CHARACTERISTICS OF THE CARCASS AND NUTRITIONAL VALUES OF BREED GRASSCUTTER MEAT (*THRYONOMYS SWINDERIANUS*) FED WITH PELLETS IN BENIN.

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**Manuscript Info**

**Abstract**

The aim is to evaluate the characteristics of the carcass and nutritional values of the meat of bred grasscutter fed with pellets. 27 farmed grasscutters aged 7 months and of average weight 2.3 kg were used and divided into three groups of 9 grasscutters. The experimental device is a complete random block with three treatments and three replicates. At the end of the trial, one-third of the grasscutters were randomly selected from each group for determination of the carcass characteristics and nutritional value of the meat. Results showed that the live weight at slaughter of grasscutters varied from 2796 ± 35.07 g to 2876 ± 55.95 g (p>0.05). The difference was not significant between the cold carcass yield of grasscutters fed with the three pellets (p>0.05). However, it was significant between the warm carcass yield of bred grasscutters (p<0.05). The length of the carcass varied from 26.46 ± 0.57 cm to 27.82 ± 0.58 cm in the grasscutters with the pellets (p<0.05). The meat of grasscutters contains a crude protein content ranging from 17.26 ± 0.02 to 22.6 ± 0.02% and fat matter from 3.5 ± 0.07 to 7.05 ± 0.06%. The difference between the moisture, protein and fat matter content between meats of the grasscutters fed with the three pellets was significant (p<0.05). The grasscutters bred fed with pellets 1 and 3 contain the best protein levels and low fat content. They can be used in grasscutters breeding for the production of grasscutters meats of good nutritional qualities.

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**Introduction**

The breeding of non-conventional animal species is a mode of ex situ conservation of animal biodiversity which contributes to the coverage of animal protein requirements and to the improvement of incomes in tropical rural
Africa in sub-Saharan Africa (Hanotte and Mensah 2002; Hardouin, 1986). Grasscutter breeding or the breed grasscutter (*Thryonomys swinderianus*) falls within this framework (IEMVT-CIRAD, 1992). Since its inception, grasscutter breeding is booming in Benin with more than 70,000 heads of grasscutters in captivity for more than 3,000 breeders (Mensah et al., 2013). It is a game very hunted in intertropical Africa for its meat appreciated by all and sold expensive compared to the beef, small ruminants and pork of current consumption (Baptist and Mensah, 1986). Vegetation fires and poaching are increasingly decreasing and favoring the replacement of game grasscutter by bred grasscutter (Mensah, 1991). Thus, grasscutter breeding can be suggested as an obvious solution for environmental problems (Karikari and Nyameasem, 2009).

In Benin, the breed grasscutters are mainly fed with a wide range of dry and fresh fodder with dietary supplements composed of energetic, nitrogen, vitamin and mineral matter (Mensah 1995; Toleba et al., 2009). Some breeders supplement fodder with crop residues, agro-industrial products and kitchen remnants. However, faced with all-season feeding problems faced by growers, the production of complete pelleted feed can be the sustainable solution for feeding the grasscutters in captivity (Aizoun et al., 2015). Several studies on grasscutters in captivity have led to significant advances in feeding, reproductive control, zootechnical performance, ethology, age determination (Mensah, 2000, Sacramento et al., 2013). But few were devoted to the nutritional values of grasscutter meat, especially fed with pellets feed. The purpose of this study is to evaluate the characteristics of the carcass and to determine the nutritional values of grasscutter in captivity fed with pellets foods based on green fodder, maize products and by-products and other Food ingredients.

