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SENSORY EVALUATION OF PROBIOTIC YOGURT INOCULATED WITH DIFFERENT STARTER CULTURES

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ABSTRACT

Today's consumer choice is mostly based on products that provide health benefits, such as probiotic yogurt. The consumer does not tolerate consistency defects, poor firmness or gel viscosity, and also its acid taste, so our goal was to make comparison between different probiotic yogurts (different starter cultures) and to choose the one that is most suitable for consumer use, product that have the best consumer acceptance. Starter cultures that were used in production process were with the following commercial names: ABT-2, ABT-6 and ABT-10 consisting of S. thermophilus, L. acidophilus and B. bifidus. The sensory evaluations showed that the sample C was most preferred by the panelists.

Keywords: *probiotic yogurt, sensory evaluation, starter cultures*

INTRODUCTION

Yogurt is fermented dairy product which is worldwide known for its acceptance in terms of nutritional and health benefits, Özer and Kirmaci (2010). This product is a mixture of milk fermented by lactic acid that is produced by lactic acid bacteria (mostly used for yogurt production: Lactobacillus bulgaricus and Streptococcus thermophilus), (Yadav et al. 2015).

Probiotic yogurt is a functional dairy product that contains probiotic bacteria and has a lot of positive effect on people's health, (Trajchevski, 2015). By using this products, people can get lot of health benefits. It can be improved their intestinal microbial balance, the stimulation of the digestive system, the lactose metabolism, the reduction of blood cholesterol level, the prevention against urinary infections, cardiovascular diseases, osteoporosis, diarrhea, anti-mutagenic and anti-carcinogenic properties. The probiotics are defined as microbial cell supplement that have positive impact on the health of the host when ingested alive in sufficient amount, (Marinaki, 2016).

The development of this novel functional foods that contain probiotic is a highly growing area of food industry and also attracts a special interest from the field of nutrition, due to their beneficial properties to human health. If we want these products to deliver their health benefits, probiotics must be present in it, at level higher then 6 log cfu g^{-1}, at the time of consumption, in order to survive the passage through the gastrointestinal tract, (Saxelin, 2008).

The objective of this work was to determine the effects of the starter cultures on sensorial properties of three types probiotic yogurt produced by using commercial starter cultures (ABT-2, ABT-6 and ABT-10), which contain S. thermophilus, L. acidophilus and B. Bifidus in different portions. The probiotic yogurt samples were evaluated during storage of 21 days at refrigerated temperature (4±1°C).

MATERIALS AND METHODS

The probiotic cultures that were used in this research paper (ABT-2, ABT-6 and ABT-10) were composed with the same types of bacteria, but in different proportion: *Streptococcus thermophilus* St-M5; *Lactobacillus acidophilus*, LA–5 and *Bifidobacterium bifidus*, BB-12; All starter cultures that were used during production process were prepared as operating instructions of the probiotic cultures manufacturer.

Yogurt manufacture

Pasteurized cow milk (3.2 % standardized milk fat) was heated at 37°C. Three variants of probiotic yogurt were produced (A, B and C). Variant A with probiotic culture ABT-2, Variant B – with probiotic starter culture ABT-6 and Variant C with probiotic starter culture ABT-10. All samples were inoculated with the activated starter culture (0.3% v/v). The fermentation was finished at pH 4.65 and the samples stored at 4±1°C for 21 days.

Sensory evaluation

100 panelists familiar with the consumption of yogurts from the Faculty of Biotechnical sciences, were used to evaluate the produced probiotic yogurts for (external appearance, viscosity, color, smell, taste and overall acceptability, using a 50-point system method (Presilski, 2002). The tests were made in a room which met the standard ISO 6658:1985. The sensory evaluation was also made in order to determine the best variant of probiotic yogurt (A, B and C), that is chosen by the final users-consumers.

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 (Variant C) has had the best overall acceptability form the consumers.

