НАУЧНИ ТРУДОВЕ НА
УНИВЕРСИТЕТ ПО ХРАНИТЕЛНИ
ТЕХНОЛОГИИ - ПЛОВДИВ
2017 г.
ТОМ 64, КНИЖКА 1

SCIENTIFIC WORKS OF
UNIVERSITY OF FOOD
TECHNOLOGIES
2017
VOLUME 64 ISSUE 1

The effect of different starter cultures on sensory properties of probiotic yogurt

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Abstract

Fermented dairy products have been an important component of nutritional diet. Probiotic yoghurt is one of the most popular fermented milk product prepared by using probiotic starter cultures and also has a great consumer acceptability due to its health benefits. The aim of this survey was to follow the effect of different probiotic cultures on the sensory properties of the probiotic yogurt which was manufactured from three different starter cultures with the following commercial names: ABT-6, ABT-750 and ABT-10 consisting of Streptococcus thermophilus, Lactobacillus acidophilus and Bifidobacterium bifidus.

Key words: probiotic yogurt, culture, sensory properties;

Introduction

Fermented dairy products are are very important to the human diet. Fermented dairy products are products that can be produced with lactose fermentation by microorganisms especially by lactic acid bacteria. (Florence et al., 2012; Commane et al., 2005).

Yoghurt represents the most popular fermented milk product worldwide and originates from countries around the Balkan and the Eastern Mediterranean Sea (Staff, 1998).

Fermented dairy products are usually produced by using lactic acid bacteria and yeasts.The probiotics, live non-pathogenic microorganisms, are defined as microbial cell supplement which exert positive impact on the health of the host when ingested alive in sufficient amount. (Özer & Kirmaci, 2010).

The term probiotics is used to name ingested microorganisms associated with beneficial effects to humans and animals (Araya et al., 2006). Probiotics are also defined as the living microorganisms administered in a sufficient number to survive in the intestinal ecosystem and must have positive effect on the host (Gismondo et al., 1999).

The main health benefits include improved the intestinal microbial balance, lactose metabolisation, stimulation of the digestive and immune system, reduction of blood cholesterol level, prevention against urinary infections, cardiovascular diseases, diarrhea, osteoporosis, as well as anti-mutagenic and anti-carcinogenic properties. (Ejtahed et al., 2011).

Probiotic yogurt has a pleasant and specific sour taste which mainly comes from the lactic acid. Starter cultures added in the production process have an influence on the final taste of the product. In probiotic yoghurts live bacteria are found, so the concentration of the characteristic flavor components is changing during the storage, which depends on the temperature and storage time (Trajchevski, 2015).

The main component that is produced during the fermentation process and storage of probiotic yogurt is acetaldehyde.

The optimal flavor and aroma of probiotic yoghurt is obtained when the acetaldehyde concentration ranges between 23 and 41ppm, while the concentration of diacetyl between 0.4 - 0.5ppm, ethanol between 2.8-10.1ppm (Kneifel et al., 1992). If probiotic yogurt is kept at temperature higher than 8^{o}C, the concentration of acetaldehyde is decreasing. (McGregor & White, 1987).

Nowadays, the consumption of new and enriched foods has shown growth to higher rates. In our country. The use of probiotic yogurt as a functional food increases each day and in the future there will be growing demand on these products.

In this research paper three different types of probiotic yogurt were produced. The differences were in the probiotic starter cultures that were used in the production process. The impact of starter culture on sensory properties of probiotic yogurt were followed.

Materials and Methods

Materials

The following raw materials were used during the research work: standardized cow milk, 0.1% skimmed powder milk up to 0.7%, three types of frozen probiotic cultures - 0.02% which are produced by CHR Hansen (ABT10, ABT750 and ABT6), Copenhagen, Denmark and prebiotic oligofructose - 1.5%.