**Material and methods:**

**Study sites:**

The experiment was conducted in a grasscutter place of rearing of Non-Conventional Animal Species Breeding Sub-Programm (S-PEEANC) of Zootechnical Veterinary and Halieutic Research Laboratory (LRZVH) in Agricultural Research Centre of Agonkanmey (CRA-Agonkanmey) in National Institute of Agricultural Research of Benin (INRAB) located in Commune of Abomey-Calavi. The climate is type Guinean, with two dry seasons and two rainy seasons. The average rainfall is 1,200 mm per year and average monthly temperatures vary between 27 and 31°C with relative humidity fluctuates between 65% from January to March and 97% from June to July. The monthly average was between 27 and 31°C with a deviation of 3.2°C between the hottest month (March) and the least hot (August).
Experimental device and data collection:
27 experimental grasscutters aged 7-month were used, divided into three groups with a live weight of 1928.4 ± 51.99 g; 2286 ± 59.52 g and 2077.6 ± 46.05 g respectively. The enclosures of rectangular shaped stage 3 levels were used for the conduct of grasscutter. The pens are divided into two compartments of size (0.7 mx 0.7 mx 0.4 m) communicated with a square opening of 0.2 m square drilled in a median wall and on the floor. This opening allowed the free passage of grasscutter from one compartment to another. For the experiment, the communication openings of the enclosure were closed by bricks to isolate animals. Each enclosure was equipped with feeder and waterer.

The 27 grasscutters were divided into three groups of nine (09) grasscutters and divided into three under-groups of three grasscutters. The device is a complete random block. Each block is made up of three subgroups or observation units. Each block received the three granulated foods with one granule per subgroup in the block. After subdividing them into a subgroup, the grasscutters underwent a food transition phase of ten (10) days following the recommendations made by Mensah and Ekué (2003). Food distribution occurred only once in the morning around 8 am. The water was served at ad libitum in the drinking troughs and renewed every day.

Production of pellets:
After picking, the fodders were cut, dried in the shade. These fodder plants were crushed at the mill. Other food ingredients including maize grain, wheat bran, rice bran, cassava chips, cottonseed meal, soybean meal, the oyster shells and salt were also crushed. All forages and concentrates are placed in a blender to have a homogeneous mixture. The resulting mixture was then placed in an extruder to effect granulation. Three pellets were produced for testing. The pellet 1 consisted of green fodders and food supplements, the pellet 2 consisted of products and by-products maize and the pellet 3 consisted of green fodders, food supplements and medicinal plants. The proportion and the quantity of ingredients used in the formulas are shown in Table 1.

| Food Ingredients      | Proportion of pellets (%) |
|-----------------------|---------------------------|
|                       | Pellets 1 | Pellets 2 | Pellets 3 |
| Guinea Grass          | 5.00      | -         | 5.00      |
| Ocimum gratissimum    | -         | -         | 5.00      |
| Ocimum basilicum      | -         | -         | 5.00      |
| Vernonia amygdalina   | -         | -         | 5.00      |
| Elephantgrass         | 5.00      | -         | -         |
| Paspalum vaginatum    | 5.00      | -         | -         |
| Leucaena leucocephala | 3.00      | 4.00      | 3.00      |
| Moringa oleifera      | -         | 4.00      | -         |
| Imperata cylindrica   | -         | -         | -         |
| Papayaseeds           | -         | -         | -         |
| Maize grain           | 30.00     | 28.50     | 20.00     |
| Maize bran            | 18.00     | 30.00     | 15.00     |
| Maize flour           | -         | 14.00     | -         |
| Rice bran             | 8.00      | 10.00     | 8.00      |
| wheat bran            | 8.00      | -         | 8.00      |
| Cotton cake           | 8.00      | -         | 8.00      |
| Soyabeanmeal          | 8.00      | -         | -         |
| Maize spathe          | -         | 7.50      | -         |
| Cassava root          | -         | -         | -         |
| Oyster shellpowder    | 1.50      | 1.50      | 1.50      |
| Salt                  | 0.50      | 0.50      | 0.50      |
| Total                 | 100       | 100       | 100       |

