SEASONAL VARIATIONS OF THE CHEMICAL CONSTITUENTS OF SOME FLAVOUR COMPONENTS OF MILK IN U.A.R.

By

ABD EL-MEGEED MAHMOUD EMERA
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Name of Candidate: Abd El Mageed Mahmoud Emera.

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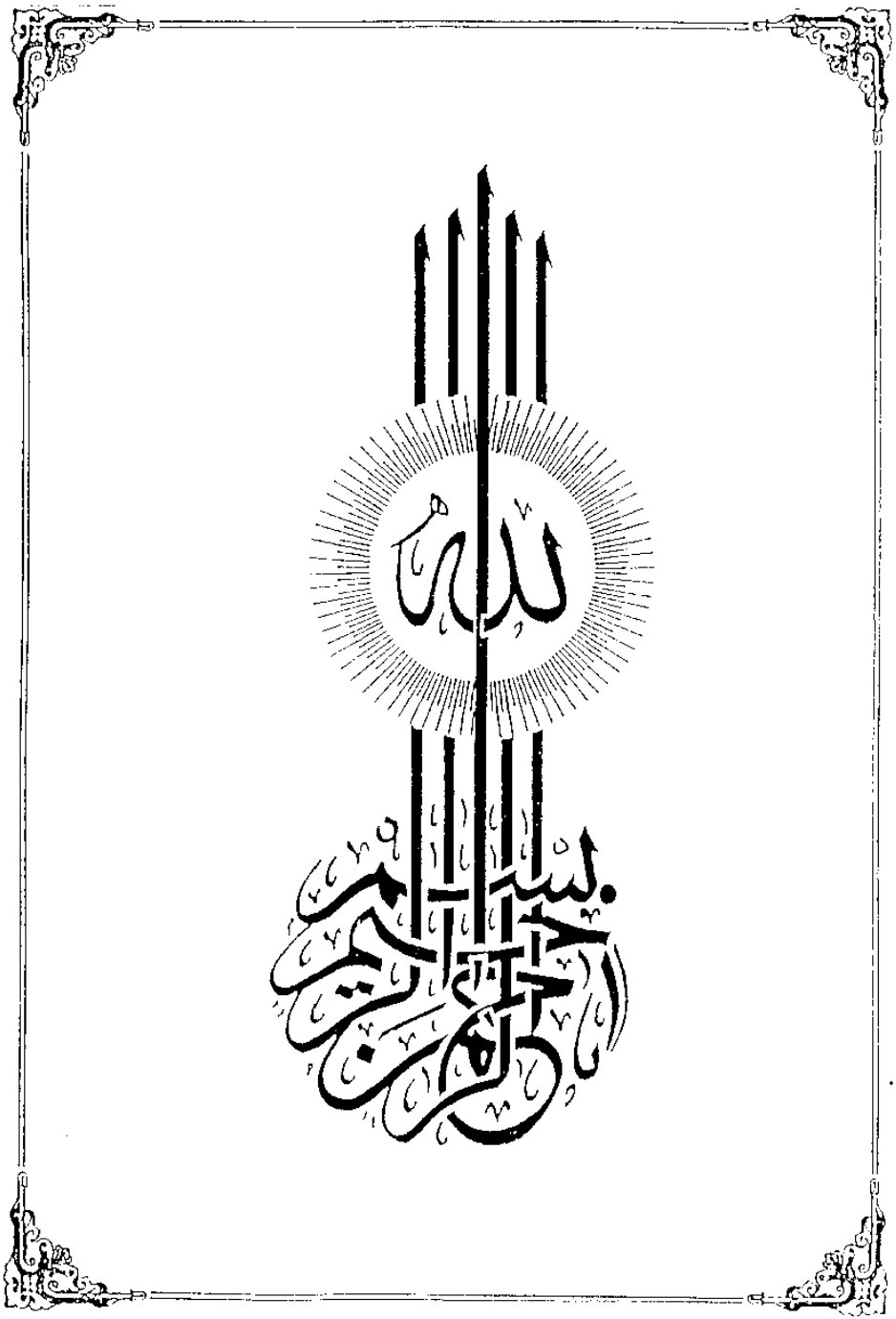

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C O N T E N T S

INTRODUCTION

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Owing to the wide variations in the concentration of certain milk constituents, it is difficult to assess the quantitative composition of milk. There is only one approach to the problem, and that is to analyse numbers of samples taken from different herds and over different periods of the year. When the mean value of each constituent is calculated from such results, an average composition is obtained.

By this means factors such as individuality, stage of lactation and season, which are known to influence the composition of milk, are damped down or practically eliminated. Samples were, therefore, taken throughout a period of twenty months. By the analysing such samples, the results in this study are considered more accurate for giving a reasonable idea of the probable variations which are normally met within local markets.