The probiotic cultures that were used in this research paper (ABT10, ABT750 and ABT6) were composed with the following types of bacteria in different proportion:

-Streptococcus thermophilus – St- M5;
-Lactobacillus acidophilus – LA – 5;
-Bifidobacterium bifidus – BB – 12;

The fermentation process was obtained according to the dairy industry standards and operating instructions of the probiotic cultures manufacturer CHR Hansen - Denmark.

Methods

The sensory characteristics of probiotic yoghurt reflect a human reaction and can generally be described by terms defined within the categories of appearance, taste, odor and texture. The evaluation of sensory properties has been made to three variants of probiotic yogurt obtained with three different probiotic cultures and same prebiotic. The purpose of the sensory analysis was to evaluate the influence of starter cultures on the quality properties of probiotic yogurt (external appearance, viscosity, color, smell and taste) and its behavior during the storage period. The storage conditions were time (0-21d) and temperature (8°C). The sensory analysis was also made in order to determine the best variant of probiotic yogurt that is chosen by the final users-consumers. The sensory analysis was made by using the method by Baltadzieva (1987) for sensory evaluation of fermented dairy products with a 50 points system. The tests were made in room which met the standard ISO 6658:1985. A total of 42 untrained male panelists and 47 untrained female panelists between the ages of 18 to 61 years old completed the sensory evaluation.

Results and Discussion

The score from the sensory evaluation of three variants of probiotic yogurt are presented in Table 1. According to the results presented in Table 1 the probiotic yogurt produced with starter culture ABT 10 is the most acceptable for the consumers. For external appearance the probiotic yogurt produced with starter culture ABT 10 got score 10, probiotic culture produced with starter culture ABT 750 got score 10 and probiotic yogurt produced with starter culture ABT 6 got score 8.33. For viscosity the probiotic yogurt produced with starter culture ABT 10 got score 10, probiotic culture produced with starter culture ABT 750 got score 10 and probiotic yogurt produced with starter culture ABT 6 got score 3.0. For color the probiotic yogurt produced with starter culture ABT 10 got score 10, probiotic culture produced with starter culture ABT 750 got score 10 and probiotic yogurt produced with starter culture ABT 6 got score 10. For odor the probiotic yogurt produced with starter culture ABT 10 got score 10, probiotic culture produced with starter culture ABT 750 got score 9.17 and probiotic yogurt produced with starter culture ABT 6 got score 9.17. For taste the probiotic yogurt produced with starter culture ABT 10 got score 8.5, probiotic culture produced with starter culture ABT 750 got score 8.0 and probiotic yogurt produced with starter culture ABT 6 got score of 7.0. The probiotic yogurt produced with starter culture ABT 10 for all sensory properties got 48.50 points, probiotic yogurt produced with starter culture ABT 750 for all sensory properties got score 47.17 and probiotic yogurt produced with starter culture ABT 6 for all sensory properties got score 37.50.

Conclusions

According to the presented data it can be concluded that starter cultures have significant impact on the senosry properties of probiotic yogurt. Probiotic yogurt produced with starter culture ABT 10 (St- M5, LA - 5, BB - 12) is the most acceptable for the consumers with total score of 48.50.

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Table 1. Sensory evaluation of probiotic yogurt (Baltadzieva, 1987)

Product:	**Probiotic yogurt**				
Sensory properties	**Description of sensory properties**	**Score**	**Average score**		
			(ABT 10)	**(ABT 750)**	**(ABT 6)**
External appearance	**Smooth structure without foam on the surface**		*10*	10	8,33
	Smooth structure without separate serum				
	Grain structure				
	Decomposition				
Viscosity	**Optimal density**		*10*	10	3
	Too high density				
	Low density				
Color	**White or yellow white**		*10*	10	10
	Untypical				
Odor	**Pleasant sour milk smell**		*10*	9,17	9,17
	Poorly expressed sour milk smell				
	Strange odor, the smell of yeast				
Taste	**Pleasant sour taste**		*8,50*	8,00	7
	Poorly expressed sour milk taste				
	Acid taste of acetic fermentation				
	Bitter taste				
	External taste				
	Unnatural taste				
Total score			*48,50*	47,17	37,50