

PJN

ISSN 1680-5194

PAKISTAN JOURNAL OF
NUTRITION

ANSI*net*

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Banana Frozen Yoghurt from Camel Milk

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Abstract: This study is conducted in the dairy laboratory of the faculty of Agricultural Technology and Fish Sciences, Al-Neelain University. The objective of this study was to investigate the possibility of manufacture frozen yoghurt from camel milk with banana flavor and investigate the suitable levels of banana which were 10, 12 and 14%. pH value, fat%, total solids, solids not fat, specific gravity, overrun, sensory properties and acceptability were studied. The result of chemical analysis showed no significant differences between the three levels of banana on pH value, fat %, total solids, solids not fat at $p > 0.05$, while the differences were significant in specific gravity and overrun. The panel test showed that there was no significant differences between three levels of banana on sensory evaluations at $p > 0.05$. 14% obtained the best score.

Key words: Frozen, yoghurt, camel, milk, banana

INTRODUCTION

Camel milk is very important source of nutrient for human in several arid and semi arid zones (Schwartz, 1992), it is complex mixture of fat, protein, lactose, minerals and vitamins (Schwartz and Dioli, 1992) and miscellaneous constituents dispersed in water (Ibrahim, 1998). In the traditional pastoral communities, camel milk is consumed fresh or fermented (Farah, 1996). Frozen yoghurt is a yoghurt product, with or without flavor, it is freeze in ice cream freezers to obtain 50% overrun (Abu Lehia and Abu Tarboush, 1995). The food value of frozen yoghurt obviously depends upon the food value of ingredients involved, the ingredients which go into the mix contain the same constituents of ice cream and ordinary yoghurt, but in different amounts (Rea, 1983). The manufacture of butter, ghee, cheese and ice cream from camel milk is still not well developed and accepted (Farah, 1996). The objective of this study was to investigate the possibility of manufacture of frozen yoghurt from camel milk with banana flavor and investigate the suitable levels of banana which will be added to the product.

MATERIALS AND METHODS

Ingredients: Camel milk was obtained from west Omdurman camel farms. Skim milk powder, sugar, banana, gelatin, color and cream were obtained from the local market.

Preparing of banana: According to Arbuckle (1977) banana washed, peeled and sliced, then mixed with pasteurized sucrose (50%) of the required amount and held at 40° F for 24 h, it was mashed and added to plain mix prior to freezing.

Method of manufacture frozen yoghurt: The method used in preparing frozen yoghurt was mentioned by Nadia (2007).

- The required amount of milk solids not fat (140 g), gelatin (5 g) and half the amount of granulated sucrose (65 g) needed were dry blended, then mixed with milk.
- The mixture was pasteurized at 80°C for 30 min.
- Cooled to 40°C.
- Inoculate with active yoghurt culture starter at the rate of (1-3%).
- Incubate for 4 h at 40°C.
- The yoghurt cooled to 5°C again for 24 h. The other half of the amount of sucrose was mixed with 100 ml milk which was subtracted from the needed amount of milk and pasteurized at 80°C for 25 sec (Arbuckle, 1977) then cooled to 5°C.
- Sugar solution and banana were added to yoghurt mix, prior to freezing.
- The product was packaged in cups 45 ml in volume.
- Hardening held at -25°C for 24 h.

Chemical analysis: The pH of frozen yoghurt was determined by using pH meter (HANNA-instrument. model 209 Bench meter). Fat content, total solids and specific gravity was determined according to AOAC (1990).

Sensory evaluations: Frozen yoghurt was scored by a regular score panel from the staff members and students of the faculty of agricultural technology and fish sciences, Al-neelain University, scoring was carried out for appearance, texture, color, flavor and overall acceptability.

Table 1: Proximate chemical composition of frozen yoghurt from camel milk with different levels of banana

| Composition | 10% Banana | 12% Banana | 14% Banana | Sig. level |
|------------------|------------|------------|------------|------------|
| Fat | 1.83±0.30 | 1.66±0.25 | 1.80±0.30 | NS |
| pH | 4.26±0.11 | 4.06±0.78 | 4.26±0.15 | NS |
| Total solids | 38.03±1.00 | 37.5±1.2 | 37.9±0.7 | NS |
| Solids not fat | 36.2±1.27 | 35.8±1.4 | 36.1±0.7 | NS |
| Specific gravity | 0.940±0.35 | 0.955±0.18 | 0.977±0.23 | * |
| Overrun | 47.4±5.2 | 34±7.2 | 29.7±6.4 | * |

NS = Non Sig.; *Sig. (p<0.05)

Table 2: Effect of banana percent on properties of frozen yoghurt from camel milk

| Properties studied | 10% Banana | 12% Banana | 14% Banana | Control | Sig. level |
|---------------------------------|------------|------------|------------|-----------|------------|
| Appearance (9 point) | 7.46±0.61 | 7.06±0.80 | 7.93±0.23 | 7.33±0.83 | NS |
| Texture (9 point) | 8.13±0.23 | 7.40±1.11 | 7.73±0.30 | 7.60±0.20 | NS |
| Color (9 point) | 7.33±0 | 7.46±0.75 | 7.80±0.20 | 7.06±1.10 | NS |
| Flavor (9 point) | 7.53±0.80 | 6.80±1.92 | 7.86±0.41 | 7.26±1.00 | NS |
| Overall acceptability (9 point) | 7.40±0.86 | 7.43±0.90 | 7.73±0.25 | 7.23±0.81 | NS |

NS = Non Sig.; (p<0.05)

Statistical analysis: The collected data was subjected to statistical analysis program, SPSS. Analysis of Variance (ANOVA) was used to find out the significant difference between the three level of banana used in the manufacture the frozen yogurt from camel milk and to test out the sensory characteristics of the product.

RESULTS AND DISCUSSION

Table 1 presents the proximate chemical composition of frozen yoghurt from camel milk with levels of 10%, 12%, 14% banana. The averages fat % of the resultant frozen yoghurt were (1.83±0.30), (1.66±0.25), (1.80±0.30) respectively. pH values were (4.26±0.11), (4.06±0.78), (4.26±0.15) respectively, total solids were (38.03±1.00), (37.5±1.2), (37.9±0.7) respectively, solids not fat were (36.2±1.27), (35.8±1.4), (36.1±0.7) respectively, specific gravity were (0.940±0.35), (0.955±0.18), (0.977±0.23) respectively.

The results showed that there is no significant differences between 10%, 12%, 14% banana at p>0.05 in fat%, pH, total solids, solids not fat values, while the differences were significant in specific gravity and overrun %. The high value of specific gravity obtained by 14% banana with mean 0.977±0.27, high percent of overrun obtained by 10% banana with mean 47.4±5.2, this result might be due to banana composition which contain high starch percent, that decrease the ability of whipping air into the mix.

Regarding sensory evaluations of banana frozen yoghurt from camel milk the data are given in Table 2 declared that the best score of appearance (7.93±0.23), color, (7.80±0.20), flavor, (7.86±0.41) were obtained by 14% banana and the best score of texture (8.13±0.23) was obtained by 10% banana. In general observation, 14% banana frozen yoghurt was more acceptable and palatable among consumers.

Conclusion and recommendation: According to the results of this study, it could be concluded that it is possible to manufacture banana frozen yoghurt from

camel milk as follows 5% fat, 13% sugar, 0.5% gelatin, 14% SNF and 14% banana, it was more suitable and obtained the best score, more study recommended.

ACKNOWLEDGEMENT

Thanks are extended to the staff of the dairy laboratory in the faculty of Agricultural Technology and Fish Sciences, Al-Neelain University for the unlimited help to achievement of this work.

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