Laboratory analysis of the pellets:
Food samples offered and rejected of different pellets were collected and analyzed using the methods allowed by the Interprofessional Office of Analytical Studies (BIPEA, 1976) and Association of Official Analytical Chemist (AOAC, 2000). These analyzes were performed at Laboratories of Sciences of sol Water and Environment (LSSEE) in National Institute of Agricultural Research of Benin (INRAB) and Laboratory of Sciences and Animal Production.
Techniques of the Faculty of Agricultural Sciences (FSA) of University of Abomey-Calavi (UAC). The Determination of dry matter (DM) was made by drying by placing in an oven at 105°C for 24 h to stabilize the weight and then weighed after it has cooled. This is for remove any residual water. The determination of the crude protein content was made by the method Kjeldahl (AOAC, 2000), the crude fiber by the method of Van Soest et al. (1991), the fat was determined by the Soxhlet device (AOAC, 2000) and that of crude ash by carbonization slow at oven. The contents of calcium and phosphorus are assayed by atomic absorption spectrophotometry.

Characteristics of the carcass of farmed grasscutters:
Three grasscutters of each group randomly selected and sacrificed at the end of the experiment to analyze the characteristics of the carcass. Before slaughter, the grasscutters were dieters for 24 hours but had access to water. After sacrificing the animals, they were depilated with boiling water, eviscerated, weighed and refrigerated at 4°C for 24 hours to obtain the weight of the cold carcass. The parameters studied are the live weight at slaughter, the weight of the warm carcass, the weight of the cold carcass, the weight of the heart, the weight of the liver, lungs, kidneys, carcass length, yield in hot carcass and cold carcass. The formulas used to calculate the carcass yield variables are as follows:

Warm carcass yield = (Warm carcass weight / live weight) × 100
Cold Carcass Yield = (Cold Carcass Weight / Live Weight) × 100

Nutritional qualities of meat of bred grasscutters:
The determination of the chemical composition of the meat concerned the main nutrients and certain minerals. For this purpose, each analysis is based on 3 trials of 10 g of fresh grasscutter. The chemical elements determined were: Dry matter (DM), moisture (%), Crude protein, Fat and Total ash. The contents were determined according to the methods of the Association of Official Analytical Chemist (AOAC, 2000). The dry matter (DM) and moisture were determined by drying by placing in an oven at 105 °C for 24 hours until the weight was stabilized and then weighed after allowing it to cool. The determination of the crude protein content was made by the method of Kjeldahl (AOAC, 2000), that of the lipids was determined by the Soxhlet device (AOAC, 2000) and that of the total ash by slow charring in the oven at 550°C. His analyzes were carried out at the Laboratory of the School of Nutrition of Sciences and Food Technologies of the Faculty of Agronomic Sciences (FSA) of UAC.

Statistical analysis of data:
The descriptive statistic was performed in terms of mean and standard deviation for the data. The Royan-Joiner normality test and the variance equality test were performed to test respectively the normality and the equality of the variances. In the case of normality, an analysis of variance (ANOVA) was performed for the nutrient values of the pellets, carcass characteristics, organ weights and nutritional values of the meat. Otherwise, the nonparametric Kuskal-Wallis test was performed at the 5% threshold. In case of significant differences between the averages for a parameter following the three pellets, the Student Newman &Keuls averaging test was performed at the 5% threshold. The analyzes were carried out with software R3.0.2 (R Development Core Team, 2012. http://www.Rproject.org/).

Results:
Nutrient values of pellets:
The bromatological analysis of the three pellets gives the nutrient values shown in Table 2. The dry matter and fat content of the three pellets was not significantly different (p>0.05). On the other hand, the content organic matter and total carbon content was significantly different for the three pellets (p<0.05), as well as that for crude protein, crude fiber, total ash, calcium and phosphorus for the three pellets P<0.05).

