

CARCASS EVALUATION AND ORGANOLEPTIC ASSESSMENT OF THE MEAT OF
GIANT AFRICAN RAT (*Cricetomys gambianus*) AND GRASSCUTTER (*Thryonomys*
swinderianus raptorum).

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ABSTRACT

Carcass yield, chemical composition and organoleptic quality attributes of giant African rat (*Cricetomys gambianus*) and grasscutter (*Thryonomys swinderianus raptorum*) were evaluated. Grasscutter was found to have higher live and carcass weight, higher lean meat yield, but lower dressing percentage than giant African rat. The weights of body components showed direct relationship with the animals' size and sex with male animals having higher values. Chemical composition showed that grasscutter had higher crude protein and lower fat contents than giant African rat. Giant African rat had higher index of water holding capacity and ultimate pH and consequently lower percentage of cooking losses. Variation in carcass quality due to sex were also observed. Significant differences ($p < 0.05$) were observed in sensory quality scores for meat samples with respect to meat color, flavor, tenderness, juiciness and overall acceptability. Grasscutter meat was found to be more palatable.

Key Words: Grasscutter, giant African rat, carcass evaluation, chemical, sensory qualities.

INTRODUCTION

In an attempt to summarize the knowledge and advocate investigation on the use of animals unknown to most of the people except some small communities, Noel Vietmeyer of the U.S.A. National Research Council was reported to first use the term "Microlivestock" to describe this group of animals (Hardouin, 1969). Although rodents are common food items over much of Africa, three rodents were highlighted to deserve consideration as edible meat source and these include, guinea pig

(*Caviaporceus*). giant rat (*Cricetomys* spp.) and grasscutter or cane rat (*Thryonomys swinderianus*) (Hardouin, 1989). In a survey of wild animals offered for sale along the roadside in Nigeria, the most numerous animals on sale, in order of quantity were Maxwell's duiker (*Cephalophus Maximwell*, Smith), the grasscutter (*Thryonomys swinderianus*), bush-tailed porcupine (*Atherurus africanus*, Gray) and the giant snail (*Archachatina marginata*) (Martin, 1983).

Grasscutter is found only in Africa (Baptist and Mensah,

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1986) and is widely known in West Africa as the "cutting grass or cane rat." The appearance is deep brown liberally ticked with yellow (Asibey, 1974). Reports indicate that the meat of the grasscutter is preferred to the meat of any other kind of domestic animal or commercially available game, although objective evaluation of this is rare (Baptist and Mensah, 1986, Martin, 1985). Grasscutter according to Martins (1985), is probably the most important bush meat animal in West Africa, despite its high price, it is much sought after (Martin, 1985).

Giant African rat is found in many races in the forest areas of Africa. It has a light brown skin, which is smooth and tight. Giant African rat and grasscutter are of great economic importance as a source of animal protein among the rural Africans.

There is dearth of information in literature on carcass evaluation and organoleptic assessment of the meat of grasscutter (Martin, 1985) and organoleptic assessment of giant African rat. This study was therefore designed to evaluate and compare the carcass quality attributes and organoleptic properties of giant African rat and grasscutter.

MATERIALS AND METHODS

Six matured animals (growth maturation) per sex (male or female) of giant African rat and grasscutter were obtained through contract arrangements with the farmers around Bacita sugar farms.

Sugar cane farms in Bacita, Nigeria during the month of August. The animals trapped in locally adapted wire net cage traps were transported to the laboratory for the study.

Carcass Evaluation

The animals (male and female) were kept for less than 24 hours in the laboratory before slaughtering.

Prior to slaughtering, the live weight of each animal was taken (the difference between the weight of the cage containing the animal and the cage alone). Each animal was then tactically led out of the cage and stunned with a wooden club applied on the head before slitting the neck at the level of atlas vertebra.

Each slaughtered animal was dehaired after dipping them in hot water (about 60°C) for a minute and all the hairs scrapped. The dehaired animals were eviscerated with all the internal organs and abdominal fat carefully removed, after which the carcass was weighed to obtain eviscerated weight and dressing percentage computed as a ratio of live weight. The weights of head, liver, kidney and heart were taken. Each eviscerated carcass was split into two equal longitudinal halves. One half of the carcass was weighed and carefully dissected into skin, fat, bone and muscles. The lean meat, fat and bones were then weighed separately and percentage lean meat, fat and bone calculated as a ratio of carcass weight. Visual assessment of color and wetness of the lean meat were

made as described by MacDougall and Disney (1967).

Analytical Procedures

pH readings were taken post-mortem after overnight storage (pH ultimate) by sticking the electrodes of a standardized Kent EIL 7020 pH meter into the thigh muscles. Moisture (dry matter), fat, crude protein and ash contents were determined as described by AOAC(1980). Water holding capacity of the thigh muscles were assessed using the filter press method as described by McDougall and Disney (1967). Cooking losses were determined by comparing weight of meat from the thigh muscles (cut into cubes of approximately 1cm³) before and after 15 minutes cooking (Wood, et al. 1981).

Sensory Evaluation:

Sensory tests were carried out on thigh meat boiled for 15 minutes by a trained (Ladele et al. 1996) nine-member panel that rate the samples for tenderness, juiciness, flavor, color and overall acceptability on a 9 point hedonic scale.

All data were subjected to analysis of variance. Least significant difference between sample means were determined by Duncan's multiple range test (Duncan, 1955).

