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Chemical Composition of *Balangu* Offered for sale at Hadejia Local Government Area of Jigawa State

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ABSTRACT

The study was conducted at Hadejia Local Government Area (LGA) of Jigawa State. Raw meat and Balangu were bought at three different locations, namely:-Atafi (T1), Yan-Koli (T2) and Yayari (T3). Samples were collected three times fortnightly. The experiment was laid in a completely randomized design. The samples were immediately taken to Animal Science Laboratory of Bayero University, Kano for Proximate Analysis. Results showed that Atafi (23%) and Yayari (20%) have the highest number of Balangu sellers. Ash content of raw meat in all the treatments differ statistically ($P<0.05$), but the crude protein and ether extract for treatments 2 and 3 were statistically similar ($P>0.05$). Values of ash, moisture, crude protein and ether extract, in Balangu ranged from 8.47 to 9.93%, 10.63 to 12.57%, 49.33 to 60.00 and 15.67 to 18.33%, respectively. There was statistical ($p<0.05$) difference in crude protein values between the treatments. In treatments 2 and 3, crude protein and ether extract contents were statistically different ($P<0.05$) in Balangu for all the three treatments. In conclusion, Balangu sold at T3 has the highest values of ash and moisture. It is recommended that further researches on the assessment, composition and microbial load of Balangu from retail meat outlets in Hadejia metropolitan should be carried out.

Keywords: Chemical Composition, *Balangu* and Hadejia

Introduction

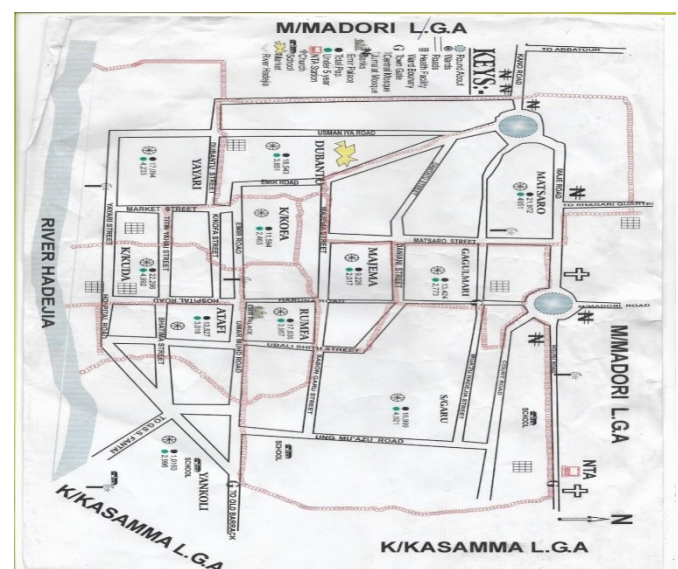
Meat is an edible animal flesh which comprises principally of the muscular tissue and also includes internal organs called viscera. The bulk of meat is derived from goat, cattle, pig, sheep and poultry (Hussain *et al.*, 2006). Animal products especially meat and meat products contain important nutrients

such as amino acids, vitamins, minerals and fatty acids which are essential for human growth and development (Campbell *et al.*, 2008).

The chemical composition of meat varies considerably with age, species, degree of fatness of animals and the part of carcass involved. Because of the enormous value of meat in the diet, there exist large markets for

There exist different types of meat products from the industrially processed corned beef, ham, bacon, sausage to the indigenous Nigeria traditionally processed ready-to-eat meat products such as *Balangu* (roasted meat), *Kilishi*, *Danbu-Nama*, *Tsire*, *Jirga*, *Ndako*, *Banda*, *Suya* and many more. The production and consumption of ready-to-eat roasted meat products cut across religion, social status and gender (Omojola, 2008). The aim of this

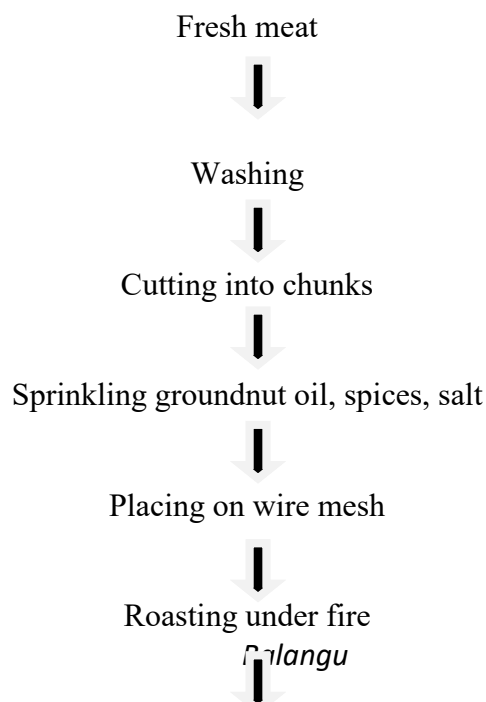
The study was conducted at Hadejia LGA of Jigawa State, Nigeria. Hadejia town is located between 10°02'28.14''E Longitude and 12°27'12.49''N Latitude. The town is served by federal trunk linking it to Nguru in the East, Kano in the North-West, Katagum in the South and Dutse in the South-West as shown in figure 1. The old town is walled with newer development having extended outside the walls. It is bounded on the immediate South by Hadejia River. The area is covered by deposit of silt, sandy and clay soils. The soil formation gives the area the great influence on agricultural development. Hadejia LGA lies in the Sudan savannah zone covered by palatable grasses, shrubs and legumes which give a quality land for good grazing of livestock. It has an annual rainfall ranging from 100cm-110cm per annum and accompanied by heavy wind. The temperature ranged from 31 - 40°C. There are two distinctive seasons in a year, with 6-8 months of dry season and the raining season lasts for about four months.