Table 2: Chemical composition of the pellets

| Parameters            | Pellet 1 | Pellet 2 | Pellet 3 | Prob  |
|-----------------------|----------|----------|----------|-------|
| Dry matter (%)        | 90.04 ± 0.09 | 90.33 ± 0.03 | 90.33 ± 0.03 | 0.1637 |
| Organic matter (% MS) | 93.34 ± 0.02b | 94.05 ± 0.03a | 92.75 ± 0.01c | 5.88e-07 |
| Crude protein (% MS)  | 17.59 ± 0.02a | 10.73 ± 0.01c | 14.09 ± 0.02b | 0.01556 |
| Crude fibre (% MS)    | 9.02 ± 0.12a | 7.23 ± 0.16c | 8.21 ± 0.14b | 0.01556 |
| Fat (%) MS            | 2.16 ± 0.10 | 2.09 ± 0.03 | 2.27 ± 0.04 | 0.26987 |
| Total ashes (% MS)    | 6.66 ± 0.00b | 5.95 ± 0.01c | 7.25 ± 0.01a | 0.01455 |
Characteristics of the carcass of bred grasscutters fed with the pellets:-

Table 3 summarizes the characteristics of the carcass in the grasscutters fed with the different pellets. The results showed that the slaughter weight of the grasscutters fed with pellets varied from 2796 ± 35.07 g to 2876 ± 55.95 g. The difference between the slaughter weight of the grasscutters fed with the different pellets was not significant (p>0.05). The warm carcass yields obtained from the grasscutters fed with pellets were 2876 ± 55.95 g, 2796 ± 35.07 g and 2844 ± 64.26 g, respectively. The difference was not significant between the weight of the warm carcass of grasscutters fed with pellets 2 and 3 as well as the grasscutters fed with pellets 1 and 3 (p>0.05). On the other hand, this difference between the weight of the warm carcass of the grasscutters fed with the pellets 1 and 2 is significant (p<0.05). The same holds for the weight of the cold carcass (p<0.05). The cold carcass yield of the grasscutters ranged from 61.13 ± 1.44% to 63.99 ± 1.93% without significant difference (p>0.05). The hot carcass yield of grasscutters fed with pellets ranged from 64.22 ± 2.09% to 70.75 ± 2.22%. The difference between the warm carcass yields of the grasscutters fed with pellets 1 and 3 was not significant (p>0.05). On the other hand, this difference was significant between the warm carcass yield of the grasscutters fed with pellets 1 and 3 compared to grasscutters fed with pellets 2 (p<0.05). Carcass length 27.82 ± 0.58 cm was obtained in grasscutters fed with pellets 1; 27.3 ± 0.47 cm and 26.46 ± 0.57 cm were obtained in grasscutters fed with pellets 3 and pellets 2 respectively. No significant difference was found between carcass lengths of grasscutters fed with the three pellets (p>0.05).

**Table 3:** Characteristics of the carcass of grasscutters fed with the pellets.

| Parameters                        | Pellet 1          | Pellet 2          | Pellet 3          | Prob  |
|----------------------------------|-------------------|-------------------|-------------------|-------|
|                                  | Mean ± ET (n = 3) | Mean ± ET (n = 3) | Mean ± ET (n = 3) |       |
| Live weight at slaughter (g)     | 2876 ± 55.95a     | 2796 ± 35.07a     | 2844 ± 64.26a     | 0.487916 |
| Weight of the warm carcass (g)   | 2035.8 ±102.51a   | 1796 ±75.12b      | 1960.6 ± 65.78ab  | 0.027325 |
| Weight of the cold carcass (g)   | 1840 ±44.30a      | 1709.6 ± 59.25ab  | 1770.6 ± 34.45ab  | 0.039843 |
| Hot carcass yield (%)            | 70.75 ± 2.22a     | 64.22 ± 2.09b     | 68.92 ± 0.91a     | 0.002531 |
| Cold carcass yield (%)           | 63.99 ± 1.93a     | 61.13 ± 1.44a     | 62.45 ± 0.89a     | 0.128251 |
| Length of the carcass (cm)       | 27.82 ± 0.58a     | 26.46 ± 0.57a     | 27.3 ± 0.47a      | 0.359178 |

ET = Error-Type. Values followed by different letters (a, b, c) on the same line are significantly different according to Student Newman & Keuls test at the threshold 5 %. Prob = Probability.

