STUDIES ON FERMENTED DAIRY FOODS

By

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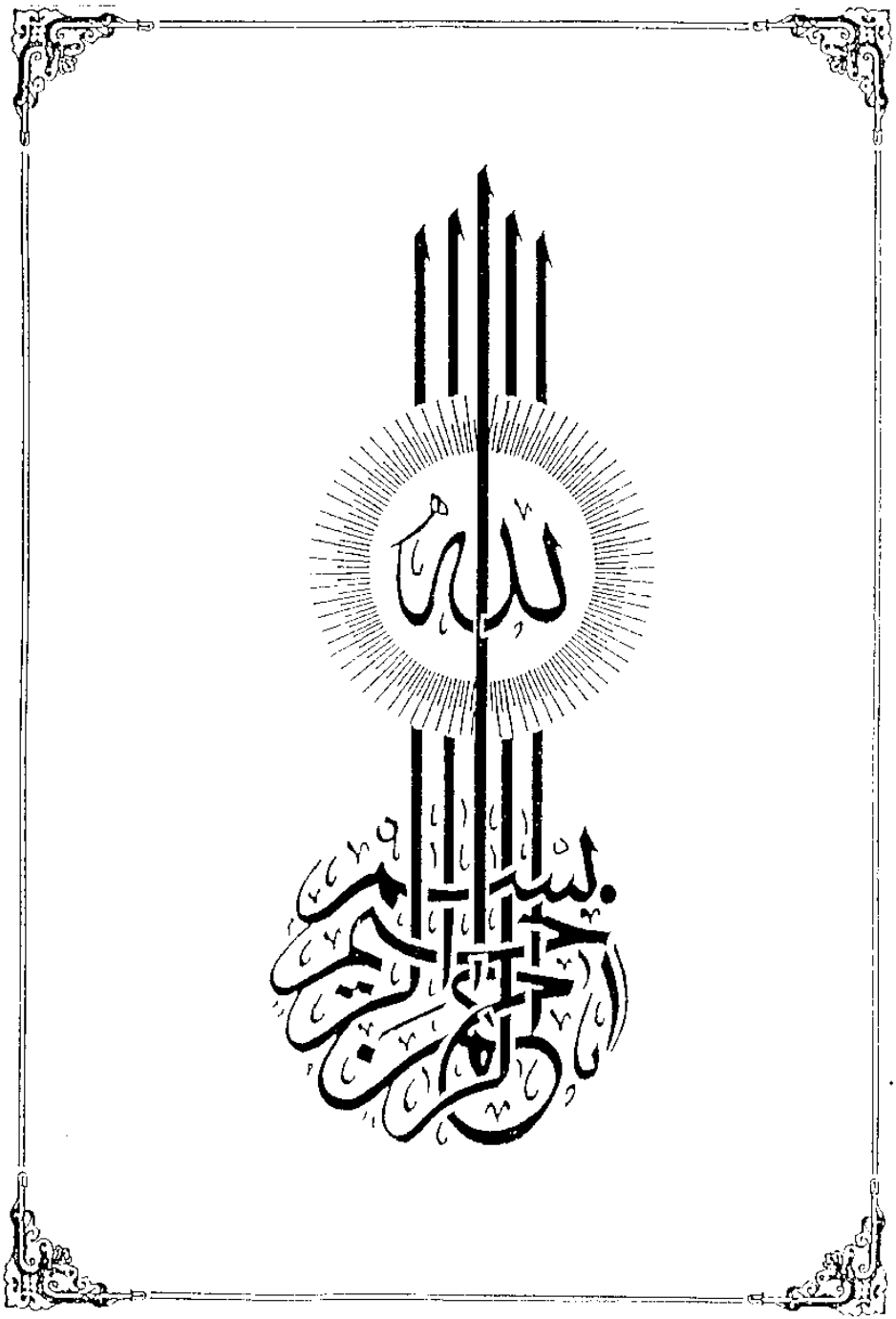

DEDICATION

To my:

FATHER,

MOTHER,

WIFE and REEM

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INTRODUCTION

quality of fermented products through studies of growth and interaction of many useful microorganisms. Moreover, attention has been focused on the need of dairy industry for new isolates of streptococci as yet unused for dairy fermentations. The expansion of the processing of pasteurized milk products in developing countries to conform unit and health regulations has created a bottleneck in starter selection. Environmental conditions in each country affect the properties of the predominant native microflora and this limits the use of some "universal" starter. A realistic solution for this problem might be to select starter cultures among the native flora that could be used successfully in the dairy industry.

This work was directed mainly to study the following points:

I. Chemical and microbiological properties of Laban Rayeb.

II. Biochemical activities of the predominant bacterial group isolated from Laban Rayeb.

III. The use of the predominant isolated as starter cultures in the manufacture of fermented milk.

IV. The use of the predominant isolated as starter cultures in the manufacture of concentrated fermented milk.

REVIEW OF LITERATURE

Carbohydrate (% by difference)	-	59.00
Fiber %	-	2.50
Calcium (mg/100 g)	-	55.00
Iron (mg/100 g)	-	3.80
Phosphorus (mg/100 g)	-	410.00
Niacin (mg/100 g)	2.20-5.68	3.35-3.69[a]
Riboflavin (mg/100 g)	0.147-0.545	0.262-0.286[a]

[a] Means varied depending on the method.

El-Sadek et al. (1965) analysed ten samples of laban El-Zeer, obtained from different parts of upper Egypt after varying periods of fermentation. They found that the pH values varied from 3.25 to 4.70, while the the corresponding titratable acidity ranged from 1.05 to 3.30%.

Fahmi et al. (1966) studied the chemical properties of Zabadi in U.A.R. They found that the titratable acidity ranged from 0.72% to 1.65% with an average 1.27%, and the pH varied from 3.50 to 5.30 with an average of pH 4.36.

Kosikowski (1966) studied the chemical composition of a plain commercial yoghurt sample. He found that it contained 1.65% fat, 12.9% total solids, 5.45% total protein, 5.15% carbohydrate and 0.75% ash.

Gorner et al. (1972) stated that acetaldehyde content of yoghurt increased during 2-4 h of incubation reaching 20-40 mg/kg in the ripe yoghurt. They concluded that to obtain good aroma, yoghurt should have an acidity of 38-40 SH°, 10-20mg acetaldehyde and 20-30 mg acetic acid/kg.

Kroger and Weaver (1973) determined the fat, protein, total solids and calorific value of 44 yoghurt samples. Their averages and ranges were 1.18% (0.89 - 2.04%) for fat, 4.29 (3.09 - 5.38%) for protein, 24.97% (15.10 - 30.73%) for total solids and 103.2 k.cal/100 g (62.3 - 127.0 k.cal/100 g).

Chemical analysis was carried out in Mish by Nassib and El-Gendy (1974). The results indicated that the pH of Mish varied from 5.2 to 7.1, the fat content from 2.2. to 8.0%, solids content from 17.6 to 47.5%, salt content from 0.3 to 13.8% and amino nitrogen content from 5.5 to 13.6 mg N/100 ml of sample.

Abou-Donia et al. (1975a) found the average values for

the chemical analysis of Egyptian market Zabady to be: pH 4.08, titratable acidity 1.17%, alcohol 0.092% and diacety 11 ug/100 g.

Alary et al. (1975) analysed 6 different commercial yoghurts. The mean results obtained were: lactose, 5.67, fat, 1.19, casein, 4.24, NaCl, 0.185, D.M. 11.29, lactic acid, 1.42, Ca, 0.156 and P, 0.114.

El-Erian et al. (1975) found that the chemical analysis of Mish varied from sample to sample, depending on the components used. The moisture content varied from 55.76 to 74.14%. Salt content of Mish samples ranged from 10.3 to 18.0%, while fat percentages were between 5.3. and 18.0%. About 55.9 to 84.1% of the total nitrogen of Mish was found as free amino nitrogen.

Mert (1976) found that the moisture content of 107 yoghurt samples ranged from 80.90 to 96.00% (av. 90.62%), SNF content ranged from 30 to 181 g/L (av. 90.85 g/L) and acidity from 23 to 96°SH (av. 82.18 °SH). In 100 samples the consistency was too fluid, and in 20 samples the flavour was bitter acid or acrid of 53 samples labelled as full fat, only 8 exceeded 30 g fat/L, 4 contained 20-30 g fat/L, 13 contained 10-20 g/L and 28 contained $<$ 10 g/L. Of 53 samples labelled as semi-fat, 31 and 5 respectively, contained $>$ 20; 10-20 and $<$ 10 g/L.

Abdel-Moneim (1978) reported that the titratable acidity and pH of Laban Rayeb samples were 1.12% and 5.08, respectively.

Hofi et al. (1978) studied the chemical composition of market Zabady. They found that it contained 1.91% fat, 12.32% total solids, 10.44 SNF, 0.46% total nitrogen and 0.045% non protein nitrogen. They also found that pH values varied from 3.7 to 4.6, while the corresponding titratable acidity ranged from 0.82 to 1.52%.

Kondratenko and Gosheva (1978) mentioned that the volatile substances responsible for aroma of Yoghurt appeared to be acetaldehyde, acetone, 2-butanol and ethanol and were present in very small quantities in pasteurized milk, and ethyl acetate and diacetyl that appeared after incubation. Acetaldehyde, diacetyl and ethyl acetate increased during culturing at 45°C then decreased during storage at 4°C, whereas ethanol increased after the 10th day of storage.

Tamime and Robinson (1978) stated that the most acceptable Labneh" had a total solids (T.S.) of 22-32% and an acidity of 1.6-1.7% lactic acid. The optimum starting material for the process was natural yoghurt of 16% T.S. The influence of starter cultures was also shown to be

Richmondo et al. (1979) examined 47 samples of yoghurts and found that, the mean composition for 28 low fat flavoured, 14 full fat flavoured, 3 low fat plain and 2 full fat plain yoghurts respectively, were 4.26, 4.51, 5.69 and 5.66% protein, 1.56, 4.01, 1.62, and 4.71% fat and 25.83, 26.39, 16.25 and 17.88% T.S. with pH of 4.07, 3.88, 4.22 and 4.26, and energy content 106, 121, 69 and 92 Kcal/100 g.

Gorner (1980) reported that lactic and acetic acids, acetaldehyde and other secondary metabolic products of bacteria (V.F.A.) were important for flavour production in yoghurt. The mine flavour and aroma component of yoghurt appeared to be acetaldehyde skimmilk yoghurt likewise, had a high content of VFA formed by lipolysis. The residual fat in the skimmilk was sufficient for the formation of typical yoghurt flavour.

Rosenthal et al. (1980) studied the characteristics of concentrated yoghurt (Labneh) covered with oil. Typical results were (% wet basis): T.S., 46.48, fat, 20, salt , 4.83, protein 17.67 NH_3, 0.014, acidity, 3.42, pH 3.59, free fatty acids 2.045 (ml. equiv./g); Chemical composition at 2 wk and 6 months storage were similar.

Maard (1980) studied the lactose content of yoghurt. He stated that milk contains 4.6% lactose and yoghurt contains