CARCASS CHARACTERISTICS OF HYLA RABBITS FED GRADED LEVELS OF WATERMELON WASTE WITH WHEAT OFFAL AS ABSORBENT

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ABSTRACT

This study was conducted to evaluate carcass characteristics of Hyla rabbits fed graded levels of watermelon waste with wheat offal as absorbent. Forty five Hyla rabbits of 5-6 months of age were used for this experiment. The experiment lasted for four months. The rabbits were allotted to five dietary treatments (0%, 10%, 20%, 30% and 40%) in a completely randomized design with 9 rabbits per treatment. Data were collected on carcass characteristics of the rabbit and subjected to Analysis of Variance (ANOVA) using SAS version 9.3.1. Based on the results, watermelon waste with wheat offal (WRWO) had significant effect ($p<0.05$) on the carcass characteristics such as live weight, bled eight and de-skinned weight of Hyla rabbits. There was no significant effect ($p>0.05$) of the experimental diets on skin weight, eviscerated weight, dressing percentage, head, forelimb, hind limb, neck, liver, kidney, lung and spleen.It can therefore be concluded that inclusion of watermelon waste with wheat offal as absorbent can be fed to Hyla rabbit without adverse effect on their carcass yield.

Keywords: Carcass characteristics, hyla rabbits, watermelon, wheat offal, absorbent

INTRODUCTION

Rabbits are prolific, with short gestation length, early sexual maturity and ability to rebreed several times within a year generation interval (Uchewa *et al*., 2014). The meat from rabbit surpasses meat from other farm animals in protein content (Kumar *et al*., 2023). It also contains low cholesterol, fewer calories and a lower percentage of fat compared to beef, pork, chicken or lamb (Kumar *et al*., 2023). Rabbit meat is prescribed safe and healthy for consumers (Wang *et al*., 2020). Hyla rabbit, one of famous breeds of rabbit in Nigeria is reported to be productive breed that is used in many cross-breeding programs for genetic improvement.

Feed supply has remained a major constraint in livestock production because of the ever increasing cost of unconventional feedstuffs occasioned by the competition between man and livestock for both cereal grains and legume seeds (Amefule *et al*., 2004). Watermelon fruit (*Citrullus lanatus)* is deep green smooth thick exterior rinds with grey or light green vertical stripes. Dubey *et al*. (2021) concluded that the most underutilized portion of watermelon, rind possess good efficiency to be utilized not only in food industry but also in another sectors. Olosunde *et al*. (2023) reported that watermelon waste can be processed into unconventional feedstuff by mixing it with wheat offal as absorbent. There is need for supplementation of both cereals grain and legumes seed with under-utilized unconventional feedstuff such as agro-industrial by products such as watermelon waste (Awoyomi *et al*., 2022*)* as a means of reducing production cost as well as competition between man and livestock. Thus, this study sought to evaluate: the carcass characteristics of hyla rabbits fed graded levels of watermelon waste with wheat offal as absorbent.

MATERIALS AND METHODS

The experiment was conducted at Bora, Federal College of Animal health and Production Technology, Ibadan. Forty-five hyla adult rabbits of 5-6 months of age were used for the experiment. The experiment lasted for six months. Watermelon wastes were collected from different fruit markets in Ibadan such as Oje and Bodija market. The samples were thoroughly washed to remove sand particles. The watermelon rind were sliced to smaller pieces using knife, then ground into a paste form, and mixed with wheat offal as absorbent at ratio of 1:1 and then sun-dried for 3 days. The sample was stored in an air tight container prior to mixing with other feed ingredients and used in formulation of the rabbit diets. The five rations of the experimental diets formulated were: T_1 –

