Preliminary study of the utilisation of coconut in yoghurt production

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Abstract

The possibility of using the coconut in yoghurt production was evaluated. Four types of yoghurt were made from the mixture of cow milk and coconut milk using the different percentage. The preliminary results show that the final product is delicious, has pleasant coconut flavour. The titratable acidity of yoghurt ranged from 75° T (type D) to 95° T (Type A). The consistency/viscosity of the product has gone up with increase of the percentage of coconut in the mixture. The coagulation time of yoghurt is about 5 hours. After the organoleptic appreciation, the preference was given to different types of yoghurt.

Introduction

Since ancient time, milk from goats, ewes, buffaloes and mare has been fermented by certain oriental people (Gall, 1981). Different cultured milk has been consumed for centuries in Eastern Europe, and in the countries of the near Middle and Far East (Ogilvy, 1976). In some countries, fermented milk foods are flavoured over fresh milk because of their hygienic safety, better flavour and texture, and possible therapeutic effects (Kosikowski, 1982).

Fermentation remains the form of transformation that is most commonly practiced in Africa. Fermented milk is often preferred to fresh milk because it has better storage stability and higher digestion (Sanogo, 1994).

Yoghurt is a fermented dairy product very popular in Cameroon. Generally the product is made from imported cow milk. Meanwhile, in the zones of high livestock practices (North-west and Adamawa provinces), yoghurt is made also from fresh cow milk.

Yoghurt can be presented in large variety. It exists as set or stirred (drinking) yoghurt, plain, partly skimmed or skimmed, sweetened and flavoured forms. Some yoghurt are flavoured with discernible fruits, honey or essences (Kosikowski, 1982). The fruits and flavouring essences can be used to create exciting new tastes and texture in yoghurt dessert (Hamilton, 1999). Yoghurt obtained by using coconut milk is a delicious and nutritional product (Spore, 1998).

Materials and Methods.

Cow Milk
Cow milk partly skimmed was used in yoghurt production. After leaving milk to stand for about 12 hours at low temperature (4-10° C), the cream can be skimmed off by using a spoon. This milk was divided into equal portions for the preparation of different mixtures.

Coconut milk
Coconut milk is obtained from the fruit as follows:
- Washing and cutting of the coconut
- Grinding of coconut
- Pressing and filtration

Starter culture
The starter culture was composed of Lactobacillus bulgaricus and Streptococcus thermophilus. The lyophilized culture was reactivated by the method described by Rostrossa (1980).

Procedure
Yoghurt was produced from the mixture of cow milk and coconut milk. The different mixtures were composed according to the following percentages presented below:
A. 80% of cow milk and 20% of coconut milk
B. 70% of cow milk and 30% of coconut milk
C. 60% of cow milk and 40% of coconut milk
D. 50% of cow milk and 50% of coconut milk

As control sample, yoghurt produced from 100% of cow milk (Type E) was presented. The yoghurt was manufactured as described by Bogdonova et al. (1982). The manufacturing steps are given in Figure 1.

Analysis
Milk samples were analysed for density, titratable acidity and butterfat, following methods described by Patritii et al. (1980).

Yoghurt samples stirred and analysed for viscosity using the viscometer. Yoghurt acidity was estimated by the titration procedure of Taunier (°T), described by Patritii et al. (1980). The coagulation time of yoghurt was determined.

Organoleptic Characteristics
Yoghurt colour, flavour, consistency and taste were determined by the consumers and the preference was given to one of
Table 1. Physicochemical properties of milk.

<table>
<thead>
<tr>
<th>Properties</th>
<th>Range</th>
<th>Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>1.027 - 1.033</td>
<td>1.030</td>
</tr>
<tr>
<td>Timetable acidity (°T)</td>
<td>16.0 - 18.0</td>
<td>17.0</td>
</tr>
<tr>
<td>Butter fat (%)</td>
<td>1.5 - 2.5</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Table 2. Characteristics and coagulation time of yoghurt.

