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Social Characteristics of Camel Milk Consumers and the Analysis of the Camel Milk Consumption in East and Center Sudan

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ABSTRACT

This study was carried out during May, 2015 at states of Red Sea, Kasala, Gadarif, Gezira and Khartoum- in east and central of the Sudan. The study was based on well designed questionnaires to obtain information on camel milk consumption. A total of 224 questionnaires were filled during meeting with the consumers through field visits at sell points of the camel milk. Regarding to camel milk consumers, the age group of 25 - 40 years represent (51.5%) of camel milk consumers. Most of the surveyed consumers were male (96.4%), married (78.7%) and of the primary education (40.2%). Moreover, The number of household members in the targeted groups who ranges from 4 to 10 individuals were 50.8%. A high percent of the consumers (60.3%) confirmed that they had begun the consumption of camel milk since more than three years. The targeted group responded consume more than one type of milk, and in general, 74.5% of the target consumers consume and prefer cow's milk to other types of milk, followed by camel milk (10.3%) and goat milk (4.5%). Majority of respondent consumers (82.7%) stated that they preferred fresh camel milk, followed by (10.7%) preferred fresh and powder milk together, while, small proportion of them (6.6%) preferred the powder milk form. The average daily consumption of 48.3% of the surveyed families ranges between 0.5 to 1 liter. Most of the respondent consumers (90.2%) use camel milk for support treatment against diabetes, gastrointestinal and liver diseases. Most of the targeted group who utilized camel milk as a treatment (82.6%) affirmed and said that their conditions were improved after consumption of camel milk while the rest of

them (17.4%) did not affirmed any improvement in their health conditions. The investigated consumers indicated that there are many tests performed to check the quality of the milk. These include according to the importance. The tests of odor, appearance and taste came at top with 61.1%, 39.9% and 38.3%, respectively. Coagulation tests on boiling and water adulteration came in second, while the tests of consistency came last. Results showed that 25.1% of the targeted sample always conduct home tests on the milk and milk products, and that 41.8% of this sample do conduct these tests sometimes, while the remaining 33.1% never conduct these tests.

INTRODUCTION

In spite of the increasing production, the consumption of camel milk and meat/ habitant did not increase significantly: from 23 to 28 litres/hab/yr for milk and 1 to 1.2 kg/hab/yr for meat between 1961 and 2009. However, these values don't take in account the self consumption which could be important (especially for milk) in nomad population. Most camel milk production is consumed locally by families and their animals, and does not reach the urban markets because most of the camel herds are located in the arid and desert areas which are far from the commercial markets. Recently, a new camel milk product called Camelicious_ has been launched in the United Arab Emirates market (AME Info, 2006). This product is now available in different flavours and was developed by Central Veterinary Research Laboratory in Dubai. Nowadays, other dairy products (cheese and ice cream) and chocolates produced from camel milk are also available in the markets of Gulf countries due to the increasing demand in recent years. The objective of this study is to investigate on camel milk consumption and characterize the camel milk consumers considering the social aspects.

Material and Methods

Description of the Study Area Location

This study was conducted at states of Red Sea, Kasala, Gadarif, Gezira and Khartoum- in the Sudan. Butana plain is a semiarid clay region, which encompasses part of the present Kassala, Gedaref, Gezira, River Nile, Blue Nile, Sennar and Khartoum States. It lies between Latitude 13 40' and 17 50' North and Longitude 32 40' and 36 00' East. It is bound by the Main River Nile on its northwestern border, the Blue Nile on its southwestern edge, the Atbara River in the northeast and by the railway connecting Kassala and Sennar in the south (Ali and Majid, 2006).

Methodology:

Survey: This study was carried out during May, 2015. The study was based on well-designed questionnaires to obtain information on camel milk consumption using complete random design. A total of 224 questionnaires were filled during meeting with the consumers through field visits at sell points of the camel milk. Additional interviews and meetings with camel owners were held during field visits. Some of the information collected during interview probably supported by observations. Before initiating the survey, the

questionnaires were developed and pre-tested in the field. The filled questionnaires were reviewed in the field by the survey team before proceeding to data entry. The entered data were checked for errors and consistency before undertaking analysis.

