Effect of Inclusion of Cocoa Powder on Proximate Composition, Chemical, Mineral, Microbial And Sensory Evaluation Of Unripened Cheese Made from Soyabean Milk

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INTRODUCTION

Cheese, a concentrated dairy commodity, either of animal origin or plant origin, is produced by a combination of activities including acid or rennet coagulation or curdling milk, stirring and heating the curd, draining off the whey, collecting and pressing the curd. The cheese is ripened, cured, or aged to develop the flavour and texture.

Warankashi™ is consumed in its fresh unripened state, fried or used as a meat-analogue in stews and soups. ‘Warankashi’ is an excellent source of protein, fats and minerals such as calcium, iron and phosphorous, vitamins and essential amino acids, thus making it an important food in the diet of both old and young. When it is of plant origin, such as soy beans, it also has a very rich nutritional profile.

Cocoa, Theobroma cacao, has been widely used in varying applications. Chocolate has been consumed as confection, aphrodisiac, and folk medicine for many years before science proved its potential health benefits. It’s a rich source of dietary polyphenols.

Due to effect of processing, milk of plant origin lacks capacity to provide adequate mineral content and antioxidants need of the populace.

OBJECTIVES

The objective, therefore, is utilization of cocoa (cocoa powder) in cheese making, to improve presentation and nutritional composition of choco-soy cheese, an unripened cheese.

MATERIALS AND METHODS

Dried and clean soyabean, cocoa powder

Cleaned, soaked and softened soybeans was wet-milled and manually filtered. The emulsion obtained was pasteurized and stored at 30ºC prior utilization in cheese making.

Portions of soya milk and cocoa powder were blended (CoP-SaM) in ratio as follows: 0: 100, 2: 5: 95, 5: 5: 95 and 7: 5: 92.5.

Alum solution (20 ml of the 5% w/v) was added to each of the milk blends.

Soyabean milk with cocoa powder blend was transferred into a metal pot and heated over a slow burning fire till it starts boiling.

The milk was kept at the boiling point and the alum solution (coagulant) introduced until it coagulated and there was a visible separation of curds and whey.

The curds and whey were then poured into a clean muslin cloth and the whey was allowed to drain.

Formed curd was placed in a clean container and cut to desired shapes and fried in hot vegetable oil (light frying).

RESULTS

<p>| Table 1: Proximate composition of unripened choco-soy-cheese |</p>
<table>
<thead>
<tr>
<th>Sample</th>
<th>Moisture (%)</th>
<th>Protein (%)</th>
<th>Fat (%)</th>
<th>Fibre (%)</th>
<th>Ash (%)</th>
<th>CHO (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>18.00</td>
<td>16.76</td>
<td>16.15</td>
<td>0.00</td>
<td>4.34</td>
<td>44.75</td>
</tr>
<tr>
<td>B</td>
<td>26.48</td>
<td>21.48</td>
<td>17.37</td>
<td>0.00</td>
<td>5.10</td>
<td>29.57</td>
</tr>
<tr>
<td>C</td>
<td>25.69</td>
<td>23.87</td>
<td>17.28</td>
<td>0.00</td>
<td>5.39</td>
<td>27.77</td>
</tr>
<tr>
<td>D</td>
<td>23.13</td>
<td>26.90</td>
<td>17.44</td>
<td>0.00</td>
<td>5.47</td>
<td>27.04</td>
</tr>
</tbody>
</table>

Values are means of triplicate determination. *Values in the same column bearing different superscripts are significantly different (p<0.05).

Legend: A (0: 100), B (2: 5: 95), C (5: 5: 95), D (7: 5: 92.5).

Table 2: DPHH, FRSA and Vitamin content of unripened choco-soy-cheese

<table>
<thead>
<tr>
<th>Sample</th>
<th>DPHH (%)</th>
<th>FRSA (%)</th>
<th>Vit. C (mg/100 g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>51.59</td>
<td>20.78</td>
<td>11.69</td>
</tr>
<tr>
<td>B</td>
<td>64.21</td>
<td>31.74</td>
<td>21.43</td>
</tr>
<tr>
<td>C</td>
<td>66.54</td>
<td>35.33</td>
<td>18.22</td>
</tr>
<tr>
<td>D</td>
<td>68.14</td>
<td>37.14</td>
<td>16.02</td>
</tr>
</tbody>
</table>

Values are means of triplicate determination. *Values in the same column bearing different superscripts are significantly different (p<0.05).

Legend: A (0: 100), B (2: 5: 95), C (5: 5: 95), D (7: 5: 92.5).

Table 3: Calcium, Iron and Magnesium content of unripened choco-soy-cheese

<table>
<thead>
<tr>
<th>Sample</th>
<th>Calcium (mg/100 g)</th>
<th>Iron (mg/100 g)</th>
<th>Magnesium (mg/100 g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>56.23</td>
<td>10.13</td>
<td>35.10</td>
</tr>
<tr>
<td>B</td>
<td>80.06</td>
<td>20.92</td>
<td>46.93</td>
</tr>
<tr>
<td>C</td>
<td>81.03</td>
<td>22.18</td>
<td>48.92</td>
</tr>
<tr>
<td>D</td>
<td>83.01</td>
<td>24.01</td>
<td>46.90</td>
</tr>
</tbody>
</table>

Values are means of triplicate determination. *Values in the same column bearing different superscripts are significantly different (p<0.05).

DISCUSSION

Increase in moisture content (Table 1) was observed across all substitution levels.

Crude protein, crude fat, and ash content increased as cocoa powder inclusion level increased (Table 1). *Total carbohydrates decreased as cocoa powder inclusion increased.

The antioxidants level (Table 2) showed significant increase. Compared with the control, DPHH and FRSA content increased as inclusion of cocoa powder increased.

Vitamin C decreased as inclusion level increased except in control sample.

Calcium, Iron and Magnesium, as presented on Table 3, increased as cocoa powder inclusion levels increased.

Choco-soy cheese can be recommended for growing children and old folks as it is capable of supplying needed mineral requirement.

Choco-soy cheese appeared like a meat analogue. Colour of sample D (Table 4) as well as control was accepted.

In terms of toughness, no significant differences exist between all the samples.

CONCLUSION

Choco-soy cheese, a new product, was produced for the populace.

The nutritional value obtained by inclusion of cocoa in soya milk blends will improve the wellbeing of the people living in areas where food shortage exists.

This venture will impart positively, the income of cocoa farmers and everyone in the cocoa chain industry.

Cocoa can be utilized in making functional cheese for categories of people regulating their carbohydrate intake. This can be served as a snack food or component of a meal.

REFERENCES