Determinations were made for the specific gravity, fat, solids-not-fat, lactose, total nitrogen, ash and chloride. These determinations were made on one hundred and

sixty samples of individual cow's milk, and one hundred and sixty individual samples of buffaloe's milk. Analysis of the importance of flavour components were also of equal interest. At the present time it cannot be said with certainty what compounds contribute to the characteristic flavour of normal milk, however, it seems probable that certain of the low molecular weight compounds present in certain of the low molecular weight compounds present in trace quantities such as acetone, acetaldehyde, butyric acid and certain other free fatty acids contribute to the flavour; With the above view, this study is carried out and results obtained in this text are recorded in the following three parts :

1. Seasonal variations of specific gravity, Fat, Solids-not-fat, lactose, total nitrogen, ash and chlorids of cow and buffalo milk.

2. Effect of stage of lactation on the compositions of cow and buffalo milk.

3. The importance of flavour component in the milk.

REVIEW OF LITERATURE

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(a) Composition of milk :

Milk is a balanced multicomponent dietary system with components having separate as well as partially overlapping functions. It provides nutrition for the young mammal, supports the growth of symbiotic intestinal flora and transmits passive immunity. The composition of milk varies among species and races of mammals, with the course of lactation, and to some extent with the composition of the diet.

There are marked qualitative differences among species in the protein, lipid and carbohydrate, other than lactose (Sloan et al., 1961, Jenness et al., 1964 and Gloss et al., 1967). Table I presents the quantitative rather than qualitative interspecific differences in the composition of milk in some species (Jenness and Sloan, 1970). The latter authors reported that these quantitative differences arise from differences in rate of biosynthesis and secretion of the several components including water Gaull et al, (1968).

Table I : The composition of milks of various species
(Jenness and Sloan, 1970)

	Total solids g.%	Fat g %	Whey protein g %	Lactose g.%	Ash g.%
Cow (Bastauras)	12.7	3.7	0.6	4.8	0.7
Water Buffalo (Bubalus, babalis)	17.7	7.4	0.6	4.8	0.8
Camel (Camelus dromedaries)	13.6	4.5	0.9	5.0	0.7
Sheep (Lavis aries)	19.3	7.4	0.9	4.8	1.0
Goat (Capra hircus.	13.2	4.5	0.4	4.1	0.8

Stage of lactation appears to influence all components. Fat and protein percentage high in colostrum drop to a low percentage around the second month and then rise at slightly different rates, increasing most rapidly at the end of lactation. In contrast, lactose is low in colostrum but rises to normal in the first week and remains steady until mid-lactation. Thereafter, it decreases slowly at first and then more rapidly at the end of lactation.

b) Changes in milk composition .

1. Density

The density of such a system as milk is a resultant of the densities of its components complicated by variations in the ratio of solid to liquid fat and in the degree of hydration of the proteins. Thus the density of a given specimen of milk is determined by its percentage composition, by its temperature, and by its previous history of temperature fluctuations and processing treatments.

Hutchinson (1940), made an equation which gave a correction factor that could be added to, or subtracted from any specific gravity obtained within the range 40 F° to 90 F°. Using this correction factor he found that the specific gravity of cow's milk ranged from 1.0225 to 1.0350. It is also shown that the differences in composition, would not be greater than 0.00036 at 60 F° to 90 F° .

Rutz, et al., (1955) studied the effects of homogenization on the sp. gr., and found that reduction in the size of the fat globules had no influence upon sp. gr. of milk.

Short (1956), studied the effects of pasteurization homogenization, and sterilization on the density of separated, natural, and enriched milk. He indicated that neither holding nor H.T.S.T. pasteurization appeared to have any effect on milk density. Homogenization plus pasteurization of separated, natural, and enriched milk showed increases of 2.2, 6.5, and 9.8 x 10^{-5} g. per ml. respectively over the corresponding control

which was pasteurized only. He also found that milks homogenized and sterilized at 95°C for 1 hr. showed a decrease in density of 9.4 -10.0 x 10^{-5} g. per ml. He said, however, that this decrease was not related to the milk fat content.

Whitnah, et al.,(1957) studied the effects of temperature changes between - 7°C and + 8°C on density of homogenized milk and found that when milk was super cooled to 6.35°C or - 6.75°C, a maximum density was obtained. They also found that maximum density of milk-water mixtures varied between 5.50°C and 4.0°C, according to the milk : water ratio in the mixture, and that for skimmed milk was about-2.75°C. Watson (1958), found that density was more closely correlated to S.N.F. than fat percent in milk.

Amble and Dodd (1960) showed that the average milk fat percent were the most variable character and sp. gr. was the least variable one.

Fricker (1961) showed that the average sp. gr. of milk were 1.0324 at 10°C and 1.0294 at 20°C.