Statistical analysis: To give sense out of the data collected different statistical tools were employed based on the available data obtained. The computer software Excel was used for data manage

(Table 1). Gender of camel milk consumers in the states of the study:

Sex	State					
	Red Sea	**Kassala**	**Gedarif**	**Gezira**	**Khartoum**	**Percent**
Male	100%	100%	100%	88%	93.9%	**96.4%**
Female	0%	0%	0%	12%	6.1%	**3.6%**
Total	100%	100%	100%	100%	100%	**100%**

Age:

Ages of surveyed camel milk consumers ranged from less than 25 to 56 years and above with an average of 40.5 ± 5 years. In Table (55) the age group of 25 - 40 years represent the majority of consumers of camel milk by (51.5%), followed by (41 - 55 years old) by28.3% , then came the age group above 56 years old at the rate of (11.2%) and the lowest rate (9%) was the younger age group.

(Table 2). The age groups of Camel milk consumers in the states of the study.

	Ages				
State	Less than 25 years	25-40	41-55	More than 56 years	Total
Red Sea	6.1%	40.8%	38.8%	14.3%	100%
Kasalla	18.5%	44.4%	25.9%	7.4%	100%
Gedarif	6.1%	61.2%	18.4%	14.3%	100%
Gezira	4%	34%	42 %	20%	100%
Khartoum	10.2%	73.5%	16.3%	0%	100%

Social Status:

Table (3) showed that the highest proportion of camel milk consumers were married (78.7%), unmarried were (19.7%) while, the other status were (1.6%).

(Table 3). The social status of Camel milk consumers in the study area:

Social Status	**Red Sea state**	**Kasalla state**	**Gedarif state**	**Gezira state**	**Khartoum State**	**Percent**
Married	77.6%	85.2%	81.6%	92 %	57.1%	**78.7%**
Single	20.4%	14.8%	14.3%	6%	42.9%	**19.7%**
Others	2%	0%	4.1%	2%	0%	**1.6%**
Total	100%	100%	100%	100%	100%	**100%**

Education:

Table (4) showed that the highest proportion of camel milk consumers in the targeted sample were a primary school education graduates (40.2%), followed by the secondary school graduates (24.8%) then by those who did not go to school (18.5%), followed by the university undergraduates (15.1%) and last university post graduates (0.4%).

(Table 4). The educational levels of Camel milk consumers in the states of the study.

Educational level	State					
	Red Sea	Kassala	Gedarif	Gezira	Khartoum	Total
Illiterate	8.2%	51.9%	18.4%	8%	6.1%	18.5%
Primary	26.5%	44.4%	42.9%	54%	32.7%	40.2%
Secondary	28.6%	3.7%	36.7%	24%	30.6%	24.8%
Under graduated	34.7%	0%	2%	8.0%	30.6%	15.1%
Post graduated	2%	0%	0%	6%	0%	0.4%
Total	100%	100%	100%	100%	100%	100%

Number of family members:

The number of household members in the targeted groups ranged from 4 to 10 individuals and comprised 50.8% of the sample size. Followed by families comprised of one individual to 3 individuals at the rate of 25%, while those who had no families were 15%. The size of families comprised of more than 10 individuals were 9.2% (Table 5).

(Table 5). Family size of the respondent owners in the states of the study:

Family size	State					
	Red Sea	**Kassala**	**Gedarif**	**Gezira**	**Khartoum**	**Total**
Without family	16.3%	3.7%	8.2%	6%	40.8%	**15%**
1 -3 persons	28.6%	14.8%	32.7%	16%	32.7%	**25%**
4 – 10 persons	51%	59.3%	53.1%	64%	26.5%	**50.8%**
Total	100%	100%	100%	100%	100%	**100%**

Camel milk consumption:

Daily consumption of camel milk per liters by respondents in the states of the study:

The interviewed stated that most of the families (48.3%) consumed between 0.50 - 1 liter per day, while, 32.7% of the respondent consumers reported that they consumed more than 1 liter / day and the lowest proportion of the interviewers consumed 0.25 liter per day (Table 6).

(Table 6). Daily consumption of camel milk in liters by respondents in the study area:

Quantity consumed	State					
	Red Sea	Kasalla	Gedarif	Gezira	Khartoum	Total
0.25 Liter	16.3%	3.7%	10.2%	14%	51%	19%
0.50 Liter	40.8%	7.4%	14.3%	44%	40%	29.3%
1 Liter	30.6%	18.5%	24.5%	22%	9%	19.0%
More than 1 Liter	12.3%	70.4%	51%	20%	0%	30.7
Total	100%	100%	100%	100%	100%	100%

Daily per capita consumption of camel milk (ml) in the study area:

A high average daily consumption of camel milk per capita in the surveyed States was 500 grams (36.1%), and 250 grams (20.1%) (Table 7).