Effects of pellets on the weight of organs of grasscutters:-

Table 4 shows the weight of certain organs of grasscutters fed with the pellets produced. The heart weight of grasscutters fed with pellet 1 was highest (20.4 ± 1.82 g) and that of grasscutters fed with pellet 2 was the lowest (13.2 ± 1.30 g). The highest liver weight 18.6 ± 1.95 g was obtained in grasscutters fed with pellet 3 and the lowest 12.8 ± 1.92 g was recorded in grasscutters fed with pellet 1. The kidney weight recorded in grasscutters fed with the three pellets varied from 9.2 ± 1.30 g to 10.4 ± 1.14 g. The lowest lung weight 12.4 ± 1.14 g was obtained in grasscutters fed with pellets 2 and the high 14.2 ± 0.84 g was recorded in grasscutters fed with pellet 1. The difference was significant between the heart weight of the grasscutters fed with the three pellets (p<0.05). The same applies to the weight of the liver and the weight of the lung. On the other hand, the difference was not significant between the kidney weight of the grasscutters fed with the three pellets (p>0.05).

**Table 4:** Weight of organs of grasscutters fed with pellets

| Parameters                      | Pellet 1          | Pellet 2          | Pellet 3          | Prob  |
|--------------------------------|-------------------|-------------------|-------------------|-------|
|                                  | Mean ± ET (n = 3) | Mean ± ET (n = 3) | Mean ± ET (n = 3) |       |
| Heart Weight (g)                | 20.4 ±1.82a       | 13.2 ±1.30c       | 15 ± 2.24b        | 0.037983 |
| Liver Weight (g)                | 12.8 ± 1.92b      | 14.8 ± 2.39b      | 18.6 ± 1.95a      | 0.012167 |
| Weight of the kidney (g)        | 10.4 ± 1.14       | 9.2 ± 1.30        | 9.8 ± 1.48        | 0.236879 |
| Lung Weight (g)                 | 14.2 ± 0.84a      | 12.4 ± 1.14c      | 13.2 ± 1.30b      | 0.012358 |

ET = Error-Type. Values followed by different letters (a, b, c) on the same line are significantly different according to Student Newman & Keuls test at the threshold 5 %. Prob = Probability.
Nutritional values of meat of grasscutters fed with pellets:-
Table 5 shows the nutrient values of the meat of grasscutters fed with pellets. The analysis of the results shows that the dry matter and total ash in the meat of the grasscutters was not significantly different between the three pellets (p>0.05). The difference between the moisture, protein and fat content in the meat of the grasscutters fed with the three pellets was significant (p<0.05).

Table 5:- Nutrient values of grasscutter meat

| Variables          | Pellet 1       | Pellet 2       | Pellet 3       | Prob     |
|--------------------|----------------|----------------|----------------|----------|
|                    | Mean ± ET(n = 3) | Mean ± ET(n = 3) | Mean ± ET(n = 3) |          |
| Dry matter (%)     | 22.87 ± 0.10a   | 20.78 ± 0.15a   | 21.86 ± 0.03a   | 0.678512 |
| Moisture (%)       | 77.13 ± 0.10c   | 79.22 ± 0.15a   | 78.14 ± 0.03b   | 0.051257 |
| Crude protein (%)  | 19.5 ± 0.06b    | 17.26 ± 0.02c   | 22.6 ± 0.02a    | 0.023579 |
| Fat (%)            | 6.36 ± 0.18b    | 7.05 ± 0.06a    | 3.5 ± 0.07c     | 0.045842 |
| Total ashes (%)    | 3.3 ± 0.6a      | 2.01 ± 0.05a    | 2.6 ± 0.03a     | 0.235416 |

ET = Error-Type. Values followed by different letters (a, b, c) on the same line are significantly different according to Student Newman &Keuls test at the threshold 5 %. Prob = Probability.

