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Production of Soft Cheese with Low Fat and Salt Contents

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ABSTRACT

Soft cheese with low fat and salt contents was produced. The cheese milk was standardized to contain 1% or 2% fat and salt was added to milk at a level of 2%. Delvocid was added to cheese milk at a level of 20 ppm. The milk was coagulated. The resultant cheese was pickled in its own whey and stored at refrigerator temperature for 30 days. The resultant cheese showed acceptable quality when fresh and during the storage period.

INTRODUCTION

High levels of sodium are contra-indicated in some instances of heart trouble. Many processes have been developed for producing low sodium milk or dairy products (Mettler, 1980). Also Zwaginga (1983) tried to produce low-salt cheese. On the other hand, Hurt (1972) has recommended that the dietary intake of saturated fatty acids should be reduced to lower the blood cholesterol level and that this can be accomplished by producing low-fat dairy products or developing a modified cheese containing lower levels of saturated fatty acids and cholesterol. Trials have been carried out on the manufacture of cheese with a low-fat content (Madsen *et al.*, 1966; Amer *et al.*, 1977; Ibrahim *et al.*, 1984; El-Neshawy *et al.*, 1986).

Domiati cheese is considered to be the most popular soft cheese with Egyptian consumers. It contains higher salt and fat levels. Therefore, those suffering from heart and kidney diseases cannot consume such cheese. The

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present study has been carried out as an attempt to produce soft cheese with low-fat and salt contents.

MATERIALS AND METHODS

Buffalo's milk was obtained from the herd of the faculty of Agriculture, Zagazig University. A culture of lactic ferment supplied by Hansen's Laboratory, Denmark, was obtained from Misr Milk and Food Company, Egypt. Delvocid was obtained from Milky Land Company, Egypt. A calf rennet was obtained from Misr Milk and Food Company and used for cheese making.

Soft cheese making

Low fat and low salt content soft cheese was made as follows.

Fresh buffalo's milk was standardized to 1% or 2% fat. Each milk was heated at 71°C for 15 s, cooled to 40°C, salted at a level of 2% salt, inoculated with 1% lactic ferment, renneted, treated with 20 ppm Delvocid and then incubated to complete coagulation. The coagulum of each milk was ladled and left to drain for 24 h. The resultant cheeses from each milk (containing 1 or 2% fat) were weighed, packed in plastic jars in their own whey and stored at refrigerator temperature for 30 days. Trials were conducted in triplicate.

Examination of soft cheese

Cheese samples were taken when fresh and then after 15 and 30 days of storage. The cheese was left to drain for nearly 2 h after its removal from the jars and weighed for yield determination.

Samples were then chemically analysed for moisture, fat, salt, total nitrogen, soluble nitrogen and acidity as described by Ling (1963). Also, total volatile fatty acids were determined according to Kosikowski (1978). Cheese samples were also organoleptically scored according to the scoring sheet proposed by El-Koussy *et al.* (1970) with maximum score points of 60 and 40 for flavour and body and texture, respectively.

RESULTS AND DISCUSSION

Cheese yield and chemical composition

Table 1 clearly indicates that cheese yield is proportional to the level of fat in the cheese milk. The fresh cheese yields were 18·84% and 22·40% when cheese was made from milk containing 1% and 2% fat, respectively.

TABLE 1
Yield and Chemical Composition of Domiati Cheese with Low Fat and Salt Contents

Treatments	*Storage period (days)*	*Yield (%)*	*Moisture (%)*	*Fat/DM (%)*	*Salt*		*Total protein*	*Soluble nitrogen (% of TN)*	*Acidity (%)*	*TVFA*
					Percentage	*DM*				
A	Fresh	18·84	61·00	14·89	1·65	4·23	24·2	6·35	0·40	12·0
	15	18·25	60·42	14·92	1·72	4·35	23·9	13·6	0·58	16·5
	30	18·10	58·89	14·97	1·80	4·49	32·7	15·3	0·72	21·7
B	Fresh	22·40	61·58	26·32	1·70	4·42	20·4	6·50	0·49	16·0
	15	21·50	61·32	26·81	1·76	4·59	20·1	15·4	0·65	21·4
	30	20·78	60·78	26·18	1·83	4·67	19·8	17·3	0·71	28·0

A = Cheese made from milk containing 1% fat.
B = Cheese made from milk containing 2% fat.
TVFA = ml 0·1 N NaOH/100 g cheese.

Davis (1965) reported that fat content of cheese milk controls its yield. Also, Hamdy & El-Koussy (1964) found that the yield of Domiati cheese was higher when the fat content of milk was increased. During pickling a gradual decrease in cheese yield was observed. But the decrease takes place at a slight rate due to the storage at refrigerator temperature. Table 1 also shows that moisture, acidity and salt contents of cheese made from milk containing either 1% or 2% fat were nearly similar. During storage a slight decrease in the moisture content of cheese was observed and this was associated with a very slight increase in both acidity and salt contents. It can be seen from Table 1 that the fat content of cheese is proportional to the fat content of the cheese milk. The fresh cheese had fat contents of 14·89% and 26·32% (DM) when cheese was made from milk containing 1% and 2% fat, respectively. The fat content of cheese increased very slightly during storage. However, the cheese made from milk containing 1% fat had a higher protein content compared with that made from milk containing 2% fat. The protein content of cheese decreased very slightly during storage. This could be due to the loss of some soluble nitrogen compounds in the pickling whey during storage. It is also evident from Table 1 that soluble nitrogen and total volatile fatty acids increased gradually during the pickling period. The cheese made from milk containing 1% fat had a lower content of total volatile fatty acids than that made from milk containing 2% fat. Abdel-Salam *et al.* (1984) reported that total volatile fatty acids of Karish cheese slightly increased during storage at refrigerator temperature.

Organoleptic properties

Table 2 shows the average scores for the organoleptic properties of the low-fat and low salt content Domiati cheese during storage. These data show that both body, texture and flavour of cheese were affected by fat content of the cheese milk. The cheese made from the lower fat content milk (1%) gained lower scores for body and texture, as well as flavour, than that made from milk of 2% fat. During the storage period body and texture of the cheese improved and also the flavour was enhanced. This could be due to the formation both of soluble nitrogen compounds and volatile fatty acids. On the other hand, the cheese did not show any defects during pickling in spite of its lower salt content. This could be due to the addition of Delvocid (pimaricin) to the cheese milk.

Gulli *et al.* (1978) reported that pimaricin retarded mould-growth for more than 30 days on Provolone cheese. Also, Salam & Khattab (1985) reported that addition of 20 ppm of Delvocid to Karish cheese milk retarded the spoilage of cheese for up to 23 days of storage and the cheese remained of acceptable quality. From the foregoing results it could be concluded that

TABLE 2
Organoleptic Properties of Domiati Cheese with Low Fat and Salt Contents

Treatments	*Storage period (days)*	*Body and texture (40)*	*Flavour (60)*	*Total (100)*
	Fresh	30	41	71
A	15	32	45	77
	30	34	48	82
	Fresh	33	45	78
B	15	35	48	83
	30	36	50	86

A = Cheese made from milk containing 1% fat.
B = Cheese made from milk containing 2% fat.

low-fat and low salt content Domiati cheese of acceptable quality could be produced from milk containing 1% fat, 2% salt and 20 ppm Delvocid.

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