(Table 7). Daily per capita consumption of camel milk (ml) in the study area:

Amount consumed/ml	State					
	Red Sea	**Kassala**	**Gedarif**	**Gezira**	**Khartoum**	**Total**
100	0%	0%	0%	0%	4.5%	**0.9%**
125	4.6%	0%	0%	0%	9%	**2.7%**
150	4.6%	0%	0%	12%	11.4%	**5.6%**
200	2.3%	0%	0%	0%	31.8%	**6.8%**
250	14.2%	15%	21.7%	20%	29.5%	**20.1%**
300	2.3%	4%	0%	26%	4.5%	**7.4%**
400	2.3%	15%	2.8%	0%	2.5%	**4.5%**
500	58.1%	30%	57.7%	28%	6.8%	**36.1%**
1000	11.6%	18%	15%	6%	0%	**10.1%**
2000	0%	18%	2.8%	8%	0%	**5.8%**
Total	100%	100%	100%	100%	100%	**100%**

Family consumption of camel milk (ml) in the study area: A high average daily family consumption of camel milk per in the surveyed States was 2000 grams (22.6%) in which Red sea and Gedarif states recorded high consumption rate comparatively with the other states (Table 8)

(Table 8). Daily family consumption of camel milk (ml) in the study area:

Amount Consumed/ml	State					
	Red Sea	**Kassala**	**Gedarif**	**Gezira**	**Khartoum**	**Total**
250	2.5%	0%	2%	2%	0%	**1.3%**
500	5%	3.7%	4%	2%	10%	**5%**
750	0%	3.7%	2%	2%	20%	**5.5%**
1000	25%	14.8%	5%	26%	26.7%	**19.5%**
1500	12.5%	0%	8.2%	16%	16.7%	**10.7%**
2000	37.5%	18.5%	25.4%	18%	13.3%	**22.6%**
3000	7.5%	18.5%	16.5%	12%	3.3%	**11.6%**
4000	5%	3.7%	2%	4%	3.3%	**3.6%**
5000	0%	7.4%	6.1%	6%	0%	**3.9%**
6000	2.5%	0%	10.2%	4%	0%	**3.3%**
7000	0%	0%	0%	0%	0%	**0%**
8000	0%	0%	0%	0%	0%	**0%**
9000	0%	0%	2%	0%	0%	**0.4%**
10000	2.5%	29.6%	16.2%	8%	6.7%	**12.6%**
Total	100%	100%	100%	100%	100%	**100%**

Seniority of camel milk consumption:

A high percent of the respondent owners (60.3%) confirmed that they had begun the consumption of camel milk since more than three years, and (17%) of them started in the consumption of camel milk since less than one years, while (16.2%) of them started the consumption of camel milk since less than two year, while a small proportion of the consumers (6.5%) had started the consumption of camel milk since less than 3 years (Table 9

(Table 9). Seniority of camel milk consumption:

Consumption Groups	State					
	Red Sea	Kassala	Gedarif	Gezira	Khartoum	Percent
Less than 1 years	10.2%	18.5%	0%	40%	16.3%	**17%**
Less than 2 years	0%	0%	4.1%	26%	51%	**16.2%**
Less than 3 years	14.3%	0%	4.1%	2%	12.2%	**6.5%**
More than 3 years	75.5%	81.5%	91.8%	32%	20.5%	**60.3%**
Total	100%	100%	100%	100%	100%	**100%**

Camel milk consumption form:

Majority of respondent consumers (82.7%) stated that they preferred fresh camel, followed by (10.7%) of the respondent who preferred fresh and dried milk together, while, small proportion of them (6.6%) preferred the dried milk (Table 10).

(Table 10). Camel milk consumption form:

Milk form	State					
	Red Sea	Kassala	Gedarif	Gezira	Khartoum	Percent
Fresh	87.7%	85.2%	79.6%	69%	91.8%	**82.7%**
Dried	12.3%	14.8%	0%	4%	2%	**6.6%**
Fresh and dried	0%	0%	20.4%	27%	6.2%	**10.7%**
Total	100%	100%	100%	100%	100%	**100%**

Addition of substances to camel milk:

Table (11) showed that most consumers of camel milk (76.4%) preferred to drink milk without mixing it with other substances and that 23.6% of them preferred to be mixed with other substances.

