dairy probiotics with added medicinal herbs with intention to diversify the assortment scale of functional products;
- for the sample with blueberry extract and liquorice extract the most appreciated sensorial characteristics were appearance and texture, colour and taste;
- rheological analyses showed that the addition of medicinal herbs not change significant the flow properties, which characterize the probiotic dairy products;
- rheologically, the products from this study falls under the category of time independent Newtonian fluids of pseudoplastic behavior.

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