

Evaluation the Sensory and Probiotics Properties of the Yogurt Supplemented with Carrot Juice

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ABSTRACT

This study aimed to develop a new type of yogurt through addition of carrot juice. Yogurt is a fermented milk product obtained from fermentation of *Lactobacillus bulgaricus* and *Streptococcus thermophilus* strains. The effect of carrot juice at different levels (0%, 8%, 16%, 24%) on sensory properties and the viability of probiotic bacteria in yogurts during storage (21 days) at refrigerated temperature (4°C) was evaluated. The yogurt supplementation with 24% carrot juice significantly improves the stability of the lactic acid bacteria, that contained the recommended levels of 10^7 cfu/g) probiotic bacteria at the end of 21-days shelf life. The yogurt with 24% carrot juice was the most appreciated (7.07 points), followed by the classic yogurt (6 points), yogurt with 8% (5.28 points) and yogurt with 16% carrot juice (5.5 points).

Keywords: yogurt, lactic acid bacteria, carrot juice.

INTRODUCTION

Fermented dairy products are popular because of the health benefits provided by the ingestion of probiotics generated by the consumption of these products and among all of the fermented dairy products yogurt is the most consumed (Cruz *et al.*, 2013), due to the positive perception on the market as being seen by the consumers as a functional dairy product containing living microorganisms like lactic acid bacteria (LAB) (Rotar *et al.*, 2015). The yogurt, to be considered as a probiotic product, *Streptococcus thermophilus* and *L. delbrueckii* ssp. *bulgaricus*, as starter cultures, must be at a daily dose of 10^9 CFU/g. Several authors have indicated that a minimal concentration of 10^6 CFU/g of a product is required for a probiotic effect (Irkin and Eren, 2008). Yogurt is also widely used as a carrier for food components such as fibers, fatty acids, and antioxidants that are believed to improve physiological functions in the body. In addition, carrots are considered to be very nutritious, containing vitamins, minerals, and dietary fiber,

as well as flavonoids and carotenoids, all of which are beneficial in preventing diseases (Cliff *et al.*, 2013).

AIMS

In this study, it was investigated the effect of yogurt supplementation with four different levels (0% (Y0), 8% (Y8), 16% (Y16), 24% (Y24)) of carrot juice on growth of the lactic acid bacteria. Also, sensory properties of the final product were investigated to establish the optimal quantity of carrot juice addition based on consumer preferences.

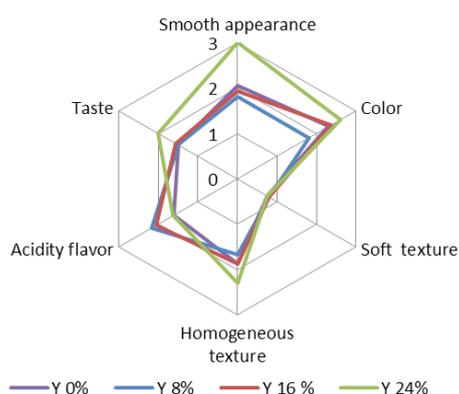
MATERIALS AND METHODS

Yogurt is made by fermenting milk 3.5% fat with the starter culture of yogurt consisting of *Lactobacillus delbrueckii* subsp. *bulgaricus* and *Streptococcus salivarius* subsp. *thermophilus* (TIPO YOGUR FERLAC II).

The viability of lactic acid bacteria of yogurt samples were assessed in 4 stages of the storage

Tab. 1. Probiotics characteristics of yogurt samples

Sample	CFU/ml*10 ⁷							
	<i>S. thermophilus</i>				<i>L. bulgaricus</i>			
	Storage period (days)							
	1	7	14	21	1	7	14	21
Y0	2.68	4.24	5.19	4.42	2.88	5.24	5.9	4.88
Y8	3.12	5.52	5.89	5.42	3.82	6.52	6.89	6.42
Y16	3.32	5.85	6.16	6.35	3.92	6.85	7.16	6.65
Y24	3.96	6.72	7.17	6.23	4.36	7.42	7.67	6.86

**Fig 1.** Sensory profile of the four type of yogurt

period, stage 1 - at the beginning of storage; stage 2 - at 7 days of storage; stage 3 - at 14 days of storage and stage 4 - at 21 days. All samples were analysed in duplicate.

The number of lactobacilli was determined on the MRS agar and the number of streptococci was determined on M17 agar medium after 48 h, respectively 72h of incubation (Pop *et al.*, 2015; Rotar *et al.*, 2014). Sensory analyzes of the samples, as well as the control sample were evaluated by 25 untrained panelists using a 9-point hedonic scale.

RESULTS AND DISCUSSION

The addition of 24% carrot juice resulted in an increase of the viable cell counts of *L. bulgaricus* from 4.36×10^7 CFU/mL on day 0 to 6.86×10^7 CFU/mL on day 21, whereas, *S. thermophilus* increases from 3.96×10^7 CFU/mL on day 0 to 6.23×10^7 CFU/mL on day 21 (Tab. 1).

Results showed that the yogurt supplementation significantly improves the stability of the lactic acid bacteria, due to the carbohydrates,

vitamins and minerals found in high quantity in carrot.

The addition of carrot juice influences the sensory properties of yogurt. However, panellists prefer the yogurt with 24% carrot juice as is shown in Figure 1.

CONCLUSION

This research identified that the rich additions in polyphenolic compounds, fibres and vitamins could be potentially considered as a source of ingredients for yogurt supplementation

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