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QUALITY ASSESSMENT OF FOOD ANIMAL'S MEAT

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I-ABSTRACT

A total of 100 random samples of camel and sheep meat Boheira samples (50 of each) were collected from different slaughter houses at El-Behera and Alexandria provinces. The samples were examined organoleptically, chemically and microbiologically. The results revealed that, all samples were accepted organoleptically. Concerning chemical examination, it was found that, the mean values of pH in camel and sheep meat were 5.71± 0.02 and 5.76 ± 0.02 respectively, the mean values of T.V.N were 10.86 ± 0.78 and 14.36± 0.37 mg % respectively, also the mean values of T.B.A were 0.12± 0.01 and 0.16 ± 0.01 mg% respectively. Regarding microbiological examination, the result revealed that, the mean values of total aerobic bacterial count in camel and sheep meat were 9.31 x 10^5 ± 1.47 x 10^5 and 17.99 x 10^5 ± 2.07 x 10^5 cfu/g. respectively, the mean values of Enterobacteriaceae count were 12.51 x 10^5 ± 1.82 x 10^5 and 8.95 x 10^5 ± 1.13 x 10^5 cfu/g respectively, the mean values of Coliform were 1.4 x 10^5 ± 0.23 x 10^5 and 0.91 x 10^5 ± 0.11 x 10^5 cfu/g. respectively, the mean values of mould and yeast count were 1.5 x 10^5 ± 0.31 x 10^5 and 0.48 x 10^5 ± 0.05 x 10^5 cfu/g. respectively. The significance and public health hazard of the obtained results was discussed and the measures to obtain a good quality camels and sheep meat were recommended.

II-INTRODUCTION

The increase of human population and the great shortage of animal protein plus the crises of avian influenza and swine influenza which widely spread in Egypt have led the authorities to give much attention to compensate this shortage from other species such as camels and sheep.

The camel is a good source of meat in areas where the climate adversely affects other animal's production efficiency. Camel can provide a substantial amount of high quality meat. The demand for camel meat appears to be increasing due to health reasons, as they produce carcasses with less fat as well as having less cholesterol and relatively high polyunsaturated fatty acids than other meat animals (**Dawood and Al-Alkanhal, 1995).**

Sheep are considered important tools for the development of rural economy as estimated five million families are engaged in various activities related to rearing of sheep and utilizing their products (**Agnihotri, 1998).** Sheep are important meat producing animals worldwide whereas goats are more important meat animals in the tropics, (**Farid, 1991)**.

Fresh meat is a rich medium for microbial growth, which leads to spoilage if not stored properly. Storage at refrigerated temperature, by further modifying the surface environment which is detrimental to spoilage organisms, may prove as a better proposition for delaying the spoilage by psychrotrophes.

Determination of any or all members of the family enterobacteriaceae as indicator of food sanitary quality has received the attention of more and more food scientist. The occurrence of Enterobacteriaceae show bacteriological and toxigenic risk bacteria in meat and lead to public health hazard. **(Mira, 1989**)

The mould count is used as an index of the proper sanitation and high quality products. Mould can assist in the putrefactive processes and in other cases; they may impart a mouldy odor and taste to food stuffs. Also mould can grow over an extremely wide range of temperature therefore; one can find mould on particularly all foods at almost any temperature under which foods are held. Besides, mould can assist in the putrefactive processes and may produce toxic substances namely mycotoxins which are harmful to man and animals (**Frazier and Westhoff, 1983)**

Yeast normally play a small role in spoilage because they constitute only a small portion of the initial population , because they grow slowly in comparison with most bacteria and because their growth may be limited by metabolic substances produced by bacteria. Spoilage yeasts are those which can find their way into food being widely distributed in nature resulting in undesirable changes in physical appearance of food (**Walker, 1976).** So this work was aimed to assess the quality of camels and sheep meat.

III-MATERIAL AND METHODS

A total of one hundred random samples of camel and sheep meat (50 from each) were collected from different abattoirs at El-Boheira and Alexandria provinces. The camel's meat samples were taken from the hind quarter and sheep meat samples from fore quarter. The samples were packed in sterile plastic bags and transferred directly to the laboratory with a minimum of delay where they were examined.

1. **Sensory evaluation. According to (Wilson, 1985)**

2. **Chemical examination**

a. pH value: the pH were determining by using pH meter according to (**leson-carbonell et al, 2005).**

b. Total volatile Nitrogen (TVN): was estimated according to the method recommended by **(FAO, 1986).**

C-Thiobarbituric acid value (TBA): was estimated according to the method recommended by **(FAO, 1986).**

3. Microbiological evaluation:

Preparation of Samples (APHA, 1985).

