

## RELEVANCE OF DRIED MEAT PRODUCT ('KUNDI'), AN INTERMEDIATE MOISTURE MEAT, FOR FOOD SECURITY.

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### Abstract.

Millions of people worldwide especially in under and developing countries suffer from hunger and malnutrition, which contribute inversely to Food Security of such country. The main goal of food Security is for individual to be able to obtain adequate and quality food needed at all times, and to utilise the food to meet the body needs. 'Kundi' is an relish Intermediate Moisture Meat (dried meat) product, produced in the Northern part of Nigeria.

2 – 3 years old male *Camelus dromedarius* and White Fulani animals were used for this study, 2 kg of semimembraneous muscles from each animals were used, and trimmed of all external fat, connective tissues and bones. Meat samples were cut in sizeable pieces of weight ranges 70 – 90 grams of 6-8 cm and kept in the refrigerator for 24 hours. Fresh meat cuts were boiled for 20 minutes at 100 °C, seasoned and oven dried for 3 hours at 170 °C. This study assessed Proximate composition of fresh and dried meat ('Kundi') products and their sensory evaluation in a completely randomized design. Results showed that fresh camel meat had 74.55% and 21.96% significantly ( $P < 0.05$ ) higher in moisture and protein content than 72.69% and 18.96% of fresh beef, while fresh beef had higher ( $P < 0.05$ ) ether extract (6.34%) than fresh camel meat (2.39%). Laboratory Prepared Beef 'Kundi' (LPBK) had the highest ( $P < 0.05$ ) value in moisture content 35.09% followed by Laboratory Prepared Camel 'Kundi' LPCK with 30.21% while Commercial 'Kundi' (CK) had the least. Protein obtained was inversely proportionally to moisture content. Ether extract for LPCK and LPBK were statistically similar ( $P > 0.05$ ) and both were lower ( $P < 0.05$ ) than value obtained for CK. Also results obtained for sensory evaluation showed that the panelist rated seasoned Kundi to have the highest significant ( $P < 0.05$ ) value for tenderness, flavour, colour, juiciness, texture and acceptability with values 6.50, 5.30, 6.50, 6.53, 6.30 and 7.00 respectively. Study showed that dry meat products ('Kundi') is of high nutritional qualities, could be of a great relevance, to food security.

Key word: 'Kundi', Beef, Camel, Seasoned and Unseasoned Kundi.

**INTRODUCTION:** Millions of people worldwide suffer from hunger and malnutrition, a major factor contributing to this international problem is Food Insecurity, which is lack of sustainable physical or economic access to enough, safe, nutritious, and socially acceptable food. Food Security therefore exist when all people at all times have access to safe nutritious food, in order to maintain a healthy and active life (FAO,1996). For Food Security to exit at the national, regional and local levels, food must be available, accessible and properly utilized (World Bank, 2001). Food availability means ensuring sufficient food is available for household through their own production. Food accessibility means reducing poverty that is making food available, and having purchasing power, especially the low-income households (Sen, 1981). Food utilization means ensuring a good nutritional outcome. Meat makes a valuable contribution to diets in developing countries because of its nutritional importance, as a source of protein, having high biological value, an excellent source of many nutrients: especially protein, fat, Bvitamins, iron, zinc and vitamin A and essential and non-essential amino acid needed to build, maintain and repair body tissues. If meat is very vita to humans health, then, why shortage of meat? Alonge (1984), noticed that in Nigerian, shortage of meat is not due to, absolute scarcity of animals, spoilage through microbial infestation, insect damage,

fragmentation during handling, and transportation but it due to increase in deterioration and lack of meat preservation in Nigeria. In Nigeria meat and meat product are extremely perishable, due to the fact that preservation appliance are hard to come by and where they are available, erratic power supply in the country is a main problem.

Therefore, it is necessary to prevent spoilage of meat and preserved the little available meat.

Meat are processed into intermediate moisture meat (IMM) which are heterogeneous group of foods, resemble dry foods due to its resistant to bacterial spoilage, but is known to contain too much moisture to be considered as dried food. It has 30 - 40 % moisture content, Shelf life stable, reduced water activity and its good enough for eating without further hydration. 'Kundi' is an IMM that is highly palatable and could be eating with or without hydration.

It is therefore the aim of this study to assess the proximate composition of fresh and dried meat products (Kundi) and their Sensory evaluation for food security.

## **MATERIALS AND METHODS:**

Beef was purchased from slaughter house at the Animal Science and Fisheries Department, Osun State University. Semimembranous muscles from 2-3 years old male Camelus dromedarius and White Fulani were used for this study.

### **Meat Processing and Preparation of 'Kundi'**

Meat was trimmed of all external fats, blood vessels, nerves, excess epimysial connective tissues and deboned with a sharp knife and later washed with clean water. The chunks were held overnight for 24 hours at 4 °C and later cut into sizeable smaller portion within the range of 70 – 90 grams of 6 cm to 8 cm wide. Cut samples (2 kg) from both beef and camel muscles were separately boiled in water (5 times weight of meat samples). Meat samples were boiled in a pressure cooker for 20 minutes at 100 °C and stirred at intervals for uniform doneness. Liquid broth was drained off and meat samples were allowed to equilibrate to room temperature. Boiled samples were later dried in the oven for 3 hours at 170 °C.

### **Proximate Composition**

Protein, Moisture, Ether Extract and Ash content were determined according to A.O.A.C. (2000).