Discussion:-
Nutritional values of pellets:-
The chemical composition of the pellets produced and used in this study can be compared with those found in the literature. The dry matter values of the pellets obtained (90.04 to 90.33%) are similar to those obtained (90.92-91.25%) by Wogar (2012). They are greater than the values varying between: 83.3 to 88.5% obtained by Fantodji et al. (2003); 76.37-89.15 found by Traoré et al. (2009); 86.65 reported by Wogar and Yara (2015); 80.7-89.49% obtained by Soro et al. (2014); 85-88.50 recorded by Seiduet al. (2016). But these values are lower than those varying between 94-97% obtained by Okeke and Mogbo (2013). The organic matter contents varying between 92.75 and 94.05% are similar to those reported by Traoré et al. (2008), Traore et al. (2009) and Ngoula et al. (2012). The crude protein levels obtained in this study for pellets 1 and 3 (14.09 and 17.59%) are in the range of 12-18.5% and 14-18% dry matter recommended for grasscutters (Mensah, 1993, Mensah, 1995, Adeniji, 2009). The crude protein contents of pellets 1 and 3 obtained in this study belong to the intervals: 11.5-20.2% reported by Traoré et al. (2009); 11.62-20.20% recorded by Wogaret al. (2013). All protein values found for the three pellets are in the 9.6-24.5% range obtained by Fantodji et al. (2003); 10.45-21.90 found by Wogar and Ayuk (2012). However, these values are lower than the intervals 20.88-22.98 found by Okeke and Mogbo (2013) and 17.90-20.6% reported by Seiduet al. (2016).

The fiber contents (7.23 to 9.02% DM) obtained during our work are in the range 6.70-18.56% obtained by Ngoula et al. (2012); 4.35-21.45% reported by Wogar (2015). These values are greater than 6.01-6.26% and 3.99-4.52% obtained respectively by wogar (2012) and Okereke et al. (2015). They are also lower than 13.23-17.90% found by wogar (2011); 11-21 (Okeke and Mogbo, 2013) and 16.67-19.79% (Seiduet al., 2016). The values (5.95-7.25% DM) of total ash found in this study belong to the 6-9% range reported by Seiduet al. (2016). They are similar to 3.29-7.09% found by Ngoula et al. (2012). These values are less than 8.68-10.33% obtained by Traoré et al. (2009); 11.75-11.87% found by Wogar and Ayuk (2012) and 25-35% reported by Okeke and Mogbo (2013). Calcium levels (0.64-0.95%) obtained in this study are similar to 0.35-0.9% found by Schrage and Yewadan (1999); 0.2-0.7% obtained by Pond et al. (1995); 0.32-0.66% reported by Traoré et al. (2009); 0.71 recorded by Soro et al. (2014); 0.82-0.85% found by Seiduet al. (2016). They belong to the range 0.038-1% reported by Ngoula et al. (2012). The phosphorus levels (0.33-0.47%) found during this work are in agreement with the values 0.26-0.42% obtained by Traoré et al. (2009) and 0.3-0.33% recorded by Seiduet al. (2016). They are less than 0.53% found by Soro et al. (2014). The fat contents (2.09-2.27% DM) obtained for the pellets are respectively between 2.5-4.5% recommended (Mensah, 1993; Mensah, 1995). They are also in agreement with those reported by Soro et al. (2014) and Traoré et al. (2009). But these values are less than 8.02-8.82% (Okeke and Mogbo, 2013). Differences in the different nutrients between this study and the various works cited may be due to the quality and quantity of the different food ingredients used in the composition of the food.
Effects of pellets on the characteristics of the carcass of grasscutters:-

