PROXIMATE AND SENSORY EVALUATION OF MEAT FROM BEEF AND CAMEL SOURCES

[1]Olanihun, A. O., [2]Kalla, D. J. U and [2]Mancha, Y. P
1Forstry Research Institute of Nigeria, Federal College of Forestry, Jos
2 Department of Animal Production, Abubakar Tafawa Balewa University, Bauchi
Correspondence authors email: adeolaolanihun1@gmail.com; 08035317340

ABSTRACT
The study was conducted in Jos, Plateau State to determine the sensory evaluation of meat from beef and camel sources. The meat samples were purchased from Jos abattoir and yankanda market, all within Jos metropolis of Plateau state. The manual tenderization hammer was use to strike each piece for between 5 to 7 strikes till desired tenderness was achieved. Each piece was immersed in a sauce which was earlier prepared and placed in a greased flat pan over moderate heat. The meat samples were uniformly cook to obtain even cooking pattern. The process was repeated for the camel meat. Each one was packed separately in aluminum foil papers. The meat was served to a sensory panel which comprised of staff and students of the Animal Production Program of the Abubakar Tafawa Balewa University, Bauchi. The meat samples were served to the panelists at intervals between which they were allowed to eat and drink some water to remove taste of a previously served sample. Sensory Evaluation forms were given to each participant to fill. The proximate composition of the meat samples were also analyzed. The result showed that, the average values for all the attributes Palatability, Tenderness, Juiciness, Color, Aroma, Acceptability and Flavour for different Beef and camel varies from 4.66±0.28 to 7.51±0.15. The result also revealed that all the meat varieties were high in palatability except for Beef ham (4.66). on the Juciness, same pattern was also observed (Beef ham: 5.03). The result of the proximate composition showed that, Beef steak recoeded the highest value (28.12%) of DM while Camel ham had the lowest (19.84%). On CP, the highest value was observed in Camel ham (27.06%) while Camel suya recorded the lowest (19.82%). Similar pattern were observed for EF and Ash contents. There were significant diffferences observed between meat varities across all the proximate parameters assessed. It was therefore concluded that, camel meat is a rich source of various macro and micronutrients making it nutritionally as good as any conventional meat sources.it was recommended that, camel meat can be used as best substitute for beef as patty, steak, suya and ham
Key words: meat, sensory, evaluation, camel, beef

INTRODUCTION
Meat is the most valuable livestock product and, for many people, it serves as the first-choice source of protein. It is either consumed as a component of kitchen-style food preparations or as processed meat products (Williams, 2017). Meat is a valuable nutritious food that if not processed will spoil within a few days (Fellow, 2008). It is an ideal medium for many organisms as it provides a suitable environment for proliferation of meat spoilage microorganisms especially bacteria and common food-borne pathogens. Meat products or processed meats are the result of the need to preserve meat in ancient times because not all the meat available could be eaten at once. Some could be processed and preserved for later consumption. Therefore, meat processing is necessary so as to preserve meat and make it available over a long period. Meat processing, also known as further processing of meat, is the manufacture of meat products from muscle meat, animal fat and certain non-meat additives. Additives are used to enhance flavour and appearance of products.

Meat is defined as the whole of the carcass of cattle, sheep, goat, camel, buffalo, deer, hare, poultry or rabbit (Williams, 2017). The Camel meat has been processed into burgers, patties, sausages and shawarma to add value. Camels are one of the most fundamental resources of the national economy and food security of many countries in the world (Ibrahim, 2015). Owing to the increasing human population and the declining productivity of arabal agricultural land in Africa, there is an urgent need to develop marginal lands, such as arid land zones, and optimize their utilitization through appropriate livestock production systems of which camel production is the most suitable (Al-Zidan *et al*., 2020). There are about 24.2 million camels in the world, with 80% of them in Africa and the

highest population in Somalia (7 million) and Sudan (4.5 million) which represent about 18% of the world camel population. The number of camels is expected to be more than 5.4 million in the 2025 according to the annual growth rate of (5.14%) (Ibrahim, 2015). Camel meat production is increasing rapidly.This indicated that the demand for camel meat is increasing which encourage further processing of this commodity into different meat products to satisfy the consumer preference (Mohammed, 2020). The demand for camel meat appears to be increasing due to health reasons, as their meat is low in fat as well as has less cholesterol and relatively high polyunsaturated fatty acids than other meat animals. One of the major reasons today for the importance of camel meat is the health- promoting attributes of the grass-fed livestock (Kalla *et al*., 2005).

MATERIALS AND METHODS

The meat products were purchased from the Jos abattoir and the yankanda market all within the Jos metropolis of Plateau state and conveyed to a private meat processing outfit within the town. The meat samples were partitioned into portions of 2.5kg each and set aside for both beef and camel. Each piece was immersed in sauce which was earlier prepared and placed in a greased flat pan over moderate heat. The meat samples were uniformly cooked to obtain even cooking pattern. The process was repeated for the camel meat. Each one was packed separately in aluminum foil papers. The meat was served to a sensory panel which comprised of staff and students of the Animal Production Program of the Abubakar Tafawa Balewa University, Bauchi.. The order of presentation was varied and the panel members did not know anything about experimental protocol or sample codification. The meat samples were served to the panelists at intervals between which they were allowed to eat and drink some water to remove taste of a previously served sample. Sensory Evaluation forms were given to each participant to fill. The data was computed into excel spread sheet for analysis. Data for demorgraphic characteristics were anaylized using descriptive statistics, Likert scale rule was used for the sensory evaluation data, proximate chemical analysis in the experiment was analysed using T-test. SPSS program version 23.0

