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Effect of Scalding and Flaming Methods of Processing on Physico-chemical and Organoleptic Properties of Grass-cutter Meat

[1]A.J. Omole, [2]I.O. Ayodeji, [1]O.A. Ashaye and A.K. Tiamiyu

[1]Institute of Agricultural Research and Training, Obafemi Awolowo University,
Moor Plantation, Ibadan, Nigeria.
[2]Federal College of Animal Health and Production Technology, I.A.R. and T.,
Ibadan, Nigeria.

Absract: The effect of removing the fur of grass-cutter traditionally, by scalding and Flaming on chemical and organoleptics properties was evaluated. A total of 8 grass-cutters were divided into 2 groups. The fur of each grass-cutter in the 1st group was removed separately by scalding, in which the grass-cutter was dipped inside hot water of about 80°C and knife was used to remove the fur (Scalding). In the second group, each grass-cutter was placed separately on burning fire wood for the removal of the fur (Flaming). The sensory, and chemical composition of the raw meat were evaluated. Moreover the meat was cooked and fried for sensory evaluation. The result shows that flaming method of processing of grass-cutter improved the taste, flavour and general acceptability better than scalding method ($P<0.05$). The two methods of processing had no effect on the weight of the organ and the dressing percentage, also the chemical composition of the meat was not influenced by the two processing methods hence consumer could use either of the two methods of processing the fur.

Key words: Scalding, flaming, sensory, grass-cutter, chemical composition, Nigeria

INTRODUCTION

Grass-cutter meat constitutes an important delicacy meat for many Africans both in urban and rural areas. The meat fetches higher price than that of beef, mutton and pork and it accounted for the greater proportion of bush meat in the local market[3,9,14]. The meat is well accepted to all social classes in both urban and rural areas and the protein content of the meat ranges between 19 and 23% which compare favourably with other conventional livestock such as beef, mutton and pork with protein content of 19.35, 16.8 and 19.25% respectively[2,12]. Grass-cutter meat is low in fat, sodium and cholesterol hence it is good for people suffering from hypertension and those that have fat related diseases. The meat has an excellent taste and contain higher proportion of unsaturated fatty acid, all essential amino acid such as methionine, lysine and tryptophane are present in the meat[10,1]. The fur of grass-cutter is coarse, bristly coat with no under fur. Fur, feather or hair of an animal must be removed first before further processing can take place. Animal could be defeathered, defurred or dehaired by scalding and flaming. Scalding is a traditional method of removing the fur or hair by dipping the animal in hot water of about 60 - 80°C and sharp object like knife or blade could then be used to scrape the fur. Flaming is another traditional method by which the slaughtered animal is placed on straw or fire wood and fire is lit. It has been noted that some chemical and physical changes occur during the processing of meat i.e. flavour, tenderness and colour or chemical changes such as moisture, protein and mineral content etc.[15]. This study was conducted to assess the physical, chemical and sensory qualities of grass-cutter meat processed by scalding and flaming traditional methods.

MATERIALS AND METHODS

The experiment was carried out at the Livestock Laboratory of Institute of Agricultural Research and Training, Ibadan, Nigeria. Eight grass-cutters of mean weight 2.65 ± 0.06 kg were used for the study. Four grass-cutters were randomly allotted to each of the two groups. The animals were weighed individually. The fur of the animals in the 1st group was removed individually by scalding in which the grass-cutter was dipped inside hot water of about 80°C and knife was used to remove the fur. In the second group, the grass-cutter was placed

Corresponding Author: A.J. Omole, Institute Of Agricultural Research and Training, Obafemi Awolowo University, Moor Plantation, Ibadan, Nigeria.

Table 1: Time taken for scalding/flaming.

Variable	Scalding	Flaming
Time/Minutes	$60.15^{a} \pm 9.56$	$29.30^{b} \pm 4.12$

Means with different superscripts are significantly different from each other (P<0.05)

Table 2: Carcass analysis as affected by scalding and flaming.

Variables	Scalding	Flaming
Live weight (g)	$2.65^{a} \pm 0.12$	$2.64^{a} \pm 0.11$
Defurred weight (g)	$2.55^{a} \pm 0.09$	$2.53^{a} \pm 0.10$
Carcass weight (g)	$2.03^{a} \pm 0.11$	$2.03^{a} \pm 0.11$
Dressing %	$76.98^{a} \pm 3.28$	$76.96^{a} \pm 3.31$
Head (g)	$0.24^{a} \pm 0.015$	$0.24^{a} \pm 0.013$
Kidney (g)	$0.02^{a} \pm 0.001$	$0.02^{a} \pm 0.001$
Lung (g)	$0.039^{a} \pm 0.001$	$0.38^{a} \pm 0.001$
Liver (g)	$0.077^{a} \pm 0.023$	$0.077^{a} \pm 0.023$
Heart (g)	$0.023^{a} \pm 0.005$	$0.023^{a} \pm 0.004$

Means with different superscripts are significantly different from each other (P<0.05)

individually on burning fire wood for the removal of the fur (Flaming). The time taken for the fur removal in the two groups was taken. The defurred weight was also taken. The colour, flavour, texture and general acceptability of the carcass was rated by 20 untrained panelists through questionnaires[7]. Heart, liver, lungs, kidney and head were separated and weighed individually. The dressing percent was calculated as ratio of eviscerated weight to liveweight in percentage. Part of the meat cut from different parts was cut into smaller pieces of about $3cm^3$ and cooked separately in cooking pots containing 3g of salt dissolved in 300mls of water for 10 minutes. The cooked meat was placed in different plates based on the group and served to 20 untrained panelists. Twenty copies of questionnaires were given to the panelists for rating the samples for colour, texture, tenderness, flavour and general acceptability. Part of the cooked meat also were cut into smaller pieces and fried using groundnut oil. The fried meat was served to the 20-member panelist for sensory evaluation on a nine point hedonic scale bars one (1) corresponding to extreme dislike and 9 (extreme likeness)[7]. Chemical composition of the cooked and fried meat in each group was carried out[5]. All the data were subjected to statistical analysis using T-test.