<table>
<thead>
<tr>
<th>Types</th>
<th>Acidity, °T</th>
<th>Viscosity, s</th>
<th>Coagulation time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Means (Min - Max)</td>
<td>Means (Min - Max)</td>
<td>Means (Min - Max)</td>
</tr>
<tr>
<td>A</td>
<td>95.0 (90.0 - 95.6)</td>
<td>20 (17 - 23)</td>
<td>4h 40mm (4°c - 4°c)</td>
</tr>
<tr>
<td>B</td>
<td>80.0 (80.0 - 82.5)</td>
<td>26 (25 - 28)</td>
<td>5h 00mm (4°c - 4°c)</td>
</tr>
<tr>
<td>C</td>
<td>80.0 (80.0 - 80.5)</td>
<td>50 (45 - 55)</td>
<td>4h 50mm (4°c - 5°c)</td>
</tr>
<tr>
<td>D</td>
<td>75.0 (75.0 - 77.5)</td>
<td>*</td>
<td>5h 00mm (4°c - 535)</td>
</tr>
<tr>
<td>E</td>
<td>90.0 (90.0 - 92.5)</td>
<td>30 (30 - 35)</td>
<td>4h 30mm (4°c - 445)</td>
</tr>
</tbody>
</table>

*The very heavy consistency with some small grains did not allow to determine the very viscosity.

Table 3. Organoleptic characteristics of yoghurt.

<table>
<thead>
<tr>
<th>Types</th>
<th>Flavour</th>
<th>Colour</th>
<th>Consistency</th>
<th>Taste</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Fermented</td>
<td>White</td>
<td>Semi-fluid</td>
<td>Mild</td>
</tr>
<tr>
<td>B</td>
<td>Fermented</td>
<td>White</td>
<td>Semi-solid</td>
<td>Slight sweet</td>
</tr>
<tr>
<td>C</td>
<td>Coconut flavour</td>
<td>White</td>
<td>Solid</td>
<td>Sweeten</td>
</tr>
<tr>
<td>D</td>
<td>More pronounced coconut flavour</td>
<td>White</td>
<td>Lumpy</td>
<td>Sweet, pronounced taste of coconut</td>
</tr>
<tr>
<td>E</td>
<td>Fermented</td>
<td>White</td>
<td>Semi - solid</td>
<td>Slightly sour</td>
</tr>
</tbody>
</table>

These results show that the viscosity of the final product is in direct relation with increasing percentage of coconut milk in the milk. According to Bogdanova et al. (1982) the average optimum viscosity of the set yoghurt has to be about 50.

The coagulation time of yoghurt increased from 4h 40mm (type E) to 5h (type B and D). The time of fermentation of all the types of yoghurt is about 5h.

According to Fellow (1997) incubation time for yoghurt at 42 - 44 °C is approximately 5 hours. It has been reported that the duration of fermentation at 40 - 45°C takes 3 to 6 hours (Ebing et al. 1996) and 3 to 5 hours at 45 °C (Kosikowski, 1982).

The organoleptic descriptions of flavour ranged from fermented (types A and E) to more pronounced coconut flavour for type D. The consistency of the final product ranged from semi-fluid (yoghurt A) to lumpy (type D). The yoghurt type A had a mild taste and that of type D sweet with a typical accent of coconut (sweeter). Therefore, it can be reduced that increase of percentage of coconut milk in yoghurt results into a sweeter final product.

The strong coconut flavour and sweet taste of yoghurt D was appreciated by some consumers. However, from the flavour, texture and taste of the yoghurt, consumer’s preference favoured type C as the overall best, followed by type B.

Conclusion.

According to preliminary results, the acidity of yoghurt ranged from 75°T (type D) to 95°T (type A). The viscosity of yoghurt increased as the percentages of coconut milk increased in the mixture. The coagulation time for all types of yoghurt is about 5 hours. The final product is delicious and has a pleasant coconut flavour. The general preference of the consumers was given to types C and B, however, some of them liked yoghurt type D for its very sweet taste and the strong coconut flavour.

Our study indicates that it is possible to use coconut milk in yoghurt production; therefore, it is one of the interesting alternative options in the regions with high coconut production.

Acknowledgements.

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References


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