

PJN

ISSN 1680-5194

PAKISTAN JOURNAL OF
NUTRITION

ANSI*net*

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Milk Adulteration by Adding Water and Starch at Khartoum State

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Abstract: This research investigates the Adulteration of marketable fresh milk adulterated with water and starch at Khartoum state . Also the research shows the incidence of the adulteration to the consumers in addition to the economical loss which may happen during the processing. Three hundreds samples from Khartoum, Omdurman and Bahri were collected. All samples were chemically examined and analyzed to observe their quality. Then EKO milk device was used to find whether there was starch added to the milk or not on the other hand. Lactometer was used for testing the density of the samples . Further more an oven under (105)^oC was used to detect the total solids of the samples. The lish meddall equation was used for that analysis. The research concluded that the adulteration at Khartoum state is due to addition of water(35.3%) rather than Starch. The research recommended to control the marketing of milk by regulation and rules which include the standards of the sold milk. Distribution, nominations of the producer and the distributors, good labs and Skilled technician in order to control the quality then to save consumer health and economy.

Key words: Adulteration, lacto meter, EKO milk, quality, standards

INTRODUCTION

Food and agricultural organization (FAO, 2006) reported that the fresh milk produced in the Sudan was 7.1 tones from local Breeds and most of the yield (95%) is produced by nomads and 5% in urban area while the producing cross bred cows about 500,000 head distributed in the towns and cities of the country and produce 95% milk yield produced in urban area of the total milk yield and this shows the potentiality of cross bred cows report, Khalid (2006).

The types of animals that Sudan are cows, sheep, goats and camels and they gave 74.3, 18-3, 6 and 1.5% of the total yield respectively.

The milk considered as a complete diet because it contains the major elements required for growth and production like Lactose, Fat, Protein, mineral and vitamins in balanced ratio rather than the other foods as mentioned by Fox (1992). Milk is necessary for children before and after weaning although humanization can be practiced where there is lack of fresh milk and the main components of milk are water, Ash, protein, at, lactose and whey protein and there are many factors but the type The specific gravity of cow milk varies from 1.028-1.034 under (15.5)^oC (Renner and Abd El Salam, 1991).

White the pH of the fresh milk is 6.6 and the boiling point is (100-17)^oC (Boume, 1982). The includes bacteria states like lactenine and other substances form the colon, also many milk diseases can transmitted through milk among them are brucellosis.

Tuberculosis *E. collie* salmonellas Q fever and Rift valley fever (Tarig, 2003). Any change in milk composition considered as adulteration especially its density or specific gravity.

The types of dairy animals that presented in Sudan are cows, sheep, goats and camels and they gave 74.2, 18-3, 6 and 1.5% of the total yield, respectively. The milk considered as a complete diet because it contains the major elements required for growth and production like lactose, Fat, protein, minerals and vitamins in balanced ratio rather than the other foods as mentioned by Fox (1992).

MATERIALS AND METHODS

Detection of milk components as follows:

- Total Solids, Fat and starch

The equipments used were Water Bath, Oven, Sensitive balance, Petri dishes, test tubes and Lactometer.

- 3 mls from any sample were weighed in test tube and put in water bath for 15 min then to be poured on dish with a given weight then the samples put in side the oven under (195^oC) for 3 h, then the samples weighed to find the total solid as follows:

$$\text{Total solids} = \frac{\text{The weight of the sample (after drying)}}{\text{The weight of the sample (before dring)}} \times 100$$

Determination of fat (%): Milk fat to be determined according to lishmaddell equation.

Detection of starch: Equipment used were Test tubes and Distilator.

Chemicals iodine solution: Method 2 mL from the samples (milk) were taken with pipette and put into test tube then two drops of the iodine solution were added to the sample.

RESULTS AND DISCUSSION

The results confirm what mentioned by Khalid (2006) that the majority (95%) of cows located in Khartoum state are cross bred cows. Fat percentage 0% observed in the result (Table 3) seem to be lesser than the

Table 1: Women milk compared with animal milk

Type	Water	Fat	Casein	Whey P	Lactose	Ash (%)
Woman	780.1	4.5	0.4	0.5	7.1	0.2
Buffalo	82.8	7.4	3.2	0.6	4.8	0.8
Cow	87.3	3.9	2.6	0.6	4.6	0.7
Ewe	82.0	7.2	3.9	0.7	4.8	0.9
Doe	86.7	4.5	2.6	0.6	4.3	0.8
She camel	86.5	4.5	207.0	0.9	5.0	0.8

Table 2: Chemical analysis of the milk samples collected from Jabel aulia locality (Cross bred cows)

Location	Fat	T,s (%)	Density	Added water	Added starch
Kalakla	5.1	8.7	1,0383	0.0	nil
Wohda	4.4	9.3	1,0300	0.0	nil
Dar Elsalam	2.6	7.7	1,0193	19	nil
Shigelab	1.2	7.9	1,0257	+	nil
Elfitaih	2.0	9.1	1,0269	+	nil
Elshegailut					nil
Eljabal	3.2	11.3	1,0299	-	nil
Eljabal	3.2	9.2	1,0213	+	nil
Eljabal	3.3	10.1	1,0243	-	nil
Eljabal	2.3	7.7	1,0199	+	nil
Eljabal	3.7	8.2	1,0249	+	nil

Table 3: Chemical analysis of the milk samples collected from Sharg elneel

Location	Fat	T,s (%)	Density	Added water	Added starch
Elhaj yosif	31.0	7.9	1,0246	6.18	null
Elhaj yosif	4.3	8.7	1,0283	0.00	null
Elhaj yosif	3.9	8.8	1,0293	1.60	null
Elhaj yosif	4.3	8.3	1,0269	1.80	null
Omduban	4.2	9.4	1,0318	0.00	null

previous results, (Table 2) and this means either water was added to the milk or partial removal of milk fat is secretly done and it is very clear in the rural area, notice Table 2 and 3.

The moisture content of the cows milk is about 87% and that means the total solid is about 13% and this is significantly different from what observed in the results. The two tables of the results show that there is adulteration of milk by addition of water mainly at the peripheral districts of Khartoum state. Water was used without any consideration to its health whether contaminated or not and this may lead to stomachs to the consumers also some seller used to sell their milk as cold milk by adding ice which may presser the milk for a long time, the average adulteration by water represents >95% of the total examined random samples.

The research concluded that the sellers adulterate water because its cheap rather than starch which may be expensive or difficult to be homogenized and obviously can be detected and discovered by the consumer.

The research recommended to organize all the steps of milk production of marketing especially the traditional sector in the urban and rural area.

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