COMPARATIVE STUDY OF THE SENSORY QUALITIES OF *TSIRE* (AN INTERMEDIATE MOISTURE MEAT) PREPARED WITH BAOBAB SEED POWDER AND GROUNDNUT CAKE POWDER

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ABSTRACT

A comparative study of the sensory qualities of *tsire* prepared with baobab seed powder and groundnut cake powder was conducted in this study. Spiced (Baobab/Kulikuli + spices) and unspiced (Baobab/Kulikuli + no added spices) *tsire* samples were prepared to determine their proximate and organoleptic/sensory quality attributes which included: colour, flavour, texture, juiciness, tenderness, firmness fatness and overall acceptability. Thirty Semi-trained panelists were used to assess the meat samples based on a nine-point hedonic scale. The results were subjected to analysis of variance in a complete randomized design. Results from the study indicated that, there was no significant difference ($P>0.05$) in the general acceptability of the *tsire* prepared from spiced or unspiced ingredients. The *tsire* prepared from spiced baobab seed powder showed significantly ($P<0.05$) higher organoleptic qualities compared to that produced from groundnut cake powder. From the result of this study, it has shown that baobab seed powder could be used to process *tsire*.

Key words: Tsire, Baobab Seed Powder, Groundnut Cake Powder, Acceptability

INTRODUCTION

Meat is the flesh and tissues or organs of animals with a highly nutritive value used as a food ingredient that is consumed by human beings, which provides quality protein (essential amino acids), minerals like iron and essential vitamins (Sebibe, 2014). There are different types of meat depending on the specie of animal from which they are obtained, for example, mutton from sheep, chevon from goat, beef from cattle, pork from pig and chicken from poultry (Soniran and Okunbanjo, 2002). In various parts of Nigeria meat is widely processed into different forms such as *Tsire, Balangu, Kilishi, Dambun-nama* (meat floss), *Banda* and *Kundi* (Ribah *et al.*, 2013; Inyang *et al*., 2005), according to culture and availability and consumed as a delicacy or source of protein (Olaoye and Onilude, 2010). However, other reasons for meat preference and consumption besides nutritional value or protein are: socio cultural, income level, religion, age, sex, individual differences, enjoyment, affluence, prestige and sensory properties.

The consumption of meat and its products like *tsire, balango, ganda, kundi, dambunnama (*meat floss) and *kilishi* has increased both from northern to southern part of Nigeria as well as other African countries (Igene and Mohammed, 1983; Inyang *et al*., 2004; Inyang *et al.*, 2005; Igene, 2008 and Omojola, 2008). These meat products vary in their quality attributes due in part to the ingredients used which might help to avoid associated spoilage, and thus increasing their shelf life as well as sensory properties.

Tsire is a roasted Nigerian spicy snack meat product that is popularly consumed and relished cosmopolitantly.

There is high demand for the utilization of groundnut and its products for both humans and animals as indicated by (Boli et al., 2014; and Ademola *et al*., 2015). *Kulikuli* is produced through roasting groundnut, grinding it, extracting its oil and then frying it to obtain the final product (Adjou *et al.*, 2012). *Kulikuli* powder is one of the major ingredients in the production of *Tsire.* However due to cost effect, variety and possible toxic issues (aflatoxin) associated to *Kulikuli* other ingredients could be used. Therefore, a cheaper and nutritiously similar ingredient such as baobab seed powder may be used as either supplement, replacement and value addition in the production of *Tsire*.

Food and agricultural scientists undergo series of research to discover wild and under-exploited native plants for possible potential value chain sources of food and value addition for increase food production (Vietmeyer and Janick 1996; Oelke *et al*., 1997). Several reports have also indicated that lots of lesser-known native crop species are high in nutrients and could possibly relieve critical food shortages if given adequate promotion and research attention (Murray *et al*., 2001). Baobab is good in nutrients like protein, vitamins, minerals, fibre and believed to have less microbial invasion. Processed baobab seeds are used as flavouring for soups, and also as a side dish, substituting peanut. (Addy and Eteshola, 1984). The seeds are also pressed for oil but the by-product, baobab seed cake is typically underutilized (Osman 2004) making baobab powder an amazing ingredient for this experiment.