(Table 11). Addition of substances to camel milk:

Substances	State					
	Red Sea	Kassala	Gedarif	Gezira	Khartoum	Total
Yes	6.1%	22.2%	12.2%	4%	73.5%	**23.6%**
No	93.9%	77.8%	87.8%	96%	26.5%	**76.4%**
Total	100%	100%	100%	100%	100%	**100%**

Substances mixed with camel milk:

Table (12) indicates that 50.9% of the consumers preferred mixing camel milk with camel urine, 24%, tended to mix camel milk with water, while 20.5% of them tended to mix camel milk with honey, and 4.6% of them tended to mixing camel milk with other materials.

(Table 12). Substances mixes with camel milk:

Substances	State					
	Red Sea	Kassala	Gedarif	Gezira	Khartoum	Total
Honey	33.3%	0%	0%	0%	69.4%	**20.5%**
Camel urine	0%	60%	66.7%	100%	27.8%	**50.9%**
Water	66.7%	20%	33.3%	0%	0%	**24%**
Others	0%	20%	0%	0%	2.8%	**4.6%**
Total	100%	100%	100%	100%	100%	**100%**

Do you consume camel milk as a treatment for certain diseases?

(46.3%) of the respondent consumers stated that they used camel milk for support treatment against certain diseases, while, 53.7 of the respondent consumers stated that they do not used camel milk for support treatment against certain diseases (Table 13).

(Table 13). **Do you consume camel milk as a treatment for certain diseases?**

Consumption of milk As treatment	**State**					
	Red Sea	**Kassala**	**Gedarif**	**Gezira**	**Khartoum**	**Percent**
Yes	30.6%	37%	22.4%	70%	71.4%	**46.3%**
No	69.4%	63%	77.6%	30%	28.6%	**53.7%**
Total	100%	100%	100%	100%	100%	**100%**

Uses of camel milk for remedy purposes in the states of the study.

Most of the respondent consumers (90.2%) stated that they used camel milk for support treatment against diabetes, gastrointestinal and liver diseases (Table 14) .

(Table 14). Uses of camel milk for remedy purposes in the states of the study**.**

Diseases	**State**					
	Red Sea	Kasalla	Gedarif	Gezira	Khartoum	Total
Gastrointestinal & liver diseases	56.3%	50%	27.3%	45.7%	42.8%	44.4%
Hypertension	31.2%	40%	63.6%	48.6%	45.7%	45.8
Cancer	6.3%	10%	9.1%	5.7%	8.6%	8%
Total	6.2%	0%	0.0%	0.0%	2.9%	1.8%

Do you noted any improvement of recovery:

Most of the targeted group who utilized camel milk as a treatment (82.6%) affirmed and said that their conditions were improved after consumption of camel milk, while the rest of them (17.4%) did not affirmed any improvement in their health conditions (Table 15).

(Table 15). Do you noted any improvement ?

Improvement	**State**					
	Red Sea	**Kassala**	**Gedarif**	**Gezira**	**Khartoum**	**Percent**
Yes	97.9%	89.5%	82.3%	70%	73.5%	**82.64%**
No	2.1%	10.5%	17.7%	30%	26.5%	**17.36%**
Total	100%	100%	100%	100%	100%	**100%**

Type of milk do you usually consumed?

Table (16) showed that the targeted group responded to this question in that they consumed more than one type of milk, and in general, the proportion of 74.5% of the targeted consumers took cow's milk and preferred it to other types of milk, followed by proportion of 10.3% of the respondents consumed camel milk, while, 4.5% of the respondent consumed goat milk.

(Table 16). Type of milk usually consumed:

Type of milk consun	**State**					
	Red Sea	**Kassala**	**Gedarif**	**Gezira**	**Khartoum**	**Percent**
Cow	63.2%	51.9%	79.6%	82%	95.9%	**74.5%**

Goat	2.1%	0%	10.2%	8%	2%	**4.5%**
Camel	20.4%	14.8%	4.1%	10%	2.1%	**10.3%**
Others	14.3%	33.3%	6.1%	0%	0%	**10.7%**
Total	100%	100%	100%	100%	100%	**100%**

The milk products preferred by the respondent consumers:

What is the favorite milk product for each member of your family?