Under complete aseptic conditions 25 g of the sample were removed by sterile scissors and forceps after surface sterilization by hot spatula. The weighted samples were transferred into homogenizer flask containing 225 ml sterile peptone water 0.1 %. The contents were homogenized at 14000 r.p.m for 2.5 minutes, thus to provide a dilution of 10^{-1}. The original homogenate was allowed to stand for 15 minutes at room temperature then mixed thoroughly by shaking.

1 ml of the original homogenate was transferred with sterile pipette to a separate tube containing 9 ml of sterile peptone water 0.1% to prepare a dilution1/100. From which tenth fold serial dilution were prepared up to 10^{-6}

Microbiological evaluation:-

1. Total mesophilic bacterial count according to: the method recommended by **(Swanson et al., 1992)**

2. Total Enterobacteriaceae count according to the method recommended by **(oxoid, 1996).**

3. Total Coliform count: according to the method recommended by **(ICMSF, 1982).**

4. Total mould and yeast count according to the method recommended by **(Bailey and Scott, 1978).**

IV-RESULTS

Table (1) : Statistical analytical results of chemical examination of the examined camel's and sheep meat. (n = 50)

Chemical parameters	Camel meat				Sheep meat				t-test
	Minimum	Maximum	Mean	S.E.M	Minimum	Maximum	Mean	S.E.M	
pH	5.54	6.08	5.71B	0.02	5.55	6.07	5.76A	0.02	2.03*
T.V.N (mg %)	3.17	24.71	10.86B	0.78	9.79	21.64	14.36A	0.37	4.04***
T.B.A (mg %)	0.03	0.27	0.12B	0.01	0.08	0.28	0.16A	0.01	4.07***

Means within the same row of different litters are significantly different at ($P < 0.01$).
* = Significant at ($P < 0.05$). *** = Significant at ($P < 0.001$).
S.E.M = Standard error of mean T.V.N = Total volatile Nitrogen
T.B.A = Thiobarbituric acid

Table (2): Statistical analytical results of microbial counts of examined camel and sheep meat (cfu/g).

Microbial counts	Camel meat				Sheep meat				t-test
	Minimum	Maximum	Mean	S.E.M	Minimum	Maximum	Mean	S.E.M	
Total mesophilic bacterial count	0.19×10^5	$10^2 \times 10^6$	9.31×10^5 B	1.47×10^5	0.60×10^5	9.1×10^6	1.80×10^6 A	2.07×10^5	3.38***
Total enterobacteriaceae count	0.10×10^5	11.10×10^5	12.51×10^5 A	1.82×10^5	0.20×10^5	5.1×10^6	8.95×10^5 B	1.13×10^5	1.58*
Total coliform count	0.02×10^5	12.70×10^5	1.40×10^5 A	0.23×10^5	0.01×10^5	6.10×10^5	0.91×10^5 B	0.11×10^5	1.88*
Total yeast and mould count	0.01×10^5	14.30×10^5	1.50×10^5 A	0.31×10^5	0.01×10^5	2.70×10^5	0.48×10^5 B	0.05×10^5	3.19***

Means within the same row of different litters are significantly different at ($P < 0.01$).
* = Significant at ($P < 0.05$). *** = Significant at ($P < 0.001$).
S.E.M = Standard error of mean

V- DISCUSSION

The quality attributes of any kind of meat include different parameters such as organoleptic examination, chemical parameters such as PH value, T.V.N and thiobarbituric acid and microbiological load.

The results of organoleptic examination showed that all camels and sheep meat samples were accepted. This may be due to the fact that all samples collected where it was fresh.

