PRODUCTION OF FUNCTIONAL FERMENTED MILK PRODUCTS

By

NAGWA MAHMOUD AHMED ABD ELHAMEED
B.Sc. Agric. Sci. (Dairy Science), Fac. Agric., Cairo Univ., 2010

THESIS

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APPROVAL SHEET

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SUPERVISION SHEET

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Title of Thesis: Production of Functional Fermented Milk Products
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Department: Dairy Science **Approval: 12 / 11 / 2020**

ABSTRACT

In this study, the aim was to evaluate the viability of *Lactobacillus casei* 01 that was incorporated into ice cream using four different technological techniques: technique 1, ice cream mix was directly inoculated with freeze-dried *L. casei* 01 culture prior to aging and without fermentation; technique 2 or 3, skim milk (50% of total skim milk used in the preparation of ice cream mix) was fermented with *L. casei* 01 at 37 °C until a pH of 4.5 or at 30°C until a pH of 5.5 was reached; the coagulated milk was cooled to 7°C, and then added to the remaining ice cream mix prior to aging; and technique 4, two aged ice cream mixes were mixed together prior to freezing, one of them was without sugar and fermented by *L. casei* 01 at 30°C until a pH of 5.5 and the other contained sugar and did not contain *L. casei* 01.The effect of fortification with *Lactobacillus casei* 01 on the physical properties and sensory characteristics of the produced ice cream was studied.

The following results were obtained:

- The freeze-dried *Lactobacillus casei* 01 culture that was added directly to ice cream mixes without fermentation (technique 1) had no significant effect on the physical properties or sensory characteristics of ice cream samples.
- Although there was a significant decrease in the number of viable *Lactobacillus casei* cells throughout storage, but aging and freezing together had a greater impact on viability of *L. casei* cells in ice cream samples.
- Fermentation with *Lactobacillus casei* 01 at 30°C and pH 5.5 can be used to manufacture high quality probiotic ice cream but through the fourth technique to maintain the largest number of *L. casei* in ice cream samples ($>10^7$cfu.g^{-1}) and without probiotic flavor.
- All 4 technical ice cream samples were acceptable and gave a good total impression with no marked off-flavor.

Key words: *Lactobacillus casei* 01, ice cream, probiotics, freezing, storage, viability

DEDICATION

I dedicate my dissertation to my mother, my father, my brothers, my sisters, my beloved husband and my sons for their patience, support and encourage during this study.

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