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PHYSICO-CHEMICAL CHARACTERISTICS OF EDIBLE HIDE (GANDA)

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ABSTRACT: A cross sectional study was undertaken to determine Physico-chemical characteristics of edible hide popularly called Ganda or ponmo, Ganda samples were tested and found to contain about 58.86% Crude protein, 34.93% Moisture, 5.00% Ether Extract and 1.21% Ash. Of all attributes, with the exception of density, weight and area were not significantly affected by retail cuts, while Small and medium retail cuts were similar ($p>0.05$) in terms of weight, volume and area ($p<0.05$). The cost components of Ganda in terms of cost per weight, per volume, cost per geometric volume are similar ($p>0.05$).

Key words: Ganda, Cost per geometric volume, Crude protein, Physico-chemical characteristics

INTRODUCTION

Ganda is an edible animal product obtained from hides of large animals like cattle, camel, buffaloes. Ganda serve as a delicacy in many parts of Nigeria. Ganda also called *ponmo* in south western Nigeria (1; 2). Production of Ganda involve a step by step process that render hides edible from their raw form to the final stage of consumption. These processes are: Skinning, Cutting, Dehairing, Washing, Soaking and Preservation. However in a type of Ganda called *Kwama* the skin is normally dried before skinning. The drying is done to preserve the hide for long distance transportation. Hides meant for ganda are obtainable in commercial quantities from abattoirs all over Nigeria, especially in Northern states of Nigeria where a greater proportion of livestock are produced. In general lean meat is particularly a good source of protein, niacin, vitamins B6 and B12, phosphorous, zinc, and iron with 100g of lean meat providing more than 25% of the recommended daily intake (RDI) of protein (3). Animal proteins, as indicated by (4) have a high biological value, and the presence of essential amino acids in meat makes it a complete protein (5). Nutritionally, ganda provides bulk to food, contribute to satiety value and provides some protein to the body system, though it does not have full complement of essential amino acids as in carcass meat (6). Although Ganda is consumed widely and is part of the

Nigerian food culture, there is a controversy concerning its production. There has even been a move to ban the production of Ganda as reported by (7); reason being that more revenue could be earned by processing the hides into leather. Researches related to it were scanty and not comprehensive enough as to allow for a proper understanding. Study conducted will benefit consumers; by purchasing the cheapest retail cut that will suit their need with minimum amount and having knowledge on protein content of Ganda to debunk the a widespread anecdotal notion that it has no any nutritive value, producers through producing the most preferred cuts by the people that will boost their business activities and increase their profit, policy makers by having more information to enable better decision making on the issues related to Ganda and researchers for conducting a research in areas that has not been covered by this research. The work will help consumers to have a broad knowledge on Ganda. It will also guide their choice of retail cuts in order to maximize benefits. Policy makers will benefit by having more information to enable better decision making. The aim of this study was to determine the proximate composition of Ganda, Compare the categories of retail cuts for attributes and characteristics preferred, and compare the categories of retail cuts for cost components.

MATERIALS AND METHOD

Ganda samples were collected from Sokoto Fish and Vegetables Market and transported to Agric Physical Laboratory of Usmanu Danfodiyo University, Sokoto for measurements and chemical analysis. Three retail categories (Large N100/cut, Medium 2 cuts/N100 and Small 3 cuts/N100) of Ganda were sampled randomly. Two samples were collected at random from each of the retail category from all available retailers in the market. The different retail cuts were also compared for Ganda attributes. The attributes included, as well as some computed variables. The samples were subjected to measurements of weight, thickness and volume. A digital scale was used for measuring weight and vernier caliper for thickness. Other variables (Density, Geometric volume and cost components) were computed. Volume was determined by displacement and, density, as a ratio of weight and volume. The area of each sample was determined by drawing its outline on a sheet of paper, measuring the perimeter of the outline with an in-extensive thread, and using mathematical relationship below to estimate the area.

$$A = \pi (c/2\pi)^2$$

Where A= Area of outline/ ganda.

C= Perimeter of the outline.

Some attributes (Table 1) were computed and not directly measured. Other attributes and preferred characteristics (Table 2) were scored by trained judges on a subjective scale of 1 (Very Low) to 5 (Very High).

Table 1; Computed cost attributes of Ganda and their Formulae

Cost component	**Formula**
Per weight	Cost per weight $= \frac{\text{Cost}}{\text{Weight}}$
Per volume	Cost per volume $= \frac{\text{Cost}}{\text{Volume}}$
Per area	Cost per area $= \frac{\text{Cost}}{\text{Area}}$
Per geometric volume	Cost per geometric volume $= \frac{\text{Cost}}{\text{Geometric volume}}$ But Geometric volume $= \frac{\text{Area}}{\text{Thickness}}$

Table 2; Impression of subjective attributes of Ganda by the respondents

Attribute	**Preferred Characteristic**	**Impression**
Thickness	Thick	Having a long distance between side (Not thin)
Cleanliness	Clean	Free from dirt and black spots
Softness	Soft	Yielding to pressing between thumb and fore finger
Openness	Open	Not rolled up
Fattiness	Fatty	Presence of subcutaneous tissue
Freshness	Fresh	Free from odour
Hardness	Hard	Off from softness

Retail cut categories were compared for all attributes identified in phase I using the General Linear Model (GLM) procedure.

