

The manufacture of white soft cheese (*Gibna Beida*) from recombined milk

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SUMMARY

The use of recombined milk in the manufacture of white soft cheese (*Gibna Beida*) was investigated. The fat content was adjusted to 1% and 2% by addition of fresh milk cream 48% butter fat to reconstitute skimmed milk (1 : 5 reconstitution ratio). The white soft cheese was made according to the traditional method, as follows: the prepared milk (18% T. S. and 19% T. S.) were pasteurized at 72 °c/ min. Then fast cooled to 50 °c and calcium chloride and emulsifier were added, followed by the addition of yoghurt culture. Then rennet was added at 42 °c (0.07 WI). The resultant cheese was stored in salted pasteurized whey (10% NaCl) for ripening. After two days, the cheeses were chemically analysed for water content, pH-value, acidity, total nitrogen, soluble nitrogen, total protein, fat content, ash content and also evaluated organoleptically (taste panel). The organoleptic evaluation showed that the addition of fresh cream improved the texture, flavour and appearance of cheese as compared with that made from fresh cow's milk.

INTRODUCTION

White soft cheese (*gibna beida*, *fita* cheese) is the most popular cheese in demand in the Sudan. The cheese is made in small factories spread throughout the western region and central Sudan particularly in the white Nile province where it is mainly made from fresh cow's milk. However production is shorter than to meet the demand for cheese due to inadequate milk production, and poor quality that can be collected. The use of reconstituted milk in cheese making offers a short term solution to the inadequate supply of milk. The use of low reconstitution value with the addition of fresh

milk cream in dairy products would increase the yield and eliminate the homogenization step necessary on using reconstituted milk and butter oil. The present work was initiated to compare white cheese made from fresh whole cow's milk with cheese made from reconstituted skim milk powder with cream added to maintain 1%, or 2% butter fat.

MATERIALS AND METHODS

Materials:

Fresh cow's milk was obtained from Kuku Dairy plant. The chemical composition of milk was: 87% water, 3.2% protein, 3.6% fat, 5.6% lactose and 0.6% ash.

Fresh cow's milk cream (48% B. F.) was purchased from Kuku Dairy plant. Yoghurt starter *Staphylococcus lactis* and *Lactobacillus bulgaricus* (1:1) and natural rennet powder, (Hansen's company Denmark) were used.

Cheese making:

Three types of milk were used in the manufacture of white soft cheese:

- 1- Fresh cow's milk (control - Q1),
- 2- Recombined milk with 1% fat. (Q2),
- 3- Recombined milk with 2% fat. (Q3).

The raw milk used in Q1 was heated to 72 °c for one minute then cooled to 42 °c, the temperature required for the addition of rennet (0.07 g/ 1), though the rennet treated milk was held at 42 °c till complete coagulation.

The powdered milk for Q2 and Q3 was reconstituted in warm water (1 :.5 reconstituted ratio) and the milk was divided into two portions, one was adjusted to 1% fat with addition of fresh milk cream, (Q2). The other part was adjusted to 2% fat in the same way, (Q3). Q2 and Q3 were heated to 72 °c for one minute then cooled to 42 °c. Yoghurt starter (0.5%) was added to each milk to accelerate cheese ripening and improve the quality of cheese, followed by the addition of calcium chloride (0.02%) and trisodium citrate 0.02%. Rennet powder (0.07 g/1) was dissolved in water then added at 42 °c.

The three coagulums formed were processed into white soft cheese according to Kosikowskii (1982). The cheeses were stored in salted whey (10% NaCl). Then each product was divided into two

portions, one used for organoleptic evaluation and the other kept for analysis for moisture content

The high yield of the recombined milk could be due to its high total solids. These results were in agreement with those reported for *Kareish* cheese by Abo Dawood et. al. (1977), and for pickled soft cheese by Moneib et. al. (1981) and Van Slyke (1949).

The results in table 2, showed that the cheese made from recombined milk had a higher moisture content than the cheese made from fresh cow's milk, confirming previous reports by Nagmouh et. al. (1978), Gilles and Lowrance (1981) and Moneib et. al. (1981). There was no significant difference in pH-values between the fresh cheese made from fresh cow's milk and that made from recombined milk. (Table 2).

Table 2: Chemical composition of white soft cheese.

	Q1	Q ²	Q3
Moisture content%	56.05	68.43	66.79
pH-value	4.10	4.20	4.00
Acidity%	0.40	0.90	1.20
Total nitrogen%	3.34	2.20	1.73
Soluble nitrogen%	0.33	0.50	0.41
Total protein% *	21.32	14.01	11.02
Fat%	2.63	0.87	1.10
Ash%	4.48	4.82	4.13

* Total nitrogen X 6.37.

The cheese made from recombined milk had higher and pronounced acidity. These results were in agreement with those reported by Nagmouh et. al. 1978) and Gills and Lowrance (1981). The nitrogen content of cheese made in recombined milk was lower than that made from fresh cow's milk, while the soluble nitrogen contents were higher in the cheese made from recombined milk as compared with that made from fresh cow's milk. These differences may be due to the pre-heat treatment of the milk powder that was

used for the manufacture of cheese, which lead to protein denaturation. Similar results were reported by Gilles and Lawrance (1981).

Analysis of fat content of cheese, showed values of 2.63%, 0.87% and 1.1% for cheese made from fresh cow's milk, recombined milk with 1% fat and recombined milk with 2% fat, respectively. (Table 2). These were agreeing with results reported by Nagmouh et. al. (1978). The ash contents, (table 2), were 4.48%, 4.82% and 4.1% for cheese made from fresh milk, recombined milk with 1% fat and recombined milk with 2% fat, respectively. These findings were in agreement with results reported by Kosikowski (1982). The organoleptic scoring, (table 3) indicated that all cheeses acquired agreeable taste, texture and flavour. However, cheeses from the recombined milk scored higher scores for flavour than those made from fresh cow's milk. This may be due to the high total solids contents. Cheeses from all treatments obtained nearly the same score for texture. Cheese made from fresh cow's milk had a higher score for appearance than that made from recombined milk.

Table 3: Organoleptic evaluation of white soft cheese.

Treatment	Q1	Q ²	Q ³
Flavour (15)	11.30	10.34	11.60
Texture (20)	15.23	14.68	13.85
Appearance (15)	11.83	10.39	10.02
Total (50)	38.36	35.41	35.47

N.B. Full scores are in parentheses

These findings indicated that the addition of fresh milk cream to reconstituted milk greatly improved the organoleptic properties of white soft cheese. Moreover, there was an increase in yield and a reduction in the production cost as can be seen in table 4.

Table 4: Materials required to process 100 kg milk and cost.

N.B.	Quantity			Cost L		
	Q1	Q2	Q3	Q1	Q2	Q3
Cost is based on the following unit, prices LS as in 1989:						
Raw milk, kg	9.35	25.0	30.0	53.25	108.75	150.0
Cream, kg	0.80	0.450	0.450	6.25	6.25	6.25
Yoghurt starter, kg	0.5	0.5	0.5	5.6	5.6	5.6
Rennet powder, g	7	7	7	-	9.0	9.0
Emulsifier, g		20	20		9.0	9.0
CaCl, g		20	20		2.5	2.5
NaCl, kg	2.5	2.5	2.5	19	35	41.5
Cheese yield, kg				949.4	586.6	642.1
Total cost, LS				50.0	16.8	15.5
Cost/ kg cheese, LS				100	33.5	31.0
Relative cost, LS						

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