MATERIALS AND METHODOLOGY

Experimental site

The study was conducted in the Animal Products and Processing Laboratory of the Department of Animal Science Faculty of Agriculture, Ahmadu Bello University Zaria, which is located between latitude 11°and 12° on an altitude of 646m above the see level (GPS, 2018). The area falls within the Northern-Guinea Savannah of Nigeria, with an average annual rainfall of 1100mm and varying temperature from 26°C to 35°C depending on the season. The mean relative humidity during the harmattan period and the wet season were 21% and 72% respectively (IAR, 2018).

EXPERIMENTAL MATERIALS

Chevon (goat meat), skewers (*geza*), 20kg weighing balance, 2kg sensitive kitchen scale, knife, ground nut cake powder, baobab seed powder, curry, common salt, seasoning cube, vegetable oil, dry pepper, sieve, trays, buckets, wire mesh, charcoal, paper tape, rubber containers, foil paper, tissue paper.

SAMPLE PREPARATION

Raw chevon of about 5kg was obtained from the Animal Products and Processing Laboratory of the Department of Animal Science Ahmadu Bello University Zaria. The meat (chevon) was deboned and cut into strips then further sliced into thin sheets using knife as outlined by Oyadeyi *et al*.,(2014).

INGREDIENT PREPARATION AND SKEWERING PROCESS

The ingredients were sourced from Tudun Wada Zaria market. The baobab seed was roasted for about 30 minutes, then dried and grinded finely into powder. Both baobab and *kulikuli* powder and other ingredients were mixed in a specific ratio of 100% as shown in table 4.

A total of fourty pieces of wooden skewers were used for four treatments 1,2,3,4, as plain *kulikuli*, plain baobab seed powder, spiced *kulikuli* and spiced baobab seed powder (ten each). The meat was skewered by piercing it at the center of the skewers with four slices of meat per skewer and then pressed and coated properly with the spice mix that was spread on a tray. The coated meat was then grilled on a smokeless fire made from charcoal that was medium hot at around 140°C for about 35 minutes with regular turning. The distance of the sticks from the center of the fire was about 25-30cm with regular turning of the product and intermittent addition of vegetable oil of about 2-3ml as described by (Igene and Mohammed 1983; Omojola, 2008) .

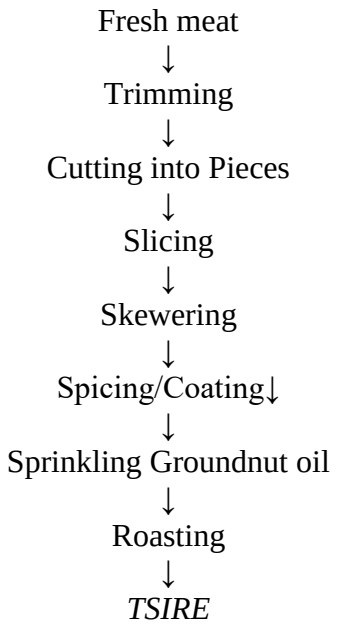

Figure 1: *Tsire* processing

SENSORY EVALUATION

A total of thirty semi-trained panelists (male and female) were used for the sensory evaluation of the meat samples using a 9-point hedonic scale; 1=like extremely; 2=like very much; 3=like moderately; 4=like slightly; 5=neither like nor dislike; 6=dislike slightly; 7=dislike moderately; 8=dislike very much; 9=dislike extremely for meat eating quality attributes (colour, texture, tenderness, aroma, juiciness, and overall acceptability). A blind coding and two equal order of arrangement were used for the meat samples as shown in Appendix I. During the evaluation, crackers biscuits and sachet water were provided for all the panelists.

STATISTICAL ANALYSIS

The data collected was subjected to analysis of variance (ANOVA) using (SAS 2004), the treatment means were separated using Duncan Mean Range Test (DMRT).