At the end of the physical measurements 20g samples were taken from each randomly selected retail sample, pooled and sub sampled and analysed for Crude Protein, Moisture, Ether Extract and Ash composition according to (7).

RESULT AND DISCUSSION

Retail Cuts Comparison of Ganda

Table 3 shows that all attributes, with the exception of density, weight and area were not significantly affected by retail cuts, while Small and medium retail cuts were similar ($p>0.05$) in terms of weight, volume and area ($p<0.05$). The similarity in thickness, cleanliness, openness and softness might be due to the fact that retail cuts are made from the same hide, with only the sizes differing. The reason for small and medium retail cuts being similar in terms of weight, Area and volume, might be the fact that the samples were obtained from different retailers, and it is clear that some retailers sell their products cheaper than others. That large cuts differ from small may be explained in terms of their having bigger sizes and wider quantitative value distance. That there was no significant difference in weight, volume and area between medium and small retail cuts shows the absence of a grading system in Ganda merchandising.

Table 3; Subjective measurement of quality attributes

Attribute	Size			
	Large	Medium	Small	SEM
Weight	137.64^{a}	74.81^{b}	55.37^{b}	6.82
Softness	2.54	2.41	2.81	0.22
Cleanliness	2.13	2.80	2.52	0.31
Thickness	4.10	4.15	4.30	0.37
Openness	2.19	2.89	1.96	0.44
Volume	122.92^{a}	67.08^{b}	48.33^{b}	6.05
Density	1.12	1.12	1.15	0.03
Area	332.47^{a}	144.35^{b}	159.68^{b}	18.82

ab = means bearing different superscript along the same row differ ($p<0.05$)

Table 4 shows the cost components of Ganda in terms of cost per weight, per volume, cost per geometric volume are similar (p>0.05), and in terms cost per area of Ganda retail cuts there is a variation, this might be due to its biger sizes and wider quantitative value distance.

Table 4; Cost components of Ganda

		Sizes			
Cost components (Per kobo)	**Overall mean**	**Large**	**Medium**	**Small**	**SEM**
Per weight	70.08	78.12	68.82	63.29	5.09
Per volume	78.99	88.03	76.95	72.02	5.99
Per area	30.73	31.42^{ab}	35.66^{a}	25.11^{b}	2.33
Per geometric volume	79.10	84.09	89.02	64.19	8.96

ab= means bearing different superscript along the same row differ (p<0.05)

Chemical composition of Ganda

Proximate composition of Ganda is presented in Table 5 Ganda contains high content of Crude protein. This is probably because hide contains large quantities of collagen which is essentially a protein. The high moisture might be as a result of Ganda being soaked in water, during retail. Some of the lipid content was probably contributed by subcutaneous fat on the flesh side of the hide. Ash, were the minerals content found naturally in the hide and skin.

Table 5: Chemical composition of Ganda

Chemical component	**Proportion**
Ash	1.21
Crude Protein	58.86
Lipid	5.00
Moisture	34.93

Given that beef contains about 73.1% Moisture, 23.2% Protein, 2.8 Fat, (3), Ganda has lower moisture, higher crude protein and higher Ether Extracts than beef. It should be expected that beef will have more moisture since; the arrangement of collagen fibers in hide is more compact than the arrangement of myofibrillar proteins in muscle. Thus there will be more spaces to hold

water in muscle than in the closed structure of hide. Ganda is higher in protein than beef because it is essentially collagen.

CONCLUSION

Softness, cleanliness, thickness, openness and density attributes were not affected by sizes of Ganda, the area, volume and weight, were also not absolute determinant of sizes of retail cuts hence; Small retail cuts appears to be cheaper per unit area. In the same vein cost per unit weight and cost per unit volume of Ganda were not affected by retail cuts although consumers stand to gain price advantage by buying small retail cuts. It was also established that ganda contains about 58.86% Crude protein 5.00% Ether Extract and 1.21%, Ash. If Ganda producers could promote their competitiveness by cleaning it much and grading it according to thickness adopt practices that will maximize Ganda characteristics preferred by the consumers.

REFERENCES

1. Obiri-Danso, K., Hogarh, J.N. and Antwi-Agyei, P. (2008). Assessment of the contamination of singed hides from cattle and goats by heavy metals in Ghana. African Journal for Environmental Science and Technology. 2 (8): 217-221.

2. Okiel, W., Ogunlesi, M., Alabi, F., Osiughwu, B and Sojinrin, A., (2009). Determination of toxic metal concentrations in flame treated meat products, *Ponmo* .African Journal of Biochemistry Research 3 (10): 332 - 339.

3. Williams, P.G., (2007). Nutrient Composition of Red Meat. http://ro.Uow.edu.au/hbspapers/48

4. Ziegler, P.T., (1968). The Meat We Eat. The Interstate Printers and Publishers, Inc. Danville, Illinois. Pp. 69-71.

5. Bastin, S., (2007), Nutrition Value of Meat: Co-op. Ext Service University of Kentucky - College of Agric. UK. Pp. 1-3

6. Jibir, Mu'awiya (2015): Personal Communication

7. Ibesmith. (2015): Retrieved January 1, 2015, from www.ibesmithblog.com: http://www.ibesmithblog.comNigerian Government set to ban 'Kpomo' - Latest Nigerian News For Today - IBE Smith's Blog.htm

8. AOAC, (1990): Association of Official Analytical Chemist: (15th Eds). Gaithersburg, USA: AOAC Press 1990. *Official Methods of Analysis.*