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RESEARCHARTICLE

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

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Abstract

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 $22.6 \pm 0.02\%$ and fat matter from 3.5 ± 0.07 to $7.05 \pm 0.06\%$. 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.

The aim is to evaluate the characteristics of the carcass and

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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

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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 (Aïzounet *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. 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-Program (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).

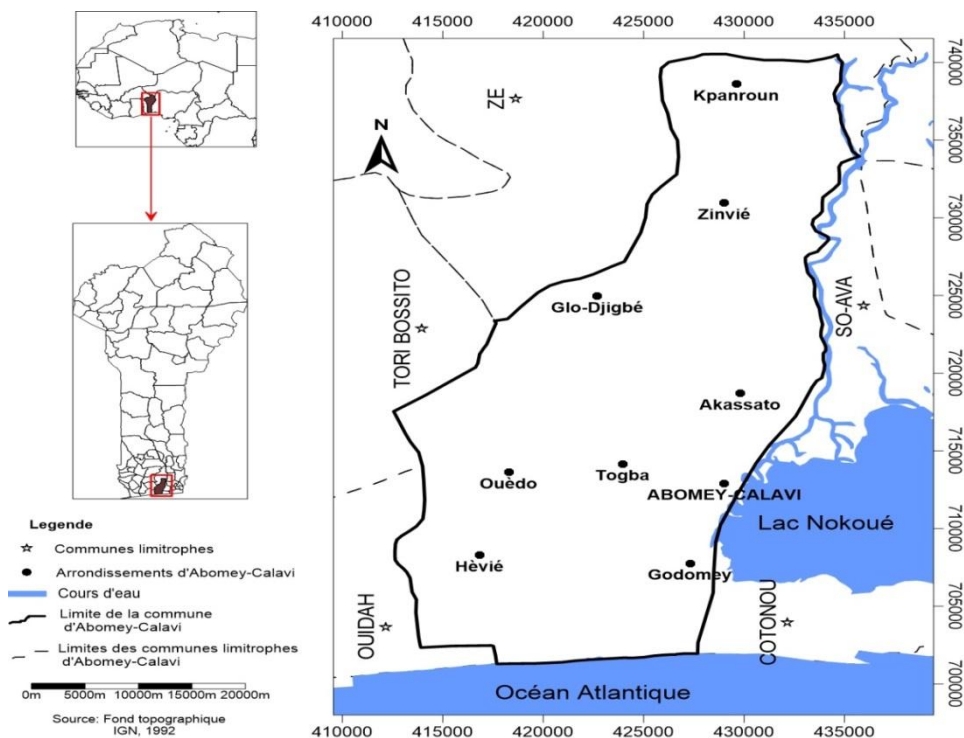


Figure 1:- Figure 1: Geographical location of the study area

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.

Table 1:- Amount of ingredients for 100 kg of pellets

Food Ingrédients	Proportion of pellets (%)		
	Pellets 1	Pellets 2	Pellets 3
<i>Guinea Grass</i>	5,00	-	5,00
<i>Ocimumgratissimum</i>	-	-	5,00
<i>Ocimumbasilicum</i>	-	-	5,00
<i>Vernoniaamygdalina</i>	-	-	5,00
<i>Elephantgrass</i>	5,00	-	-
<i>Paspalumvaginatum</i>	5,00	-	-
<i>Leucaenaleucocephala</i>	3,00	4,00	3,00
<i>Moringaoleifera</i>	-	4,00	-
<i>Imperatacylindrica</i>	-	-	-
Papayaseeds			16,00
Maize grain	30,00	28,50	20,00
Maize bran	18,00	30,00	15,00
Maizeflour	-	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	-
Cassavaroot	-	-	-
Oyster shellpowder	1,50	1,50	1,50
Salt	0,50	0,50	0,50
Total	100	100	100

Laboratoryanalysis 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	Chemical composition of the pellets			Prob
	Pellet 1	Pellet 2	Pellet 3	
	Mean ± ET	Mean ± ET	Mean ± ET	
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

total carbon(% MS)	46.67 ± 00b	47.02 ± 0.01a	46.38 ± 0.01c	2.76e-11
Ca (% MS)	0.64 ± 0.02c	0.88 ± 00b	0.95 ± 0.02a	0.01455
P (% MS)	0.42 ± 0.01a	0.33 ± 0.03b	0.47 ± 0.02a	0.00738

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.