It is evident from Table (1) that, pH values of camel's and sheep meat were ranged from 5.54 to 6.08, with an average of 5.71 $\pm$ 0.02 and from 5.55 to 6.07 with an average of 5.76 $\pm$ 0.03 respectively. Also there is a significant difference between the mean values of pH in camel's and sheep meat at ($P < 0.05$). It is obvious from the above results that the pH value in both camel's and sheep meat lies within the normal ranges of fresh meat according to **EOS (1522, 2005).**

Table (1) also showed that, the total volatile nitrogen (mg%) in camel's and sheep meat were ranged from 3.17 to 24.71, with a mean value of 10.86 $\pm$ 0.78 and from 9.79 to 21.64, with a mean value of 14.36 $\pm$ 0.37 mg %, respectively, also there is a significant difference at ($P < 0.001$) between the mean values ot total volatile nitrogen mg% in camel and sheep meat. By comparing these results with the Egyptian standard EOS (1522, 2005) which stated that the T.V.N of fresh meat must not exceed 20 mg %. It was found that 12% and 2% of samples of camel and sheep meat exceed the permissible limit according to the quality attributes; TVN number could reflect impotant correlation between protein decomposition and meat quality. **Pearson, (1968)**

On the other hand, Table (1) show that, the Thiobarbituric acid values mg% in camel and sheep meat were ranged from 0.03 to 0.27, with an average of 0.12 $\pm$ 0.01 and 0.08 to 0.28, with an average of 0.16 $\pm$ 0.01 mg%, respectively. Also there is a significant difference between the mean values of thiobarbituric acid mg% in camel and sheep meat at ($P \leq 0.001$). The EOS (1522, 2005) stated that the thiobarbituric acid value must not exceed 0.9 mg%, so all the examined samples lies within the permissible limit. The TBA test has become the most widely used chemical method for assessing the extent of oxidative deterioration in muscles. **Tarladgis et al., (1960**)

Table (2) show that, the mean values of total mesophilic bacterial count cfu/g in camel and sheep meat were $9.3 \times 10^5 \pm 1.47 \times 10^5$ and $1.8 \times 10^6 \pm 2.07 \times 10^5$ with 0.19×10^5 as a minimum and 10.2×10^6 as a maximum and 0.6×10^5 as a minimum and 9.1×10^6 as a maximum, respectively. There is a significant difference between the mean values of total mesophilic bacterial counts in camel's and sheep meat $P \leq 0.05$.

The above results indicated that camel's and sheep meat are highly contaminated and this contamination may be attributed to unsanitary methods of production or exposure to condition favoring bacterial proliferation and contamination of meat from different sources as skin of the animal, pollution in abattoir atmosphere , visceral content in normal condition and water used for washing, **Longree, (1972).**

Table (2) showed that the total Enterobacteriaceae count in camel's and sheep meat were ranged from 0.10×10^5 to 11.10×10^5 , with an average of $12.51 \times 10^5 \pm 1.82 \times 10^5$ and from $0.20 \times 10^5 \pm 5.1 \times 10^6$, with an average of $8.95 \times 10^5 \pm 1.13 \times 10^5$ cfu/g. respectively, also there is a significant difference between the mean values of Enterobacteriaceae count cfu/g of camel and sheep $P \leq 0.05$.

From the above results, we observed that, the Enterobacteriaceae count seems to be high and this is attributed to the contamination from enteric sources and

can be used as an index of enteric contamination. **Mercuri and Cox, (1979).**

From other view, Table (2) showed that, the total Coliform count in camel's and sheep meat were ranged from 0.02×10^5 to 12.70×10^5 , with an average of $1.40 \times 10^5 \pm 0.23 \times 10^5$ and from 0.01×10^5 to 6.10×10^5 , with an average of $0.91 \times 10^5 \pm 0.11 \times 10^5$ cfu/g, respectively, also there is a significant difference between the mean values of Coliform count cfu/g of camel and sheep. $P \leq 0.05$. The above results reflect that camel and sheep meat were highly contaminated with Coliform, which suggested mostly faecal contamination and points to potentially sever hazard. **Eribo and Jay, (1985).**

Also table (2) show that, the total yeast and mould count in camel's and sheep meat were ranged from 0.01×10^5 to 14.30×10^5 , with an average of $1.5 \times 10^5 \pm 0.3 \times 10^5$, and from 0.01×10^5 to 2.7×10^5 with an average of $0.48 \times 10^5 \pm 0.05 \times 10^5$ cfu/g, respectively, also there is a significant difference between the mean values of yeast and mould count cfu/g of camel's and sheep. ($P < 0.001$).

The above results show that camel and sheep meat are highly contaminated with mould and yeast and this is may be due to ubiquitous distribution of mould spores and mycelia. Various moulds can contaminated meat in the absence of hygienic measures during production and storage of meat. **Pitt and Hocking, (1985)**

So, the present study concluded that, camel's and sheep meat were high contaminated with different kinds of microorganisms, so a high standard of hygiene must be applied in slaughter-houses and also, during slaughtering, evisceration and a quartering of the carcasses. and/or during transportation and retailing.

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