Influence of Pollen, Chia Seeds and Cranberries Addition on the Physical and Probiotics Characteristics of Yogurt

Carmen POP, Romina VLAIC, Anca FĂRCAŞ, Liana SALANŢĂ, Delia GHICĂŞAN, Cristina SEMENIUČ, Ancuţa M. ROTAR*

Faculty of Food Science and Technology, University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Address - 400372 - Cluj-Napoca, Mănăştur Street, number 3-5, Romania.

*Corresponding author e-mail: anca.rotar@usamvcluj.ro

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ABSTRACT
Yoghurt is a fermented milk product obtained from fermentation of Lactobacillus bulgaricus and Streptococcus thermophilus strains. The effect of bee pollen, chia seeds and cranberries on the viability of probiotic bacteria in yogurts during storage (21 days) at refrigerated temperature (4°C) was evaluated. The yogurt supplementation with 1.4% chia seeds and 7.6% cranberries significantly improves the stability of the lactic acid bacteria, that contained the recommended levels of (10^6–10^7 cfu/g) probiotic bacteria at the end of 21-day shelf life.

Keywords: yogurt, lactic acid bacteria, chia seeds, bee pollen, cranberries.

INTRODUCTION
Yogurt has long been known as a product with many desirable effects for health. The excellent sensory properties and the health benefits of yogurt can be credited to the action of yogurt bacteria and their metabolites (Bakr and Salihin, 2013).

A product is called yogurt if live bacteria are present in the final product (Bakr and Salihin, 2013). The yoghurt, to be considered as a probiotic product, the Streptococcus thermophilus and L. delbrueckii sp. bulgaricus, as starter cultures, must be at a daily dose of 10^9 cfu/g and 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). Bee pollen and chia seeds are not only selected as a supplement for its technological and sensory properties, but also for its nutritional benefits. Indeed, a noteworthy trend in recent times is the addition of prebiotics for the improvement of the nutritional properties of yogurt and fermented dairy products (Zare et al., 2011).

AIMS
In this study, it was investigate the effect of yogurt supplementation with been pollen, chia seeds and cranberries on growth of lactic acid bacteria of the final product immediately and during storage for 21 days.

MATERIALS AND METHODS
Yoghurt is made by fermenting milk with 1.5% fat with the starter thermophilic culture (Streptococcus thermophilus and Lactobacillus delbrueckii subsp bulgaricus).

The types of yogurts were made at the end of the process with 4 addition levels (1. 1.4 % chia seeds and 5.6% cranberries; 2. 1.4 % chia seeds and 7.6% cranberries; 3. 1% pollen and 3 honey; 4. 1% pollen and 5 honey). The physico-chemical evaluation and viability of lactic acid bacteria of yogurt samples were assessed in 4 stages of the storage period, stage 1 - at the beginning of storage; stage 2 - 7 days of storage; stage 3 - 14 days of storage and stage 4 - 21 days. All samples were analysed in duplicate. The cell number of
Lactobacillus was determined on the MRS agar and the cell number of Streptococcus was determined on M17 agar medium after 48h, respectively 72h of incubation.

RESULTS AND DISCUSSION

During storage the average viable cell counts of L. bulgaricus decreased from 2.36x10^7 cfu/g on day 0 to 1.22x10^7 cfu/g on day 21, whereas, S. thermophilus decreased from 3.396x10^7 cfu/g on day 0 to 1.606x10^7 cfu/g on day 21 (Fig 1). Results showed that the yogurt supplementation with 1.4 % chia seeds and 7.6% cranberries significantly improves the stability of the lactic acid bacteria, due to the antioxidants compounds found in high quantity in supplements used.

Note: Y0- yogurt without supplement; YCC7-yogurt with 1,4 % chia seeds and 5,6% cranberries; YCC9-yogurt with 1,4 % chia seeds and 7,6% cranberries; YPH3-yogurt with 1% pollen and 3 honey; YPH5-yogurt with 1% pollen and 5 honey).

A decrease of viable cell counts was observed in the sample with honey can be explained by the presence of the large quantity of saccharides. Same results were observed by Rotar et al. (2014).

Regarding the pH value, the initial pH (4.71) of all yogurt types at day 1 was approximately the same, however, the plain yogurt and the yogurt with 1% pollen and 5% honey showed the lowest (4.13) and the highest (4.35) pH at the end of 21-day shelf life study. The results indicated that the addition the bee pollen and cranberries in yoghurts might improve the viability of lactic acid bacteria.

CONCLUSION

Overall, on the basis of the microbial and physico-chemical properties investigations, the results suggest that additions rich in polyphenolic compounds could be potentially considered as a source of ingredients for yogurt supplementation.

This research identified the qualities that need further development and demonstrated the importance of early-stage consumer acceptance research for directing new product development.

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REFERENCES