RESULTS AND DISCUSSION

The result presented in Table 1 shows that scalding method of processing takes longer time than flaming method. The longer time taken for the scalding was as a result of boiling of the water and scrapping of the fur. The heart, liver, lung and kidney weigth were not affected (P>0.05) by the two traditional methods of processing grass-cutter thus indicating any of the methods could be used. Scalding and flaming had no significant (P>0.05) effect on dressing percentage as shown in Table 2. The dressing percentage of grass-cutter compared competitively with that of rabbit, cockerel and broiler with dressing percentage ranging between 73 and 77%[2,8,12,6] but higher than that of snail which is between 39-42%[13,11]. Flaming method of processing was preferred to scalding in terms of flavour with mean score of 7.42 and 6.88 respectively (P>0.05). The mean score for general acceptability for flaming and scalding methods were 6.62 and 6.25 respectively (P<0.05). The scalding method was preferred in term of colour and neatness as shown in Table 3. The better flavour of the meat when the fur of the animal was flamed could be due to desirable flavour due to increased fat solubilization at higher temperature. Simmons *et al*[15] concluded that increase in flavour which is caused by a greater activity of mallard reaction and associated reactions involving muscle protein (Amine group), carbohydrates (reducing), such as free glucose and lipid and their degradation products.

The crude protein of the raw meat in both treatment was not significantly affected (P>0.05). The values ranged between 19.94 and 19.83% for Scalding and Flaming respectively (Table 4). The crude protein recorded in this study was lowered than what was reported by Asibey[4] and Ajayi *et al*[2]. The differences could be due to differences in age, size, stage of production of the animal, and type of feed given. Meanwhile, The protein reported in this study compared favourably with other conventional livestock meat such as beef, broiler, mutton,

Table 3: Effect of scalding and flaming on the raw meat.

Variables	Scalding	Flaming
Colour	$6.95^{a} \pm 0.70$	$6.85^{b} \pm 0.70$
Flavour	$6.88^{b} \pm 0.56$	$7.42^{a} \pm 0.49$
Texture	$6.72^{a} \pm 0.38$	$6.63^{b} \pm 0.34$
General Acceptability	$6.25^{b} \pm 0.38$	$6.62^{a} \pm 0.42$
Neatness	$6.83^{a} \pm 0.29$	$6.72^{b} \pm 0.22$

Means with different superscripts are significantly different from each other (P<0.05)

Table 4: Effect of scalding and flaming on the Chemical composition of raw meat.

%	Scalding	Flaming
Dry matter	25.67	24.67
Crude protein	19.58	19.37
Ether Extract	1.23	1.19
Ash	10.48	10.62

Means with different superscripts are significantly different from each other (P<0.05)

Table 5: Effect of scalding and flaming on sensory evaluation of the cooked meat

Variables	Scalding	Flaming
Colour	$7.85^{a} \pm 0.52$	$7.81^{b} \pm 0.54$
Taste	$7.38^{b} \pm 0.39$	$7.47^{a} \pm 0.49$
Flavour	$7.25^{b} \pm 0.42$	$7.59^{a} \pm 0.34$
Texture	$7.38^{a} \pm 0.28$	$7.37^{a} \pm 0.19$
General Acceptability	$7.45^{b} \pm 0.39$	$7.59^{a} \pm 0.42$

Means with different superscripts are significantly different from each other (P<0.05)

Table 6: Effect of scalding and flaming on sensory evaluation of fried meat.

Variables	Scalding	Flaming
Colour	$6.82^{a} \pm 0.39$	$6.83^{a} \pm 0.45$
Flavour	$7.12^{a} \pm 0.56$	$7.14^{a} \pm 0.49$
Taste	$7.23^{a} \pm 0.55$	$7.25^{a} \pm 0.64$
Texture	$7.25^{a} \pm 0.58$	$7.24^{a} \pm 0.53$
General Acceptability	$7.14^{a} \pm 0.53$	$7.15^{a} \pm 0.60$

Means with different superscripts are significantly different from each other (P<0.05)

pork which have protein content of 17.86, 19.41, 16.98 and 18.45% respectively[6].

The fat content of the meat was 1.23 and 1.21% for Scalding and Flaming method of processing respectively and were not significantly affected by the two processing methods (P>0.05) (Table 4). The fat content of the meat is low when compared to that of pork, beef and broiler. The low fat content of grass-cutter meat make it a good antidote for those that have hypertension or other fat related diseases[2,8]. The results of sensory evaluation on the cooked meat as observed by the panelists show that flaming the fur of grass-cutter had better taste (7.47), flavour (7.59) and general acceptability (7.59) (P<0.05) than when the fur was scalded (Table 5). The result of sensory evaluation of the fried meat presented in Table 6 shows that the colour, flavour, taste, texture and general acceptability of the fried meat were not significantly (P>0.05) influenced by the two processing methods of removing the fur. The relatively similar results obtained for tenderness of the meat in both treatments could be due to the fact that the animal were likely to be of the same age.

In conclusion, flaming method of processing of grass-cutter improved the taste, flavour and general acceptability better than scalding method. The two methods of processing had no effect on the weight of the organ and the dressing percentage, also the chemical composition of the meat was not influenced by the two

processing methods hence consumer could use either of the two methods of processing the fur.

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