Vet.Med.J.,Giza. Vol.44, No.1.(1996): 49-53.

MAJOR CHEMICAL CONSTITUENTS OF BEEF, BUFFALO AND CAMEL'S MEAT

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SUMMARY

Random muscle smaples were taken from L. dorsii of beef, buffalo, veal calves and camels and analysed for chemical ocmposition and nutritive value.

Obtained results confirm that:

* The moisture percent decreases with age in all species and young she camel meat had the highest mean moisture content. But in ash and carbohydrate percentage, there are no significant differences between species.

* Fat percentage was increased in advanced age, and protein percentage decreased.

* The collagenous material was of higher percentage in camel meat than buffalo and beef meat.

* Old camels meat had a higher total net energy and low price than other kinds of meat.

INTRODUCTION

Cattle and buffaloes are the main sources of meat in Egypt. About 50,000 imported cattle, 400,000 steers, 100,000 buffaloes and 350,000 veals are slaughtered annually (Awad, 1981).

Camel meat could make a greater contribution to the growing need for meat in developing countries especially for the lower income group of population as it is inexpensive.

In Sub-Saharan Africa camels are mainly kept for milk, when they become older, they are generally slaughtered. Nasr et al (1965) studied the effect of age and sex on the components of camel meat. Dakroury et al. (1980) investigated the effect of storage at chilling temperature on the keeping quality of camel meat.

Regarding the chemical composition of camel meat, Elgasim et al. (1987) and Elgasim & Elhag (1990) concluded that the carcass characteristics of the Arabian camels are comparable to those of the other red meat animal species.

The aim of the current study is to shed light on the chemical composition of camel meat in comparison with other red meat (buffaloes and baladi cattle).

MATERIAL AND METHODS

Random samples (each 500g lean meat) derived from L. dorsii muscle (between 9th and 12th

Part of Ph.D. thesis presented to Cairo University; 1995.

thoracic vertebrae) were taken (24 hrs after slaughter) from beef, buffalo and camels carcasses subjected for sale in Cairo market.

All carcasses were passed abattoir inspection, proved fit for human consumption and graded according to their age by special stamps which are quadrilateral in young beef and buffaloe below 3 years and camels below 5 years and triangular in aged animals.

Each meat sample was finely minced in a precooled Moulinex homogenizer for 30 seconds just before being used for determining its:

- Moisture according to Pearson (1981 a)
- Crude fat according to Pearson (1981 b)
- Total protein according to Lees (1975)
- ash content according to AOAC (1984)
- Carbohydrate according to AOAC (1984)
- Collagenous material according to Goll et (1963)
- Nutritional value of meat according McDonald et al. (1978).

RESULTS

Table (1): Chemical composition of beef, buffaloe and camel meat (wet material)

Species	No. of samples	sex	age	mean value %				
				Ash	carbo-hydrate	Fat	Protein	Moisture
Beef	20	♂	<3y	0.010	0.200	15.440	21.470	62.880
Buffaloe	10	♂	<3y	0.010	0.150	9.100	20.570	70.170
Buffaloe	10	♂	veal	0.010	0.140	7.990	19.090	72.770
Camel	10	♂	<5y	0.012	0.140	5.740	18.380	75.730
Camel	10	♂	>5y	0.014	0.150	13.880	24.930	61.030
Camel	10	♀	<5y	0.011	0.140	3.950	18.530	77.370
Camel	10	♀	>5y	0.010	0.220	22.320	18.810	58.640

Table (2): Chemical composition of beef, buffaloe and camel meat (ethereal extracted dry matter)

Species	No. of samples	sex	age	mean value %				
				Ash	carbo-hydrate	Fat	Protein	collagen
Beef	20	♂	<3y	0.026	0.524	41.60	57.85	10.44
Buffaloe	10	♂	<3y	0.035	0.520	30.50	68.95	3.8
Buffaloe	10	♂	veal	0.030	0.510	29.36	70.10	0.9
Camel	10	♂	<5y	0.0560	0.560	23.65	75.74	9.43
Camel	10	♂	>5y	0.037	0.390	35.61	63.96	12.09
Camel	10	♀	<5y	0.048	0.610	17.47	81.87	10.88
Camel	10	♀	>5y	0.025	0.540	53.97	45.47	17.86