Slaughter weight and carcass of grasscutters:-
The slaughter weight of the grasscutters fed with the types of pellets is 2876 ± 55.95 g, 2796 ± 35.07 g and 2844 ± 64.26 g respectively for pellet 1; pellet 2 and pellet 3. These weights at slaughter are superior to slaughter weights 2450g, 2223g, 1887g obtained in grasscutters fed on concentrated feeds containing different levels of *Panicum maximum* (Karikari and Nyameasem, 2009); 1201.84g; 1208.39 g and 1226.53 g reported by Pokut et al. (2013). But they belong to the interval 2494 g - 3630 g reported by Zyl van et al. (1999b). They are lower than slaughter weights 4990 g; 5960 g and 5400 g obtained by Okoruwa et al. (2014).

The weights of the warm carcass obtained in the grasscutters fed with the three types of pellets (2035.8 ± 102.51 g, 1796 ± 75.12 g and 1960.6 ± 65.78 g) are greater than the values 1513 g, 1319 g and 1064g found by Karikari and Nyameasem (2009); 1370.03g 1456.23g and 1264.02g reported by Henry et al. (2012) and 1615 g, 1408 g and 2116 g obtained by Zyl van et al. (1999a). But these values that we obtained are less than 3025.29g; 4089.12g and 3505g found by Okoruwa et al. (2014). The weights of the cold carcass obtained in the grasscutters fed with the three types of pellets (1840 ± 44.30 g, 1709.6 ± 59.25 g and 1770.6 ± 34.45 g) are greater than the values 1477 g, 1287 g and 1037 g reported by Karakari and Nyameasem (2009). But they are less than 2030 ± 0.11 g found by Omole et al. (2005).

Carcass yield of grasscutters:–
The hot carcass yields obtained in this study (70.75 ± 2.22%, 64.22 ± 2.09% and 68.92 ± 0.91%) are higher than those reported by Karakari and Nyameasem (2009) between 56.4% and 61.8%. Similarly, the cold carcass yields (63.99 ± 1.93%, 61.13 ± 1.44% and 62.45 ± 0.89%) were found to be higher than those obtained by the same authors varying between 55% and 60.3%. The hot carcass and cold carcass yields obtained in this study are greater than 54% found by Jori et al. (1995) and those between 56.8% and 57.9%; 50.41-55.26%; 50.12 ± 0.65% at 57.79 ± 0.51% reported respectively by Zyl van et al. (1999b), Annoret et al. (2008) and Traore et al. (2009). The hot carcass yields found (64.22 ± 2.09% at 70.75 ± 2.22%) in this study belong to 65.12% to 75.42% for the carcass yield reported by Seiduet al. (2016) in Ghana and 65% -80% found by Fayenuwo et al. (2003).

The cold carcass yields found (63.99 ± 1.93%, 61.13 ± 1.44% and 62.45 ± 0.89%) are similar to the carcass yields 64% for male and female and 63.8 ± 2.43% reported by Jori et al. (1995) and Ajayi and Tewe (1980) and belong to the 60.63% to 68.61% range obtained by Seiduet al. (2014). The carcass yields obtained in this study were less than 76.98 ± 3.28% found by Omole et al. (2005) and at intervals 71.80 to 82.30% for the grasscutters reported by Henry and Njume, 2008); 88.83% to 89.07% found by Henry et al. (2012) and 70.2% to 72.1% obtained by Pokut et al. (2013). The lengths of the carcass (27.82 ± 0.58 cm, 26.46 ± 0.57 cm and 27.3 ± 0.47 cm) obtained in this study are similar to 25.6 cm; 27.3 cm and 27.8 cm reported by Nyameasem (2010).

Impact of pellets on the weight of Lung, Liver, Kidney and Lung Organs of Grasscutters:-
The heart weights of the grasscutters fed with the three pellets in this study are comparable to those found in the literature. Its heart weights are similar to 15.45 g, 19.10 g and 21.45 g found by Seiduet al. (2016). They are greater than 11.0 g; 12.0 g and 12.8 g found for the heart weight by Nyameasem (2010) and 10.45 g, 9.18 g and 8.14 g reported by Henry et al. (2012). However, they are less than 23 ± 0.005 g found by Omole et al. (2005).