RESULTS AND DISCUSSION

Table 1: Sensory evaluation of Beef and Camel meat

Palatability	Juiciess	Tenderness	Colour	Aroma	Acceptability	Flavour
6.84±0.23	5.84±0.23	6.27±0.24	6.34±0.28	5.57±6.28	6.18±0.28	6.10±0.28
6.76±0.23	6.26±0.22	6.55±0.25	6.16±0.27	6.03±0.27	6.87±0.24	6.33±0.26
7.51±0.15	6.86 ± 0.22	6.61±0.21	7.37±0.15	6.97±0.20	6.63±0.26	7.19±0.18
7.39±0.17	6.54±0.19	6.48±0.21	6.62±0.19	7.46±0.22	7.33±0.22	7.36±0.18
7.19±0.20	6.36±0.23	6.68±0.28	6.63±0.21	6.94±0.22	6.98±0.23	6.48±0.24
6.82±0.28	6.55±0.22	6.21±0.21	6.44±0.29	5.63±0.22	6.58±0.25	6.92±0.25
4.66±0.28	5.03±0.26	5.06±0.30	4.93±0.29	4.72±0.29	4.90±0.31	0.49±0.30
5.72±0.26	5.54±0.21	5.13±98.21	6.13±1.05	5.12±0.28	5.61±0.28	5.43±0.26

Table 3: Likert 9 scale sensory perception of panelist on Beef and Camel meat

Palatability	Juiciess	Tenderness	Colour	Aroma	Acceptability	Flavour
6.84	5.84	6.27	6.34	5.57	6.18	6.10
6.76	6.26	6.55	6.16	6.03	6.87	6.33
7.51	6.86	6.61	7.37	6.97	6.63	7.19
7.39	6.54	6.48	6.62	7.46	7.33	7.36
7.19	6.36	6.68	6.63	6.94	6.98	6.48
6.82	6.55	6.21	6.44	5.63	6.58	6.92
4.66	5.03	5.06	4.93	4.72	4.90	0.49
5.72	5.54	5.13	6.13	5.12	5.61	5.43

Mean score < 4.44 (0 – 4.43) = Negative perception, Mean score between 4.44 – 5.44 = Uncertain/Neutral, Mean score > 5.44 (5.45 – 9.0) = positive perception.

Table 4: Proximate composition of Beef and Camel meat varities tested for.

	%DM (Mean)	%CP (Mean)	%EF (Mean)	%Ash (Mean)
Beef patty	21.33[a]	19.90[a]	4.27[a]	1.44[a]
Camel patty	23.12[a]	21.62[a]	3.60[ab]	2.03[b]
Beef Steak	28.12[a]	21.13[a]	7.19[b]	2.20[b]
Camel Steak	21.40[ab]	20.31[ab]	2.97b[c]	1.45[b]
Beef Suya	20.14[bc]	26.42[bc]	6.74[c]	1.80[bc]
Camel Suya	20.70[c]	19.82[c]	6.83[c]	1.54[c]
Beef Ham	21.63[d]	20.04[d]	5.82[cd]	1.27[cd]
Camel Ham	19.84[d]	27.06[d]	7.80[d]	2.81[d]
Sign	S	S	S	S

The result showed that the treatments differ significantly (P< 0.05) in the sensory parameters measured (tenderness, juiciness, flavor and overall acceptance) and all scores obtained were above moderately desirable except for Camel Ham tenderness and Aroma. These results being in agreement with the findings of Gheisari, (2011) who reported that beef was tender. Although the differences between the two species were not statistically significant for any of the texture profile parameters. The present result was in line with the findings of Elgasim and Alkanhal (2022) who compared sensory characteristics of camel with beef and stated that the camel meat had the same juiciness, but was less tenderness compared to beef. The dry matter content was significantly different among the between steak and suya on camel and beef meat investigated in the present study, but the values so obtained followed similar trend with the findings of (Bube, 2003). Similarly, the protein content followed similar trend with the dry matter and was in agreement with the reports of (Kalla *et al.*, 2005), other parameters such as ether extract and ash contents followed similar trend to the work of (Mohammed, 2020) using a variety of local meat products.

CONCLUSION AND RECOMMENDATIONS

From the study conducted, it was concluded that, camel meat highly acceptable in the stud area. It is also rich in essential nutrients. Camel meat is low in fat and cholesterol making it a preferred choice of meat for health-conscious consumers. It was therefore recommended that, camel meat can be used as best substitute for beef as patty, steak, suya and ham. Further research should also be directed to implement innovative processing and preservation technologies for development of diverse products with superior consumer acceptance

REFERENCES

Al-Zidan, F. M., Bonham, M.J.D and Windsor, J .A (2020). Severity of acute pancreatits: a multivariate analysis of oxidative stress markers and modified Glasgow criteria. British journal of survey 87(8), 1019-1023

Elgasim, E. A. and M. A. Alkanhal, (2022). Proximate composition, amino acids and inorganic minerals content of Arabian camel meat: comparative study. 45:1-4.

Gheisari, H. R (2011). Correlation between acid. TBA, peroxide and iodine vales, catalase and glutathione perioxidas activities of chicken, cattle and camel meat during refridgerated storage. Vet wolrd 4: 153-157.

Ibrahim (2015) Epidemiological survey of cimean congo hemorrhagical fever virus in cattle in east Darfur state, sudan.