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Full Length Research Paper

Effects of feeding adult snails *Stylosanthes guianensis* or *Lablab purpureus* as substitute for pawpaw leaf

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The feeding trial assessed the performance, carcass and sensory evaluation of adult snails fed solely on leaves of *Stylosanthes guianensis* or *Lablab purpureus* as substitute for pawpaw leaf. Ninety-six (96) adult snails were used for the trial, and they were shared into three groups. Each group was replicated four times with 8 snails per replicate in a completely randomized design. Parameters measured include weight gain, feed intake and feed conversion ratio, while dressing percent were calculated. The sensory evaluation was also carried out. The results show that snails fed *S. guianensis* performed better in terms of weight gain and feed intake and compared competitively with snail fed pawpaw leaf (P>0.05). The dressing percent, shell thickness, length and width, taste and general acceptability were not affected by the dietary treatments. Snail farmers are encouraged to cultivate *S. guianensis* to feed snails which can be used to substitute pawpaw leaf.

Key words: Feed conversion ratio, *Lablab purpureus*, *Stylosanthes guianensis*, weight gain.

INTRODUCTION

Snails have been well known and highly appreciated by Africans and Nigerians in particular for the tasty and delicious nature of the meat (Akegbejo and Akinnusi, 2000). The meat contains 18 – 19% crude protein and the calcium content is high (Awah, 1992; Bright 1996; Amusan and Omidiji, 1999). The low cholesterol level and high iron content of the meat make it good antidote for fat related diseases (Bright, 1996). In Nigeria, pawpaw leaf is the common feed given to snails of all ages. Cutting of pawpaw leaf by the farmer has affected the pawpaw plant adversely and always lead to rift between snail and pawpaw farmers in case the snail farmer has no pawpaw plantation of his own. There is need to look for another leaf that is well appreciated by snails. *Lablab purpureus* and *Stylosanthes guanensis* are leguminous plant that are high in protein (Gupta and Singh, 1983; Ruis and Lukewarm, 1998; Yi, 2000). A lot of works have been done on the use of *L. purpureus* and *S. guianensis* to feed ruminant such as sheep, goat and cattle without any adverse effect. No information as at present on the use of the leaves of these leguminous plants to feed snail. This trial assessed the performance, carcass and sensory evaluation of adult snails fed *L. purpureus* or *S. guianensis* as sole feed, compared to conventional pawpaw leaf.

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MATERIALS AND METHODS

The experiment was carried out at the Institute of Agricultural Research and Training, Moor Plantation, Ibadan. A total number of ninety-six (96) growing snails of mean weight of 303.67 ± 6.7 g were carefully selected and purchased from a snail farm in Ibadan, Oyo State. The snails were randomly allotted into 3 different groups (G_A – G_C). Each group was replicated four times with 8 snails per replicate in a complete randomized design. The snails in Group A (G_A) were fed *S. guanensis* while snails in Group B (G_B) and Group C (G_C) were fed *L. purerium* and paw paw leaves, respectively. The leaves were cut every fifteen days interval and stored inside refrigerator in order to maintain the freshness of the leaves. The snails were reared in a cage housing type. All management practices were duly observed. The cage has 12 compartments and each compartment had a dimension of 0.25 x 0.25 x 0.5 m^3.

Feed intake and weight gain were measured daily and weekly with the use of electric weighing balance. Shell length and width were measured on weekly basis with the use of vernier caliper while shell thickness was measured every week with micrometer screw gauge. Feed conversion ratio was calculated as the ratio of feed intake to weight gain. Twelve snails from each treatment were ran-

Table 1. Chemical composition of leaves of *L. purpureus*, *S. guianensis* and pawpaw on dry matter basis.

Parameter (%)	Stylo leaf (G_A)	Lab-lab leaf (G_B)	Pawpaw leaf (G_C)
Dry matter	19.75	23.40	21.84
Crude protein	19.97	18.18	22.53
Crude fibre	12.28	15.39	13.98
Ether extract	1.34	1.23	1.15
Ash	9.38	8.94	9.76
Nitrogen free extract	56.03	56.26	52.58

Table 2. Summary of performance of adult snails fed experimental diets.

Parameters mean values	Stylo leaf (G_A)	Lab-lab leaf (G_B)	Pawpaw leaf (G_C)	± SEM
Initial weight (g)	305.21[a]	301.8[a]	306.3[a]	14.50
Final weight (g)	370.15[a]	331.86[b]	370.7[a]	17.34
Total weight gain (g)	21.65[a]	10.02[b]	21.49[a]	2.05
Monthly weight gain (g)	21.65[a]	10.02[b]	21.49[a]	2.05
Total feed intake (g)	603.09[a]	425.04[b]	607.02[a]	21.02
Monthly feed intake (g)	201.03[a]	141.08[b]	202.04[a]	13.23
Monthly shell length Increment	1.56[a]	1.54[a]	1.56[a]	0.21
Monthly shell width Increment	1.15[a]	1.14[b]	1.15[a]	0.05
Monthly shell thickness (mm)	0.11[a]	0.10[a]	0.11[a]	0.03
Feed conversion ration	9.30[a]	14.15[b]	9.42[a]	2.14
Mortality	0.00	0.00	0.00	0.00

Means with different superscripts along the same row are significantly different ($P<0.05$).

domly selected at the end of the feeding trial for carcass analysis. The snails were starved over-night and killed with iron rod. The shell, foot and offals were then separated and weighed separately. The chemical composition of the forages and the meat were done according to the method of A.O.A.C. (1990). All data were subjected to analysis of variance and the means were separated by Duncan Multiple Range Test (SAS, 1997).