The liver weights of the grasscutters fed with the three pellets are less than 77 ± 0.023 g reported by Omole et al. (2005); 53.8 g; 48.0 g and 47 g found by Nyameasem (2010); 21.95 g, 23.98 g and 20.07 g found by Henry et al. (2012) and 26.53 g, 45.45 g and 46.52 g found by Seiduet al. (2016). The kidney weights of the grasscutters fed with the three pellets obtained in this study are similar to the weights 9.67 g and 10 g found by Nyameasem (2010); Varying between 8.23 g and 14.23 g reported by Seiduet al. (2016). They are greater than 6.58 g, 6.28 g and 7.02 g found by Henry et al. (2012) but less than 20 ± 0.001 g obtained by Omole et al. (2005). The lung weight obtained in the grasscutters fed with pellets in this study is similar to 12.30 g; 17.53 g 18.35 g reported by Seiduet al. (2016).

Nutritional values of meat of grasscutters fed with pellets:-
The level of dry matter contained in the meat of the grasscutters fed with the three pellets varied between 20.78 ± 0.15 and 22.87 ± 0.10% with no significant difference (p < 0.05). The moisture content in meat grasscutter 77.13 ± 0.10%; 78.14 ± 0.03% and 79.22 ± 0.15% in this study is superior to those reported by Pokut et al. (2013) and Seiduet al. (2016). But they are similar to those obtained by Ella et al. (2014) in Côte d’Ivoire in wild grasscutters 75% in females and 76% in males. The crude protein levels obtained in this study are similar to those ranging from 18.78 to...
21.12% obtained by Wogaret et al. (2013); 16.32 and 22.03% reported by Seiduet al. (2016). The level of protein obtained in the meat of grasscutters fed with pellet 2 is similar to 18.1 ± 0.5% in males and females reported by Zyl van et al. (1999b). But this rate is less than 22.7% recorded by Asibey (1974), with values varying between 20.91% and 22.56% found by Pokuet et al. (2013); to 20.04 ± 0.4% obtained by Ella et al. (2014) in wild grasscutter. The fat levels obtained in this study are lower than values between 9.2 ± 1.9% and 10.1 in females; to 6.5 ± 2% in males and 8.3 ± 2.3% in both sexes reported by Zyl van et al. (1999b). They are also lower than the rates included between 11.92% and 12.64% found by Wogaret et al. (2013). But the values obtained in this study are higher than those included between 0.90% and 2.09% recorded by Pokuet et al. (2013); to 4 ± 0.13% in the female and 1.5 ± 0.16% in the male to the wild grasscutter obtained by Ella et al. (2014) and values varying between 1.6% and 3.12% reported by Seiduet al. (2016). The total ash obtained in meat of grasscutters fed with pellets is higher than the 0.92%, 1.14% and 0.85% ash levels reported by Pokuet et al. (2013) and 0.5%, 0.61% and 0.63% obtained by Seiduet al. (2016). They are also greater than 1 ± 0.1% in the female and 1 ± 0% in the male for wild grasscutters reported by Ella et al. (2014).

Conclusion:-
All the results obtained during this study show that the pellets produced have a positive influence on the carcass yield, the weight of the organs and the nutritional quality of the meat of the grasscutters which consume them. The meat of grasscutters fed with the various pellets has appreciable nutritional characteristics. Meat of animals fed with the pellets based from green fodder pellets, maize products and by-products, and medicinal plants has a lower fat content and higher protein content compared to meat of grasscutters fed with the pellets based from green fodder pellets, products and by-products of maize, and other food ingredients. The production and use of these pellets in grasscutter breeding will make it possible to raise grasscutters with a meat of good nutritional qualities.

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