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Balangu Preparation

The boneless meat of a sizeable cut was roasted by placing it on a wire mesh covered with brown paper. The pieces of meat were sliced into thin sheets not less than 1 cm in thickness. Groundnut oil, spices and salt were sprinkled during roasting. The meat was continuously turned over until it was well roasted as described by Abubakar *et al.* (2011) as shown in Figure 2



Results and Discussions

Table 1: Distribution of *Balangu* sellers at Hadejia LGA of Jigawa State

S/No	Ward	Frequency	Percentage (%)
1	Atafi	9	23
2	Dubantu	0	0
3	Gagulmari	3	8
4	K. Kofa	4	10
5	Kasuwar Kuda	3	8
6	Majema	1	3
7	Matsaro	2	5
8	Rumfa	1	3
9	Sabon Garu	4	10
10	Yankoli	4	10
11	Yayari	8	20
Total		39	100

Figure 2: Demonstration of *Balangu* Production

Triplicate *Balangu* samples sold in three locations in Hadejia metropolis (Yayari, Atafi and Yankoli), were purchased using simple random sampling method. The *Balangu* samples were packaged in sterile Ziploc bag and immediately transported to the Department of Animal Science (Bayero University, Kano) feed and nutrition laboratory for analysis. The proximate analysis (ash, crude protein, moisture, crude fiber and crude fat) of *Balangu* were determined as described by AOAC (2000). Carbohydrates were determined by the percentage difference in sum of other proximate parameters (ash, crude protein, moisture, crude fiber and crude fat from 100) as described by Dagem *et al.* (2016). The experiment was conducted in a completely randomized design. Each location serves as treatment. Treatments were replicated three times with nine samples per replication. Data generated from the result of the proximate analysis of *Balangu* was subjected to analysis of variance as described by Steel and Torrie (1990). Significance differences between means were separated using Least Significant Differences.

Table 2: Proximate Analysis of Raw Meat Sold at Hadejia LGA of Jigawa State

Parameter (%)	Location			
	T1	T2	T3	SE
Ash	6.57 ^c	7.03 ^b	7.70 ^a	0.17
Moisture	8.67 ^b	9.33 ^b	10.33 ^a	0.18
Crude protein	6.53 ^a	45.33 ^b	53.00 ^b	0.02
Ether extract	11.00 ^a	15.00 ^b	15.33 ^b	0.27

^{a,b,c} Means with different superscripts along the same row are significantly different ($p < 0.05$)

Table 3: Proximate Analysis of *Balangu* sold at Hadejia LGA of Jigawa State

Parameter	Location			
	T1	T2	T3	SE
Ash	8.47 ^b	8.80 ^a	9.93 ^a	0.16
Moisture	10.63 ^c	11.60 ^b	12.57 ^a	0.19
Crude protein	49.33 ^c	53.33 ^b	60.00 ^a	0.90
Ether extract	15.67 ^b	17.00 ^b	18.33 ^a	0.38

^{a,b,c} Means with different superscripts along the same row are significantly different ($p < 0.05$)

The distribution of *Balangu* sellers at study is presented in Table 1. Result showed that Atafi (23%) and Yayari (20%) have the highest *Balangu* sellers, probably due to their population density. Table 2 shows the proximate analysis of raw meat sold in the study area. The result revealed that there were statistical difference ($p < 0.05$) between all the treatments in ash content. The crude protein and ether extract values in T2 and T3 were statistically similar ($p > 0.05$). T3 has the highest values of ash (7.70%), moisture (10.32%), crude protein (53.0%) and ether extract (15.33%).

The range values for moisture (5.04 ± 0.11 to 7.80 ± 0.09) and ether extract (10.60 ± 0.33 to 21.95 ± 0.33) for raw meat as reported by Addass *et al.* (2012) is in conformity with the findings of this work. Values of the proximate analysis obtained for the raw meat and *Balangu* in this study differ between treatments, which is similar to the report of Addass *et al.* (2012), Apata (2012) and Sanwo *et al.* (2012).

The results of the proximate analysis of *Balangu* sold at the study area is presented in Table 3. Values of ash, moisture, crude protein and ether extract ranged from 8.47 to 9.93%, 10.63 to 12.57%, 49.33 to 60.00 and 15.67 to 18.33%, respectively. There was statistical ($p < 0.05$) difference in crude protein values between the treatments. The highest

values of ash (9.93%), moisture (12.57%), crude protein (60.00%) and ether extract (18.33%) were reported from T3. Orellana *et al.* (2009) reported that ash content is the measure of mineral constituents and changes very little during processing. The range for ash (8.47 to 9.93%), crude protein (49.33 to 60.00%) and ether extract (15.07 to 18.33%) for *Balangu* obtained in this study is similar to that reported by Akinyele *et al.* (2017), who found 7.98 ± 0.41 to 8.53 ± 0.47 %, 49.44 ± 1.06 to 49.50 ± 0.95 and 18.04 ± 0.46 to 18.05 ± 0.67 %, for ash, crude protein and ether extract, respectively. Similarly, Apata (2012) reported similar values for ash (6.20 ± 0.09 to 8.80 ± 0.11), crude protein (46.36 ± 0.35 to 50.25 ± 0.60) and ether extract (9.73 ± 0.13 to 13.40 ± 0.45).

CONCLUSION

Atafi and Yayari have the highest number of *Balangu* sellers. Raw meat from T3 has the highest values for ash, moisture, crude protein and ether extract. *Balangu* sold at T3 has the highest values of ash and moisture.

RECOMMENDATIONS

It is recommended that further researches on the assessment, composition and microbial load of *Balangu* from retail meat outlets in Hadejia metropolitan should be carried out.

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