### **Sensory evaluation**

Panelists rated the samples on a nine point hedonic scale for tenderness, flavour, colour, juiciness, texture and overall acceptability.

### **Statistical Analysis**

All data obtained were subjected to analysis of variance (ANOVA), and significant means were separated using the Duncan's Multiple Range (DMR) test. The SAS computer package was used for all statistical analysis (SAS, 1999).

**RESULTS AND DISCUSSION:** In table 1, moisture content and protein content of fresh meat of camel meat had higher significant value ( $P < 0.05$ ) than that of Beef, while value obtained for Ether extract appears very low for camel meat compared to beef, this lower value obtained could be due to the type of feed, camel eat, they mainly take grasses and not concentrate, concentrate feed increase the level of fat in muscle.

**Table 1: Proximate Composition of fresh Beef and Camel meat, (g/100gDm)**

Parameters	Treatments		SEM
	Camel meat	Beef	
Moisture	74.55 <sup>a</sup>	72.69 <sup>b</sup>	0.64
Ash	1.10	1.30	0.04
Ether Extract	2.39 <sup>b</sup>	6.34 <sup>a</sup>	0.27
Protein	21.96 <sup>a</sup>	18.95 <sup>b</sup>	0.03

<sup>a b</sup> Means in the same row with different superscript are significantly (P<0.05) different.

**Table 2: Proximate Composition of IMM, of MK, LPCK, and LPBK (g/100G/Dm).**

Parameters	Treatments			SEM
	MK	LPCK	LPBK	
Moisture	23.49 <sup>c</sup>	30.21 <sup>b</sup>	35.09 <sup>a</sup>	0.42
Ash	4.82 <sup>a</sup>	1.86 <sup>c</sup>	2.40 <sup>b</sup>	0.21
E. Extract	5.43 <sup>a</sup>	4.86 <sup>b</sup>	4.41 <sup>c</sup>	0.65
Protein	66.79 <sup>a</sup>	63.07 <sup>b</sup>	58.10 <sup>c</sup>	0.25

<sup>a bc</sup> Means in the same row with different superscript are significantly (P<0.05) different.

MK – Market Kundi

LPCK- Laboratory Prepared Camel Kundi

LPBK- Laboratory Prepared Beef Kundi.

**Table 3: Sensory Evaluation of dried beef and Camel meat.**

Variables	Meat Samples		SEM
	Camel Meat	Beef	
Tenderness	6.23 <sup>a</sup>	6.50 <sup>a</sup>	0.23
Flavour	5.90 <sup>b</sup>	6.30 <sup>a</sup>	0.56
Colour	6.30 <sup>a</sup>	6.50 <sup>a</sup>	0.28
Juiciness	6.40 <sup>a</sup>	6.53 <sup>a</sup>	0.40
Texture	5.90 <sup>b</sup>	6.30 <sup>a</sup>	0.17
Acceptability	5.90 <sup>b</sup>	7.00 <sup>a</sup>	0.25

<sup>a bc</sup> Means in the same row with different superscript are significantly (P<0.05) different.

The highest value obtained for protein content in camel meat agreed with the findings of Kadcim *et al.*, (2006), who reported that Camel muscle is a good source of high protein in a hard climatic region, He also reported 20.5 – 22.7% for protein content of Camel meat. In table 2, ash, ether extract and protein content of MK had the highest (P<0.05) values of 4.82%, 5.43% and 66.70% than 1.86%, 4.86% and 63.07% for LPCK and 2.40%, 4.41% and 58.10% for LPBK respectively. Increased in nutrient values observed for the product may be due to aggregation of nutrient due to the effect of heat on meat muscles. Hedrick *et al.*, (1994), observed that denaturation of protein through the application of heat could lead to aggregation or clumping of protein molecules (coagulation), the presence of which indicates a loss in protein

solidity. He also noticed that in well cooked meat, an increased rigidity typically occur, which is referred to as protein hardening, this does not occurs below approximately 64°C . The values obtained, were observed to be greater than it fresh protein equivalent, of 21.96 % for camel and 18.95% for fresh beef. In table 2, it was noticed that the nutrient of both products increased relatively compared to it fresh counterparts. These findings agreed with the report of Egbunike and Okubanjo (1999) that Intermediate Moisture Meat (IMM) are low in moisture content and contain three to four times the raw protein equivalent; hence they are less bulky. In table 3, Panelists rated beef 'Kundi' higher ( $P < 0.05$ ) for flavour, texture and acceptability than camel 'Kundi', while meat tenderness, colour and juiciness had no significant value ( $P > 0.05$ ) for both products. It therefore indicated that beef 'Kundi' products were highly preferred by the panelists than camel 'Kundi', the lower value obtained in camel 'Kundi' for overall acceptability could highly be due to strong odour or flavor and texture of camel meat, due to it high percentage of connective tissue in the muscle (Kurtu (2004). He also observed that Camel meat appears to be unacceptable tough which could be due to the fact that traditionally meat are primarily used for trasportation, rather than for meat production. Leupoid (1968), also discribed bmeat of Camel as palatable but appear coarser than beef. However, since Camel is usually slaughtered at the end of their productive life, their meat is usually tough.

**CONCLUSION:** Study showed that dry meat products ('Kundi') is of high nutritional qualities, could be of a great relevance, to Food Security.

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