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 weights 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 ± 59.25b	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 pellet 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 \pm ET(n = 3)	Mean \pm ET(n = 3)	Mean \pm ET(n = 3)	
Dry matter (%)	22.87 \pm 0.10a	20.78 \pm 0.15a	21.86 \pm 0.03a	0.678512
Moisture(%)	77.13 \pm 0.10c	79.22 \pm 0.15a	78.14 \pm 0.03b	0.051257
Crudeprotein(%)	19.5 \pm 0.06b	17.26 \pm 0.02c	22.6 \pm 0.02a	0.023579
Fat(%)	6.36 \pm 0.18b	7.05 \pm 0.06a	3.5 \pm 0.07c	0.045842
Total ashes(%)	3.3 \pm 0.6a	2.01 \pm 0.05a	2.6 \pm 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:-

Nutrient 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 Fantodjiet *al.* (2003); 76.37-89.15 found by Traoréet *al.* (2009); 86.65 reported by Wogar and Yara (2015); 80.7-89.49% obtained by Soroet *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 Traoréet *al.* (2008), Traoreet *al.* (2009) and Ngoulaet *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 Traoréet *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 Fantodjiet *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 Ngoulaet *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 Okerekeet *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 Ngoulaet *al.* (2012). These values are less than 8.68-10.33% obtained by Traoréet *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 Traoréet *al.* (2009); 0.71 recorded by Soroet *al.* (2014); 0.82-0.85% found by Seiduet *al.* (2016). They belong to the range 0.058-1% reported by Ngoulaet *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 Traoréet *al.* (2009) and 0.3-0.33% recorded by Seiduet *al.* (2016). They are less than 0.53% found by Soroet *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 Soroet *al.* (2014) and Traoreet *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 Pokuet *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 Okoruwaet *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 Karakari 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 Okoruwaet *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 Omoleet *al.* (2005).

Carcass yield of grasscutters:-

The hot carcass yields obtained in this study ($70.75 \pm 2.22\%$, $64.22 \pm 2.09\%$ and $68.92 \pm 0.91\%$) are higher than those reported by Karakari and Nyameasem (2009) between 56.4% and 61.8%. Similarly, cold carcass yields ($63.99 \pm 1.93\%$, $61.13 \pm 1.44\%$ and $62.45 \pm 0.89\%$) 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 Joriet *al.* (1995) and those between 56.8% and 57.9%; 50.41-55.26%; $50.12 \pm 0.65\%$ at $57.79 \pm 0.51\%$ reported respectively by Zyl van *et al.* (1999b), Annoret *al.* (2008) and Traoreet *al.* (2009). The hot carcass yields found ($64.22 \pm 2.09\%$ at $70.75 \pm 2.22\%$) 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 Fayenuwoet *al.* (2003).

The cold carcass yields found ($63.99 \pm 1.93\%$, $61.13 \pm 1.44\%$ and $62.45 \pm 0.89\%$) are similar to the carcass yields 64% for male and female and $63.8 \pm 2.43\%$ reported by Joriet *al.* (1995) and Ajayi and Tewe (1980) and belong to the 60.63% to 68.61% range obtained by Okoruwaet *al.* (2014). The carcass yields obtained in this study were less than $76.98 \pm 3.28\%$ found by Omoleet *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 Pokuet *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 the 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 obtained by Omoleet *al.* (2005).

The liver weights of the grasscutters fed with the three pellets are less than 77 ± 0.023 g reported by Omoleet *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 obtained 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 values 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 Omoleet *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 $22.87 \pm 0.10\%$ with no significant difference ($p > 0.05$). The moisture content in meats grasscutter $77.13 \pm 0.10\%$; $78.14 \pm 0.03\%$ and $79.22 \pm 0.15\%$ in this study is superior to those reported by Pokuet *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 *et al.* (2016). The level of protein obtained in the meat of grasscutters fed with pellet 2 is similar to $18.1 \pm 0.5\%$ 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 $20.04 \pm 0.4\%$ obtained by Ella *et al.* (2014) in wild grasscutter. The fat levels obtained in this study are lower than values between $9.2 \pm 1.9\%$ and 10.1 in females; to $6.5 \pm 2\%$ in males and $8.3 \pm 2.3\%$ 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 $4 \pm 0.13\%$ in the female and $1.5 \pm 0.16\%$ 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 *et 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 *et al.* (2016). They are also greater than $1 \pm 0.1\%$ in the female and $1 \pm 0\%$ 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, 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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