Table (17) showed that the targeted group of consumers mentioned that they consumed more than one type of milk and milk products at the same time. In general, 76.6% of the respondents preferred the consumption of fresh milk, while 30.8% of them preferred to boil the milk before consumption, and 29.4% preferred consumption of ready pasteurized milk. 50.8% of the consumer's preferred fermented milk prepared at home than processed yoghurt and Labanah while large proportion (75.9%) of the respondent consumers preferred the consumption of ghee.

(Table 17). Milk products preferred by the respondent consumers:

Products		**State**					
		Red Sea	**Kassala**	**Gedarif**	**Gezira**	**Khartoum**	**Total**
Fresh milk	Yes	69.4%	88.9%	46.9%	84%	93.9%	**76.6%**
	No	30.6%	11.1%	53.1%	16%	6.1%	23.4%
Pasteurized	Yes	95.9%	0%	18.4%	0%	32.7%	**29.4%**
	No	4.1%	100%	81.6%	100%	67.3%	70.6%
Boiled milk	Yes	48.9%	11.1%	57.1%	2%	34.7%	**30.8%**
	No	51.1%	88.9%	42.9%	98%	65.3%	69.2%
Yoghurt	Yes	30.6%	37%	85.7%	70%	30.6%	**50.8%**
	No	69.4%	63%	14.3%	30%	69.4%	49.2%
Processed	Yes	95.9%	0%	0%	0%	6.1%	**20.4%**
	No	4.1%	100%	100%	100%	93.9%	79.6%
Butter	Yes	95.9%	3.7%	10.2%	2%	10.2%	**24.4%**
	No	4.1%	96.3%	89.8%	98%	89.8%	75.6%
Cream	Yes	89.8%	0%	26.5%	4%	18.4%	**27.7%**
	No	10.2%	100%	73.5%	96%	81.6%	72.3%
Animal ghee	Yes	87.7%	40.7%	73.5%	28%	38.8%	**75.9%**
	No	12.3%	59.3%	26.5%	72%	61.2%	24.1%
White cheese	Yes	67.3%	3.7%	63.3%	38%	8.2%	**36.1%**
	No	32.7%	96.3%	36.7%	62%	91.8%	63.9%

Quality tests performed by the respondent consumers in the study area:

The investigated consumers replied that domestic aspects of the tests performed on the milk were many, which included more than one quality test at the same time. The tests of odor, appearance and taste came at top with 61.1%, 39.9% and 38.3%, respectively. Coagulation tests on boiling and water adulteration came in second, while the tests of consistency came last (Table 18).

(Table 18). Quality tests performed by the respondent consumers in the study area:

Quality tests		**State**					
		Red Sea	**Kassala**	**Gedarif**	**Gezira**	**Khartoum**	**Total**
Appearance	Yes	18.4%	37%	34.7%	40%	69.4%	**39.9%**
	No	81.6%	63%	65.3%	60%	30.6%	60.1%

Flavor	Yes	28.6%	37%	32.7%	36%	63.3%	**60.1%**
	No	71.4%	63%	67.3%	64%	36.7%	39.9%
Taste	Yes	18.4%	59.3%	34.7%	34%	44.9%	**38.3%**
	No	81.6%	40.7%	65.3%	66%	55.1%	61.7%
Texture	Yes	8.2%	0%	4.1%	0%	28.6%	**8.2%**
	No	91.8%	100%	95.9%	100%	71.4%	91.8%
Boiling curd	Yes	26.5%	7.4%	16.3%	58%	30.6%	**27.8**
	No	73.5%	92.6%	83.7%	42%	69.4%	72.2%
Added water	Yes	8.2%	14.8%	2%	16%	22.4%	**12.7%**
	No	91.8%	85.2%	98%	84%	77.6%	87.3%
Total		100%	100%	100%	100%	100%	

DISCUSSION:

Most of consumers were in the age of youth, which reflected the high awareness of this segment about the beneficial of the camel milk. Male consumed more camel milk than female which was attributed to the remoteness of the camel milk market sites from accommodation in the Sudanese states and being around livestock markets which were usually populated by male people. The consumption of camel milk is not linked to a particular level of education and practiced by all levels of communities. Results in (Table 5) indicated that the consumption of camel milk is practiced in all types of families, whether extended families or independent (nuclear). Results concerning the seniority of camel milk consumption in (Table 6) indicated that majority of consumers started camel milk consumption for a long time with the presence and introducing of new consumers for camel milk consumption culture. Table (16) showed that the target group consumed camel milk and preferred it to other milk types and this may be attributed, according to their belief, to that they were used in the treatment of certain diseases because camels depend on their diet on natural vegetation and a proportion of 10.7% of the target group consumed other types including sheep milk and preferred it to the other milk types, which may be attributed to the unavailability of other types of milk in their home areas, and the high cost of these types. Milk production system can be broadly categorized in to three, based on marketing situations, such as urban, per urban and rural milk production systems (Tsehay, 2002). The major source of milk production in Sudan is the cow. Small quantities of milk obtained from goat and camel is also used in some regions particularly in pastoralist areas (IPS, 2000). Cow milk dominates global milk production, but milk from other animals is important in certain regions, countries and local contexts. Camels is limited at the global level and slightly higher among the developing countries as a group(0.2 percent). Concerning the camel milk consumption form (Table 10). Raw milk is less expensive than the pasteurized form, which tends to be purchased by the more affluent consumer. Nicholson et al., (2003) highlighted that fresh ('raw') milk was generally preferred to the UHT and pasteurized milk in coastal Kenya. The preference for raw milk is generally more marked in the rural regions but is also common in urban areas (Smallholder Dairy Project, 2004). In spite of the increasing production, the consumption of camel milk and meat did

not increase significantly: from 23 to 28 litres/capita/year for milk and 1 to1.2 kg/capita/year for meat between 1961 and 2009. However, these values don't take in account the self-consumption which could be important (especially for milk) in nomad population. The consumption of milk and milk products varies geographically between cites and the level of urbanization. At the household level, milk consumption patterns are defined as the combination of the types, quantities and frequencies of dairy product consumed (Mullins *et al.,* 1994). Pastoral households used more milk per capita than non-pastoral ones, although camel milk consumption and production had been increasing, there are major disparities between rural and urban areas, as well as between regions. Typical' rural resident consumed 2.5 kg per / capita /year of milk in 1990, compared with 7.5 kg per capita / year for the urban counterpart. Intensive production operations are more common near large cities thus increasing availability in these urban areas. At the same time, there are regional variations in production and consumption, which maybe attributed partly to historical and cultural preferences (Shono, Suzuki and Kaiser, 2000). Dromedary camel milk consumption has been reported to be responsible for the low prevalence of diabetes in the Raica community in India (Agrawal et al., 2007a). Camel milk consumption provided effective management for patients with type 1 diabetes (Agrawalet al., 2003) as well as for rats (Sahani et al., 2005). These were related to various factors, including the presence of high concentration of insulin/insulin like substances in camel milk, such as halfcystine (Agrawal et al., 2003). The effect of small size immune globulins of camel milk on the B lymphocytcell (B cell)(Agrawal et al., 2007b).The lack of coagulation of camel milk in the human stomach (Agrawal et al., 2003) had contributed to the hypoglycaemic effect. In the last decades, several studies have shown that milk is an important nutritional and functional food source and could provide particular health benefits due to the presence of bioactive substances in milk. Fresh and fermented Dromedary camel milk have been acknowledged for a long time in different parts of the world to provide a potential treatment for a series of diseases such as dropsy, jaundice, tuberculosis, asthma, and leishmaniasis orkala-azar (Abdelgadir et al., 1998; Shalash, 1984). Consumption of processed dairy products was observed even less frequently among the rural low-income households, indicating that the majority of the populations do not consumed processed products (butter) to any substantial degree (Coppock, 1994; Lemma *et al.,* 2005). In spite of the increasing production, the consumption of camel milk and meat/ habitant did not increase significantly: from 23 to 28 litres/hab/yr for milk and 1 to 1.2 kg/hab/yr for meat between 1961 and 2009. However, these values don't took in account the self-consumption which could be important (especially for milk) in nomad population. The milk consumption is mainly achieved under fermented form as said above (Dirar 1993). The limited consumption of butter may be due to the higher price associated with it and the need for cash income to buy some necessities. Result reflected the wariness of consumers due to dangerous diseases emerging from un hygienic status of camel milk.

CONCLUSION:

The majority of the respondent camel owners consumed the camel milk in its raw state and small proportion of the owners processed the camel milk in to sour products. Most of the families consumed more than 0.50 liter per day which reflect the desire of the consumers to attain this important commodity. Most of urban consumers used the camel milk for curing of diabetes, gastrointestinal and liver diseases.

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