Table (3): Digestible crude protein and net energy value relative to starch equivalent of 100g consumable meat from beef, buffaloe and camel

Samples	Digestable crude protein %	Net energy value relative to starch (Starch equivalent)			
		Nitrogen free extracted	Collagen-ous sub.	Protein	Ether extract
Beef <3y	15.9	0.2	3.88	14.95	37.06
Male buffaloe <3y	15.08	0.15	1.13	14.18	21.84
Veal	13.73	0.14	0.25	12.91	19.18
Male camel <5y	13.08	0.14	2.64	12.3	13.78
Male camel >5y	19.05	0.15	6.96	17.91	33.31
She camel <5y	13.22	0.14	2.13	12.43	9.48
She camel >5y	13.48	0.22	5.00	12.67	53.57

Table (4): Net energy value of digestible nutrient 100g consumable meat from beef, buffalo and camel in KCAL/Kg

Samples	Net energy value of digestible nutrient (kcal /Kg)					Price pound L.E.
	Nitrogen free extracted	Collagen-ous sub.	Protein	Ether extract	Total	
Beef <3y	0.47	9.16	37.52	87.7	134.85	1.2
Male buffaloe <3y	0.35	2.67	35.59	51.69	90.3	1.2
Veal	0.33	0.59	32.4	45.38	78.7	1.6
Male camel <5y	0.33	6.23	30.87	32.6	70.03	0.8
Male camel >5y	0.35	16.43	44.96	78.84	140.58	0.8
She camel <5y	0.33	5.03	31.2	22.44	59.00	0.8
She camel >5y	0.52	11.8	31.81	126.78	170.91	0.8

DISCUSSION

The basic composition of meat varies between different types and cuts.

The chemical analysis of the fresh meat as well as their ethereal extracted dry matter were recorded in tables (1) and (2).

The mean moisture percentage of beef, buffalo and veal calves were 62.88, 70.17 and 72.77 respectively indicating the influence of age and maturity on moisture content. Decrease water content in muscle with advanced age was also noticed in camel meat. This finding coincides with Lawrie et al. (1964) observation.

In the current study the fat percentage of buffalo meat was higher than the levels mentioned by the FAO report (1977) as 4.9%. The highest fat percentage was recorded in old she camel. This is due to the fact that camels are usually left to older age and for the dietetic animal regimen supplied to the native livestock prepared for slaughtering with high percentage of carbohydrate and fat. So at that stage thay can give more meat for human consumption with more fat.

The residual carbohydrate after the complete rigors in the meat of the three species examined appeared with no significant difference in between as due to age or species in both the wet and dry matter. However, the ash percentage was low than that recorded by Marchello et al. (1970) and this could be attributed to the difference in techniques adopted.

The chemical composition of male and she camel meat of wet material and that from the ethereal extracted dry matter show that, young camel was of higher moisture content, low protein and less fat than all examined species.

Veal calves (male buffaloe calves 6 weeks old about 60Kg B.W.) show a very low collagen compared with their adult male buffalo. T percentage of beff resemble the data recroded Unruh et al. (1986). However, Dikeman et (1986) found that collagen and elastin of b muscles were not affected by sex, diet or slaugh age. Buffaloes appeared to have lower percenta while camel's meat was of a higher percentag Old she camels were of the highest level.

Tables (3 & 4) demonstrate the nutritional valu of these different meat. The lowest digesib protein was that of young male and she camel an that of the veal calves that are also with lowe total net energy as due to the fact of their relativ low energy coming from their ethereal extracts thus such meat could be described as mor nutritional. Meat from old she camels was wit the highest total net energy followed by the ol male camel, and this is due to their high etherea extract and digestible protein. Beef and buffalo differed in their net energy since the latter was with lower etheral extract, collagen material and nitrogen free extract. The lowest price was for the camel meat while the buffalo veal was its double and beef of 1.5 times that cost.

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