The physico-chemical and microbiological aspects in ice-cream of buffalo milk added for fiber food

Gerla C. B. CHINELATEa, Dorasilvia F. PONTESb, Roberto R. de A. BEZERRAc

aUFCG, Pombal, Brazil (gerla@ccta.ufcg.edu.br)
bUFC, Fortaleza, Brazil (dora@ufc.br)
cUFCG, Pombal, Brazil (robson-aveiro@hotmail.com)

INTRODUCTION

Functional foods are now among the great progress made by man in order to promote and provide health and quality of life. These foods, which naturally brings benefits to health have been developed recently by taking advantage of recent knowledge acquired by engineers, food technologists, chemists, nutritionists and health professionals. (CRAVEIRO e CRAVEIRO, 2003). [1]

Flaxseed is a plant food shop offering potential benefits for cardiovascular health by being an important source of α-linolenic acid (omega 3) and lignans, a class of phytoestrogens. Chitosan - a naturally occurring biopolymer, found in the shells of crustaceans and other natural sources, is composed of repeating units of D-glucosamine. It is considered a dietary fiber, since it has a chemical structure very similar to cellulose, is also not digested by digestive enzymes (MUZZARELI, 1996). [2]

Buffalo milk has higher concentrations of fat, protein, total solids and some minerals in relation to bovine milk. For this reason, great importance is the transformation of food into their products, since its peculiar composition offers high performance industry.

In this context, we developed this study in order to associate a functional ice cream formulation based on buffalo milk supplemented with flaxseed and chitosan, in order to obtain products with an alternative source of fiber, analyzing the physical and chemical interactions, chemical and microbiological.

MATERIALS & METHODS

The first formulation was developed without the addition of flaxseed meal and chitosan, then the others were added as an ingredient in Chitosan percentage set at 2%. This value was defined by preliminary testing and balanced with the addition of flaxseed meal in different proportions (0%, 5%, 10% and 15%), maintaining the standard 5% fat, 12% SNGL 15% sugar, 2% chitosan and 62% water, coded SQL-0 (ice cream with 2% chitosan and 0% flaxseed), SQL-5 (ice cream with 2% chitosan and 5% flaxseed), SQL-10 (ice cream with 2% chitosan and 10% flaxseed) and SQL-15 (ice cream with 2% chitosan and 15% flaxseed). For Physical, physicochemical and chemical properties: moisture, protein, ash, lipids, carbohydrates, pH, total acidity and iodine. For microbiological analysis was performed for Salmonella detection, enumeration of coagulase-positive Staphylococcus and fecal coliform (BRASIL, 2001). [3]
RESULTS AND DISCUSSION

The ice creams were analyzed and processed results are presented in the table below.

<table>
<thead>
<tr>
<th>Samples</th>
<th>Moisture</th>
<th>Proteins</th>
<th>Ashes</th>
<th>Carbohydrates</th>
<th>Lipids</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQL-0</td>
<td>70,17 ± 0,2\textsuperscript{a}</td>
<td>6,49 ± 0,40\textsuperscript{a}</td>
<td>0,97 ± 0,01\textsuperscript{a}</td>
<td>13,57 ± 1,21\textsuperscript{a}</td>
<td>4,80 ± 0,53\textsuperscript{a}</td>
</tr>
<tr>
<td>SQL-5</td>
<td>63,00 ± 0,24\textsuperscript{b}</td>
<td>6,55 ± 0,15\textsuperscript{a}</td>
<td>1,10 ± 0,02\textsuperscript{a}</td>
<td>13,82 ± 1,32\textsuperscript{a}</td>
<td>5,24 ± 0,54\textsuperscript{a}</td>
</tr>
<tr>
<td>SQL-10</td>
<td>60,29 ± 0,18\textsuperscript{c}</td>
<td>6,69 ± 0,34\textsuperscript{a}</td>
<td>1,21 ± 0,02\textsuperscript{a}</td>
<td>14,43 ± 1,20\textsuperscript{a}</td>
<td>5,40 ± 0,41\textsuperscript{a}</td>
</tr>
<tr>
<td>SQL-15</td>
<td>60,19 ± 0,22\textsuperscript{d}</td>
<td>7,00 ± 0,57\textsuperscript{a}</td>
<td>1,30 ± 0,01\textsuperscript{a}</td>
<td>12,78 ± 1,89\textsuperscript{a}</td>
<td>6,40 ± 0,68\textsuperscript{a}</td>
</tr>
</tbody>
</table>

The ice cream had moisture between 60.19 to 70.21%. This large variation is due to the considerable addition of flaxseed meal to the formulations of ices (5%, 10% and 15%), increasing the soluble solids content, resulting in a more consistent product. The protein content ranged from 6.49 to 7.00%, increasing with the addition of flaxseed oil, thus improving the nutritional characteristics of food. The ash content ranged from 0.97 to 1.30%, these proportions guaranteed by adding the highest percentage of flaxseed. The increase of ash content means a higher content of minerals in food, of great importance to their quality. The percentage of carbohydrate was determined ranging from 12.78 to 14.43%, remaining in the samples of four formulations developed a pattern of sugar content did not differ significantly at 5% of each other. The lipid content ranged from 4.80 to 6.40%. Due to the total replacement of hydrogenated vegetable fat by oil meal in the formulation SQL-15, we observed a significant increase in content of lipid fraction in the product. This fact justified by the presence of a higher percentage of oil meal in the formulation

CONCLUSION

The application of flaxseed meal and ice cream in the processing of chitosan in different proportions studied showed satisfactory results in relation to the physical-chemical, microbiological, and nutritional and technological fit into the concepts of functional foods.

REFERENCES