RESULTS AND DISCUSSION

PROXIMATE COMPOSITION

The Proximate compositions of baobab and *kulikuli* were presented in Table 1. The protein content of baobab seed 26.71% which is compared though lower by that obtained by Ajayi *et al.* (2006) 36.00% and was higher than 13.40% of *kulikuli*. Baobab seed 35.48% had higher lipid content than 23.21% of *kulikuli.* The lipid content is within the range obtained by Ajayi *et al.* (2006) which was 33.00%. The NFE content of *kulikuli* was 52.19% which was higher than that of baobab seed of 15.55%. Ajayi *et*

al. (2006) reported 39.90% of carbohydrate. The fibre content (2.35 %) of baobab was higher than 0.26% that of *kulikuli* but lower than that obtained by Ajayi *et al.* (2006) which was 6.71%. the ash content of 14.51% of the baobab seed powder was higher than that of *kulikuli* (4.63%) and that obtained by Ajayi *et al.* (2006) 7.50%. These differences might be dew to sources of the seeds, moisture content of 7.76% which was higher than that 5.02% of (Ajayi *et al.* 2006).

SENSORY SCORES OF *TSIRE* PRODUCED FROM BAOBAB AND *KULIKULI*

The result of the sensory evaluation was presented in table 2 showed that there was no significant difference (P>0.05) in the general acceptability between the *tsire* that was produced from plain baobab and plain *kulikuli* from the mean values. There was significant difference (P>0.05) in the mean values of *tsire* produced from the spiced baobab compared to spiced *kulikuli*. However, since the cost of production affected the profitability of any production the result on Table 3, showed that, the use of *kulikuli* was more costlier than the use of baobab seeds.

CONCLUSION

It can be concluded from the study that, baobab seed has high protein and fibre contents as compared to *kulikuli*. Baobab seed could be used as a supplement or replacement of *kulikuli* in the production of *tsire*. The use of baobab seed powder is more cost effective than using *kulikuli*.

RECOMMENDATIONS

It can be recommended that;

Baobab should be used as a supplement or replacement for *kulikuli* in the production of *tsire*. More research on the availability, acceptability and utilization of baobab and other related food materials could be conducted for value addition.

Table 1: Proximate Analysis of Baobab seed powder and Kulikuli powder

Sample	% Moisture	% Ash	% Protein	% Lipid	% Fibre	% NFE
Baobab seed powder	**7.76**	**14.51**	**26.71**	**35.48**	**2.35**	**15.55**
Kulikuli powder	**6.31**	**4.63**	**13.40**	**23.21**	**0.26**	**52.19**

Source: Emelike and Akusu 2018

Table 2: Sensory Scores of *Tsire*

Treatment	Color	Texture	Tenderness	Aroma	Juiceness	Acceptability
1	1.86^{d}	2.83^{ab}	3.31^{a}	2.76^{bc}	3.03^{bc}	3.03^{bcd}
2	2.59^{cd}	2.83^{ab}	3.41^{a}	2.52^{c}	3.52^{abc}	3.03^{bcd}
3	2.37^{cd}	2.80^{ab}	3.10^{a}	2.70^{bc}	2.50^{c}	2.13^{d}
4	2.80^{bcd}	3.20^{ab}	3.03^{a}	2.73^{bc}	2.93^{bc}	2.50^{cd}
SEM	0.54	0.49	0.45	0.50	0.47	0.44

Table 3: Cost Analysis

Baobab seed Powder				***Kulikuli* Powder**			
Ingredients	%/kg meat	Proportion	Price/kg meat	Ingredients	%/kg meat	Proportion	Price
Baobab	71.7	358.5	100	*Kulikuli*	71.7	358.5	250
salt	4.1	20.5	10	Salt	4.1	20.5	10
Pepper	4.9	24.5	50	Pepper	4.9	24.5	50
Ginger	2.0	10	50	Ginger	2.0	10	50
Curry	1.3	6.5	50	Curry	1.3	6.5	50
Seasoning	8.1	40.5	50	Seasoning	8.1	40.5	50
Oil	7.8	39	100	Oil	7.8	39	100
Total	100	499.5	410	Total	100	499.5	560

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