RESULT

Results on physical characteristics of tested animals are shown in Table 1. Percentage weights of head, liver and kidney of male animals were higher ($P < 0.05$) than those of the females. Giant African rat had higher dressing out percentage than grasscutter,

however grasscutter had relatively higher carcass weight. Female animals generally had less relative lean meat yield and higher dissectible fat than the male animals (Table 2), while the muscle conformation is better in grasscutter's carcass giving higher ($P < 0.05$) meat yield than giant African rat. Thigh meat color varied significantly ($P < 0.05$) among the animals. The meat from giant African rat appeared to be more pale than meat from grasscutter. But wetness scores showed that freshly exposed muscles (30 minutes) of giant African rat was relatively wetter than that of grasscutter (Table 2).

Proximate composition of the meat from the animals investigated are shown in Table 3. Grasscutter was found to have higher crude protein content, lower fat content and relatively lower ultimate pH. Grasscutter exhibited lower index of water holding capacity and higher percentage of cooking losses than giant African rat. Sex was found to influence the carcass quality as shown in Table 3. Male animals tended to have slightly higher protein content and lower fat content than females.

Significant differences ($P < 0.05$) were observed in sensory quality scores within samples (Table 4). Overall acceptability test showed that grasscutter was more acceptable.

DISCUSSION

The live weight (3.8 - 3.9kg) of grasscutter recorded in this study was lower than the

Table 1. Physical Characteristics of the Animals*

| Species of Animal | Live Weight (g) | | Head Weight (%) | | Liver Weight (%) | | Kidney Weight (%) | | Heart Weight (%) | | Carcass Weight (g) | | Dressing Percentage (%)** | |
|-------------------|----------------------|-------------------|-------------------|-------------------|-------------------|----------------------|--------------------|----------------------|-------------------|-------------------|--------------------|-------------------|---------------------------|--------------------|
| | Females | Males | Females | Males | Females | Males | Females | Males | Females | Males | Females | Males | | |
| Giant African rat | 1432.93 ^a | 8.51 ^b | 1.70 ^b | 0.59 ^b | 0.58 ^a | 998.25 ^a | 69.71 ^d | 1505.00 ^b | 7.31 ^a | 1.64 ^a | 0.52 ^a | 0.61 ^a | 1031.53 ^b | 68.54 ^c |
| | 3850.03 ^c | 9.63 ^c | 1.89 ^d | 0.63 ^c | 0.74 ^c | 2571.03 ^c | 66.28 ^a | 3922.15 ^d | 8.52 ^b | 1.82 ^c | 0.58 ^b | 0.69 ^b | 2647.74 ^d | 67.51 ^b |

* Values are means of 3 replicate determinations.

** All percentages were computed as a ratio live weight.

Different superscripts on means within a column indicates significant difference (P < 0.05).

Table 2. Variation in the colour and wetness scores of the raw muscle and percentage muscle, bone and fat contents of the animals*

| Species of Animal | Muscle Colour Scores** | | Muscle Wetness Scores** | | Muscle (%)*** | | Bone (%)*** | | Fat (%)*** | |
|-------------------|------------------------|-------------------|-------------------------|--------------------|-------------------|-------------------|-------------------|--------------------|--------------------|-------------------|
| | Females | Males | Females | Males | Females | Males | Females | Males | | |
| Giant African rat | 5.52 ^a | 4.82 ^a | 69.04 ^b | 27.17 ^b | 2.83 ^c | 6.69 ^c | 5.41 ^b | 73.95 ^d | 24.01 ^a | 1.60 ^a |
| | 5.59 ^a | 4.84 ^a | 66.98 ^a | 28.65 ^c | 3.98 ^d | 6.58 ^b | 5.40 ^b | 72.65 ^c | 24.59 ^a | 2.35 ^b |

* Values are means of 3 replicate determinations.

** Reted on a scale of 7 = deep colour or dry, 1 = pale or wet.

*** All percentages were computed as a ratio of carcass weight.

Different superscripts on means within a column indicates significant difference (P < 0.05).

Table 3. Chemical quality attributes of the meat samples.*

| Species of Animal | Dry Matter (%) | Crude Protein (% dry wt.) | Crude Fat (% dry wt.) | Ash (% dry wt.) | Ultimate pH | Water Holding Capacity (%) | Index of Holding Losses (%) | Cooking |
|-------------------|--|--|--|-----------------|--|--|--|---------|
| Giant African rat | 30.76 ^a 30.63 ^a | 75.69 ^b 74.51 ^a | 15.30 ^c 16.06 ^c | 3.12 3.16 | 5.61 ^b 5.60 ^b | 56.53 ^b 57.77 ^c | 33.42 ^b 32.68 ^b | |
| Grasscutter | 29.00 ^b 30.66 ^a | 82.98 ^c 82.29 ^c | 8.00 ^a 9.10 ^b | 3.01 3.13 | 5.50 ^a 5.48 ^a | 54.98 ^a 55.57 ^a | 36.75 ^a 36.98 ^a | |

* = Females = Males

Values are means of 3 replicate determinations

Different superscripts on means within a column indicates significant difference ($P < 0.05$).

Table 4. Organoleptic quality attributes of the meat samples.

| Species of Animal | Colour | Flavour | Tenderness | Juiciness | Overall acceptability |
|-------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|
| Giant African rat | 5.83 ^a | 6.28 ^a | 5.85 ^b | 6.25 ^b | 6.00 ^a |
| Grasscutter | 6.20 ^b | 7.50 ^b | 5.01 ^a | 5.40 ^a | 6.70 ^b |

* Rated on a 9-Point hedonic scale, 9 = Extremely like, pale, tender or juicy; 1 = Extremely dislike, deep, tough or dry. Different superscripts on means within a column indicates significant difference ($P < 0.05$).