Without watermelon waste and wheat offal, T_2 – 10% inclusion of watermelon waste and wheat offal, T_3 – 20% inclusion of watermelon waste and wheat offal, T_4 - 30% inclusion of watermelon waste and wheat offal and T_5 - 40% inclusion of watermelon waste and wheat offal (Table 1). A total of nine animals were randomly allotted in Completely Randomized Design (CRD) to five treatments and three replicate in each treatment. The diets were fed to the rabbits based on 4% of their body weight on dry matter basis. At the end of the experiment, feed was withdrawn for 12 hours from the rabbits so as to empty their gastro-intestinal tracts (GITs) before slaughtering as described by Akinmutimi and Osuagwu (2008) and to reduce the variability in body weight due to intestinal contents. Prior to slaughtering, the rabbits were weighed; each rabbit was stunned by hand blow at the base of the neck and slaughtered by severing the jugular veins according to (Shaahu *et al*., 2014) and bled under gravity by hanging through their hind limb using wire net. The carcass weight and dressing percentage were determined and recorded. The carcass lengths were cut as described by Igwebuike *et al*. (2013) into the following carcass parts (yield); fore-limb, hind-limb, head, neck, loin, back, head and tail) and then weighed with a sensitive electronic weighing scale. The weight of the liver, kidney, heart and lung was also taken. Individual weight was noted for each rabbit and then expressed as percentage of live weight. Data collected on carcass characteristics were subjected to Analysis of Variance (ANOVA) using SAS version 9.3.1.

Table 1: Gross composition of experimental diets

Ingredient	T_1 (0%)	T_2 (10%)	T_3 (20%)	T_4 (30%)	T_5 (40%)
Maize	40.00	30.00	20.00	10.00	0.00
Watermelon/Wheat offal	0.00	10.00	20.00	30.00	40.00
Soybean Meal	5.50	5.50	5.50	5.50	5.50
Palm kernel cake	30.00	30.00	30.00	30.00	30.00
Groundnut cake	5.00	5.00	5.00	5.00	5.00
Rice bran	12.00	12.00	12.00	12.00	12.00
Fish Meal	3.00	3.00	3.00	3.00	3.00
Bone meal	2.00	2.00	2.00	2.00	2.00
Common salt	2.00	2.00	2.00	2.00	2.00
Lysine	0.25	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25	0.25
Total	**100**	**100**	**100**	**100**	**100**

T_1 – Without watermelon waste and wheat offal; T_2 – 10% inclusion of watermelon waste and wheat offal; T_3 – 20% inclusion of watermelon waste and wheat offal; T_4 - 30% inclusion of watermelon waste and wheat offal; T_5 - 40% inclusion of watermelon waste and wheat offal

RESULTS AND DISCUSSION

Table 2 shows the proximate composition of the experimental diets. The results showed that there were significant differences ($P<0.05$) of the experimental diets on dry matter, crude protein, crude fibre, nitrogen free extract (NFE) and total ash. The dry matter of the experimental diet ranged from 84.95-90.265%, crude protein 12.46- 16.08%, crude fibre 7.05-8.30%, nitrogen free extract 41.02-53.89% and total ash 7.28-13.87%.

Table 2: Proximate analysis of experimental diets

Parameters (%)	T_1 (0%)	T_2 (10%)	T_3 (20%)	T_4 (30%)	T_5 (40%)	SEM (±)
Moisture	9.74^{d}	11.05^{a}	9.90^{cd}	10.06^{c}	10.41^{b}	0.75
Dry Matter	90.26^{a}	84.95^{d}	90.10^{ab}	89.94^{b}	89.59^{c}	0.39
Crude Protein	12.46^{e}	15.05^{c}	15.69^{b}	16.08^{a}	14.61^{d}	0.56
Crude fiber	7.18^{cd}	7.05^{d}	8.04^{b}	7.22^{c}	8.30^{a}	0.05
N F E	53.89^{a}	45.85^{b}	43.57^{c}	43.52^{c}	41.02^{d}	0.04
Total ash	7.28^{d}	9.30^{c}	9.20^{c}	10.95^{b}	13.87^{a}	0.11

$^{a, b, c, d, e}$ means of different superscripts along the same row are statistically significant ($P < 0.05$);

T_1 – Without watermelon waste and wheat offal; T_2 – 10% inclusion of watermelon waste and wheat offal; T_3 – 20% inclusion of watermelon waste and wheat offal; T_4 - 30% inclusion of watermelon waste and wheat offal;

T_5 - 40% inclusion of watermelon waste and wheat offal; **SEM** (±) – Standard error of mean; **NFE**: Nitrogen Free Extract

Furthermore, 10% inclusion of watermelon rind (T_2) had the highest value of moisture content, 30% inclusion of watermelon waste (T_4) had the highest value of crude protein, 0% inclusion of watermelon rind (T_1) had the highest value of dry matter and nitrogen free extract while 40% inclusion of watermelon rind (T_5) had the highest value of crude fibre and total ash. The crude protein range is lower than 17-20% reported by Lebas *et al*. (1997).

Table 3 shows the carcass characteristics of Hyla rabbits fed graded level of watermelon waste and wheat offal as absorbent. Results showed that there were significant effect ($p<0.05$) of the experimental diet on the live weight, bled weight and de-skinned weight. However, there was no significant effect of the experimental diets on skin weight, eviscerated weight, dressing percentage, head, forelimb, hind limb, neck, liver, kidney, lung and spleen. These results were similar to observations by Igwebuike *et a*l. (2013). A range of 46.34 - 61.89% for dressing percentage recorded in this study was lower than the 74% reported by (Aduku *et al*., 1986). The rabbits fed T_5 had the highest dressing percentage, but not significantly ($p>0.05$) different from others. Rabbits on T_4 had the highest live weight value (2.36kg) which was significantly higher ($p<0.05$) than the values obtained for T_1 (2.08kg), T_3 (1.93kg), T_2 (1.56kg) and T_5 (1.10kg), respectively. The values obtained for bled weight followed a similar pattern observed for the de-skinned weights of the rabbits. Rabbits in T_4 had a higher value (2.02kg) when compared to rabbits in T_3 (2.00kg), T_1 (1.73kg), T_2 and T_5 (1.53kg). The de-skinned weight (1.79kg) of T_4 was higher than that of T_3, T_1, T_5 and T_2 with values 1.75kg, 1.62kg, 1.50kg and 1.31kg, respectively. This observed difference in carcass composition in this study could be attributed to the differences in the rabbit genetic origin, adult body weight, maturity at slaughter, environment, diet, rearing system and other factors according to the reports of (Tumova *et al*., 2014; Kumar *et al*., 2023).

Table 3: Carcass characteristics of Hyla rabbit fed graded levels of watermelon waste with wheat offal as absorbent

Parameter (mean)	T_1 (0%)	T_2 (10%)	T_3 (20%)	T_4 (30%)	T_5 (40%)	SEM (±)
Live weight, (kg)	2.08^{b}	1.56^{d}	1.93^{c}	2.36^{a}	1.10^{e}	0.11
Bled weight (kg)	1.73^{ab}	1.53^{b}	2.00^{ab}	2.02^{a}	1.53^{ab}	0.08
De-skinned weight (kg)	1.62^{ab}	1.31^{b}	1.75^{a}	1.79^{a}	1.50^{ab}	0.06
Skin weight (kg)	0.22	0.13	0.23	0.20	0.19	0.02
Eviscerated weight (kg)	1.13	0.96	1.19	1.27	0.80	0.08
Dressing Percentage (%)	52.59	46.34	54.18	50.40	61.89	2.01
Head weight (g)	4.61	4.33	5.08	6.06	4.53	0.26
Forelimb weight (kg)	0.16	0.16	0.15	0.18	0.16	0.01
Hind limb weight (kg)	0.39	0.32	0.44	0.45	0.37	0.02
Neck weight (kg)	50.00	37.67	46.33	51.25	41.33	2.12
Liver weight (g)	32.26	40.53	42.95	49.54	37.73	2.68
Kidney weight (g)	12.58	11.45	10.96	10.70	10.42	0.58
Lung weight (g)	8.16	8.67	9.71	11.42	8.68	0.59
Spleen weight (g)	0.86	0.93	1.09	0.90	0.61	0.09

[a, b] means of different superscripts along the same row are statistically significant ($P < 0.05$).

T_1 – Without watermelon waste and wheat offal; T_2 – 10% inclusion of watermelon waste and wheat offal; T_3 – 20% inclusion of watermelon waste and wheat offal; T_4 - 30% inclusion of watermelon waste and wheat offal; T_5 - 40% inclusion of watermelon waste and wheat offal; **SEM** (±) – Standard error of mean

CONCLUSION

Based on the results, watermelon waste with wheat offal as absorbent (WRWO) had no significant effect on the carcass characteristics of Hyla rabbits except on the live weight, bled weight and de-skinned weight of the rabbits. Hyla rabbits can utilize the inclusion of watermelon waste with wheat offal as absorbent diet without adverse effect on their carcass characteristics.

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