

APR -28

### Effect of *Calopogonium mucunoides* Forage on the Characteristics of Internal Organs of Pigs

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#### Abstract

A feeding trial was conducted to determine the nutritional potential of fresh legume forage (*Calopogonium mucunoides*) for pigs. A total of 30 grower pigs were used in a 63 days feeding trial. Five diets were formulated which contained 0, 5, 10, 15 and 20% level of fresh forage. Each diet formed a treatment which was offered to the pigs. Each treatment was replicated thrice with 2 pigs replicate, arranged in Completely Randomized Design (CRD). The pigs were fed 4% of their body weight and water was offered *ad-libitum*. All the organ characteristics in the investigation except the lungs showed significant ( $p < 0.05$ ) differences. The organs of the pigs fed on fresh legume forage were higher than the control. Supplementation of fresh legume forage in the diet of pigs increased the organs of pigs.

**Keyword:** Forage, pig, *Calopogonium mucunoides*

#### Introduction

Insufficient quantity and quality of animal protein in the diets of the world population affects not only the health and efficiency of the present generation, but also those of future generation, because such deficiencies result in various clinical and subclinical conditions such as reduced growth rate, poor physical and mental development in children and adolescents, impaired health, reduced resistance to diseases and low working efficiency. (Ojewola, 2010). Pig production has a fast link in solving animal protein deficiency problems, this because of its highly prolific nature, commonly farrowing from 7-12 piglets and producing two litters per year. (FAO, 2000).

The scarcity of conventional feed resources has ever continued to challenge livestock industries especially the monogastrics, that animal nutritionist has resorted to an alternative way of sourcing for feedstuff – nonconventional, so as to sustain uninterrupted animal protein supply and other products from livestock or poultry. Forage has been observed in the gastrointestinal tracts of pigs to increase the number of some aerobic and anaerobic commensal microflora such as lactobacilli and bifidobacteria while Clostridia, Enterobacteriaceae and E. Coli decreased.

The main objective of this study was to evaluate the potentials of *Calopogonium* legume forage on the characteristics internal organs of pigs.

#### Materials and Methods

The experiment was conducted at the Teaching and Research Farm of Department of Nutrition and Forage Science of the Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria. Umudike is located at latitude 5°29'N and longitude 7°32'E and lies at an altitude of 122 meter above sea level with average rainfall of 2000mm in the rainforest zone. A total of thirty (30) grower pigs (landrace and large white) were used for each. The pigs were 120 days old, with an average initial weight of 18kg. They were randomly distributed into five dietary treatment replicated three times with two pigs per replicate in a completely randomized design. (CRD). Each treatment group was fed with 5, 10, 15 and 20% inclusion level of fresh *Calopogonium mucunoides* forage respectively while the control group did not contain any forage. Pigs were fed both feed and water *ad-libitum*.

The forage was obtained from the university environment. The fresh forage cut at the bloom stage was chopped into small sizes and was incorporated into the concentrate feed at 0, 5, 10, 15 and 20% supplementary levels. The diets as shown in table 1 were formulated by trial and error method according to Olomu (1995). The pigs with an average initial weight of 18.5kg were housed in an open-sided pig house roofed with asbestos roofing sheet. The open sides of the building were covered with expanded metal and iron net to prevent flies and other insects from entering. Each pen had a dwarf wall each of 120cm, separating each other on a concrete floor. Each of the pens had a wallow, feeder and watering trough, all made of concrete.

Two pigs (one male and one female) from each treatment were used at the end of the experiment to evaluate the organ characteristics of pigs fed on different graded levels of *Calpogonium mucunoides* forages. Prior to slaughter the animals were fasted for 24 hours but were only given drinking water to clear their gut content from the undigested feed. Live weight of each pig was taken before slaughter. Slaughtering was done by severing with sharp knife from the neck and bled completely by hanging from the hind limb up and held down. The slaughtered pigs were scaled by pouring hot water (60°C) on the entire skin and hairs easily removed by scratching with a knife. The gut and its contents were weighed, cleaned and reweighed. The organs were removed and weighed using a sensitive top loading balance (Aculab). The organ weights were expressed in percentages of live weight.

Data collected were subjected to analysis of variance (ANOVA). Significant means were separated using Duncan New Multiple Range Test (Steel and Torrie, 1980).

Table 1: Composition of concentrate diet fed to grower pigs

| Ingredients (%)                | Composition |
|--------------------------------|-------------|
| Maize                          | 50.70       |
| Soyabean                       | 27.60       |
| Fishmeal                       | 1.50        |
| Palm kernel Cake               | 16.00       |
| Bone meal                      | 3.50        |
| Salt                           | 0.25        |
| *Premix                        | 0.25        |
| Methionine                     | 0.10        |
| Lysine                         | 0.10        |
| Total                          | 100.00      |
| Calculated Analysis (%)        |             |
| Crude protein                  | 19.59       |
| Metabolizable Energy (kcal/kg) | 3046.33     |
| Lysine                         | 1.08        |
| Methionine                     | 0.38        |
| Calcium                        | 0.55        |
| Phosphorous                    | 0.51        |

\*To provide the following per kg feed; vitamin A 10,000iu; vitamin D3 1500iu, vitamin E 4.8iu, vitamin K, 2mg; riboflavin 3mg; panthothemic acid 6mg; niacin, 15mg; choline 3mg; vitamin B12 0.08mg; folic acid 4mg; Mn 64mg; Zinc 0.5mg; iodine, 1.0mg; cobalt 125mg; copper 10mg; