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Development of an omega- 3 fatty acids fortified ice cream by using ground flax seeds and microencapsulated fish oil

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The present study was carried out to develop an omega-3 fatty acids fortified ice cream by using ground flax seeds and microencapsulated fish oil as the source of omega-3. Eighteen formulae were developed (omega-3 content 15, 25 and 35 mg with 0.2, 0.3 and 0.4% stabilizer / emulsifier respectively), using either ground flax seeds (Fabrique aux, Canada) or microencapsulated fish oil (BASF Global the chemical company) and milk fat, non-fat milk solids, sugar and stabilizer/emulsifier (Cremodan 4605) as main ingredients. The viscosity and flow rate characteristics in the aged ice cream mix in different formulae were evaluated and compared with those of the commercial dairy ice cream mix. Out of the eighteen different formulations, six formulations having similar viscosity (324 cp) and flow rate (20 ml/sec) values to those of the commercial ice cream were selected for further study.

Thereafter, the descriptive sensory analysis was carried out and the data were analyzed using Kruskal-Wallis analysis to determine the best formulation and best flavor profile to make omega-3 fortified ice cream from each source. The physiochemical (AOAC, 2005) and microbiological (SLS 516) characteristics of the formulations were evaluated. Further, samples were drawn from two treatments weekly for a period of six months to evaluate the changes occurring in peroxide value and microbiological count of aerobes, yeast / moulds and for *E. coli-coliforms*.

However, throughout the study products containing 0.4% of Cremodan with 25 mg of omega-3 as a source of micro encapsulated fish oil with mango flavor, and 0.3% Cremodan with 25 mg as a source of flax seeds with vanilla flavor were identified as being better.
The results revealed that the total solids, non-fat milk solids, fat, protein, ash contents of the microencapsulated fish oil incorporated ice cream sample were 40.54,10.9, 8.9, 3.89, and 0.96% respectively and in the flax seeds incorporated ice cream sample were 39.24, 10.96, 9.03, 4.08 and 0.96% respectively. The peroxide value and microbiological properties of both treatments remained within the standard limits even after six months of shelf life. The study concludes that the selected formulations have good physicochemical properties and give compatible overall acceptability compared to commercial dairy ice-cream.

Keywords: Omega – 3 fatty acids, flax seeds, microencapsulated fish oil

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