For external appearance the probiotic yogurt produced with starter culture ABT-2 (Variant A) has got score of 7.65 points, probiotic culture produced with starter culture ABT-6 (Variant B) has got score of 10 points and probiotic yogurt produced with starter culture ABT-10 (Variant C) has got score of 10 points.

For viscosity the probiotic yogurt produced with starter culture ABT-2 (Variant A) has got score of 6 points, probiotic yogurt produced with starter culture ABT-6 (Variant B) has got a score of 10 points and probiotic yogurt produced with starter culture ABT-10 (Variant C) has got a score of 10 points.

For quality parameter color, each of examined probiotic yogurt variants (A, B and C) produced with starter culture ABT-2, ABT-6 and ABT-10 have got score of 10 points.

For quality parameter odor the probiotic yogurt produced with starter culture ABT-2 (Variant A) has got score of 10 points, probiotic yogurt produced with starter culture ABT-6 (Variant B) has got score of 8 points and probiotic yogurt produced with starter culture ABT-10 (Variant C) has got score of 9.5 points.

For quality parameter taste the probiotic yogurt produced with starter culture ABT-2 (Variant A) has got score of 7.5 points, probiotic yogurt produced with starter culture ABT-6 (Variant B) got score 8.0 and probiotic yogurt produced with starter culture ABT-10 (Variant C) has got score 9.5.

The probiotic yogurt (Variant A) produced with starter culture ABT-2 for all sensory quality parameters has got a score of 41.15 points, probiotic yogurt (Variant B) produced with starter culture ABT-6 for all sensory quality parameters has got a score of 44.5 points and probiotic yogurt (Variant C) produced with starter culture ABT-10 for all sensory quality parameters has got the best score of 49 points.

Table 1. Sensory evaluation of probiotic yogurt (Sensory evaluation test).

Product: Probiotic yogurt (Variant A, B and C)					
Sensory properties	**Description of sensory properties**	**Score**	**Average score**		
			Variant A (ABT-2)	Variant B (ABT-6)	Variant C (ABT-10)
External appearance	**Smooth structure without foam on the surface**		7.65	10	10
	Smooth structure without separate serum				
	Grain structure				
	Decomposition				
Viscosity	**Optimal density**		6	8.5	10
	Too high density				
	Low density				
Color	**White or yellow white**		10	10	10
	Untypical				
Odor	**Pleasant sour milk smell**		10	8	9.5
	Poorly expressed sour milk smell				
	Strange odor, the smell of yeast				
Taste	**Pleasant sour taste**		7.5	8	9.5
	Poorly expressed sour milk taste				
	Acid taste of acetic fermentation				
	Bitter taste				
	External taste				
	Unnatural taste				
Total score			**41.15**	**44.5**	**49.0**

CONCLUSIONS

According to the presented data it can be concluded that starter cultures have significant impact on the sensory 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 a total score of 49 points. Starter cultures have significant effect on sensory quality of probiotic yogurt.

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СЕНЗОРНО ОЦЕНУВАЊЕ НА ПРОБИОТИЧКИ ЈОГУРТ ИНОКУЛИРАН СО РАЗЛИЧНИ ЧИСТИ КУЛТУРИ

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Резиме

Денешниот избор на потрошувачите е насочен кон производите кои придонесуваат за здравствени бенефити. Еден од тие производи е и пробиотичкиот јогурт. Потрошувачите на овие производи не толерираат неправилности во конзистенцијата, недоволна цврстина, несоодветен вкус, па нашата цел беше да направиме споредба помеѓу различни варијанти на пробиотички јогурт произведени со различни стартер култури и да се избере една која ќе биде најсоодветна и најприфатлива за консуматорите. Стартер културите кои беа користени во процесот на производството се со следниве комерцијални имиња: ABT-2, ABT-6 и ABT-10, и се состојат од *S. thermophilus, L. acidophilus* и *B. bifidus.* Сензорната анализа покажа дека примерокот С беше најдобро прифатен од панелистите кои беа вклучени во оценувањето.

Клучни зборови: *пробиотички јогурт, сензорно оценување, стартер култура.*