RESULTS AND DISCUSSION

The chemical composition of the leaves of stylo (*S. guanensis*), lab-lab (*L. purerium*) and pawpaw is shown in Table 1 and their crude protein content were 19.97, 18.18 and 22.53%, respectively. The crude fibre of Lab-lab is higher than either of stylo and pawpaw leaf. The initial weight of the snails in all the groups were relatively the same, varied between 301.8 and 306.3 g.

The mean monthly feed intake of snails in G_A and G_C was not significantly different from each other but higher than that of G_B ($P<0.05$). The mean monthly weight gain also showed the same trend like that of feed intake. The lowest weight gain of 10.02 ($P<0.05$) was recorded in snails in G_B. The lowest feed intake recorded in G_B could be as a result of high fibre content of the diet compared to G_A and G_C. The lowest weight gain recorded in G_B could be due to lowest feed intake coupled with poor utilization of the forage. The weight gain in all the treatments was generally low which could be as a result of slow growth nature of snails (Amusan and Omidiji, 1999) and due to the fact that snails used in this experiment were of age (Awah, 1992). It must be noted that snails prefer succulent leaf or forage (Omole and Kehinde, 2005) due to “delicate” nature of the teeth otherwise called “radula”. Thus the highest feed intake recorded in G_A and G_C could also be attributed to succulent nature of stylo and pawpaw leaf compared to Lab-lab (Table 1). The feed conversion ratio was better in G_A and G_C than G_B ($P<0.05$). It implies that feed was better converted to edible meat in G_A and G_C. The poor efficiency of feed utilization reported in G_B could be due to poor weight gain and high fibre content in the Lab-lab. The shell length, width and thickness were not affected by the feed offered. The mineral content (ash) in all the treatments which is responsible for shell growth and development (Daouda, 1995; Bright, 1996) was relatively the same.

No mortality was recorded during the feeding trial as observed in Table 2. The zero mortality confirmed the safe nature of all leaves of the plant used in the experiment. The proper management practices observed coupled with hardy nature of snail (Cobbinah 1993) could also be attributed to zero mortality recorded. The results of carcass analysis show that the shell, foot and offals weights were affected by the dietary treatments as shown

Table 3. Carcass analysis of adult snails fed leaves of stylo, lab-lab and pawpaw.

Parameters mean values	Stylo leaf (G_A)	Lab-lab leaf (G_B)	Pawpaw leaf (G_C)	± SEM
Live weight (g)	365.91 [a]	330.15 [b]	367.02 [a]	14.14
Shell weight (g)	121.04 [a]	98.45 [b]	120.43 [a]	6.48
Offal weight (g)	81.94 [a]	63.04 [b]	82.41 [a]	4.12
Foot (g)	145.67 [a]	125.13 [b]	144.83 [a]	5.89
Dressing percent	39.61 [a]	37.86 [a]	39.42 [a]	2.94

Means with different superscripts along the same row are significantly different (P<0.05).

Table 4. Sensory evaluation of snail meat fed leaves of stylo, lab-lab and pawpaw.

Scores values means	Stylo leaf (G_A)	Lab-lab leaf (G_B)	Pawpaw leaf (G_C)	± SEM
Colour	6.81 [a]	6.82 [a]	6.84 [a]	0.36
Taste	7.45 [a]	7.47 [a]	7.46 [a]	0.60
Flavour	6.75 [a]	6.74 [a]	6.74 [a]	0.41
Texture	6.41 [a]	6.43 [a]	6.43 [a]	0.38
General Acceptability	6.98 [a]	6.97 [a]	7.01 [a]	0.53

Means with different superscripts along the same row are significantly different (P<0.05).

Table 5. Chemical composition of snail meat fed leaves of stylo, lab-lab and pawpaw on dry matter basis.

Parameters (%)	Stylo leaf (G_A)	Lab-lab leaf (G_B)	Pawpaw leaf (G_C)	± SEM
Crude protein	18.28 [a]	18.21 [a]	18.41 [a]	1.68
Ether extract	1.02 [a]	0.99 [a]	1.01 [a]	0.03
Ash	14.06 [a]	13.81 [a]	13.96 [a]	1.12
Crude fibre	0.01 [a]	0.02 [a]	0.01 [a]	0.00
Nitrogen free extract	66.63 [a]	66.97 [a]	66.61 [a]	3.02

Means with different superscripts along the same row are significantly different (P<0.05).

in Table 3. The dressing percent which is the ratio of the foot (edible portion) to the live weight was not significantly different from one another (P>0.05) in all the treatments. The dressing percent reported in this trial was lower than what was reported by Hamzat et al. (2007) and this could be due to the fact that the snails were fed solely on leaves of plant alone without any supplementation.

The results of sensory evaluation by the panelists show that there were no significant differences in the mean taste, colour, texture and general acceptability of the meat of the snails fed stylo, Lab-lab and pawpaw leaf as observed in Tables 4 and 5.

It could be concluded that snails fed *S. guanensis* performed better than Lab-lab in terms of feed intake, weight gain and feed conversion ratio although there was no significant differences in the dressing percent, shell thickness, length and width, taste and general acceptability in all the treatments. It is recommended that the farmer should be encouraged to plant *S. guanensis* for feeding snails rather than cutting pawpaw leaf which is detrimental to pawpaw plant.

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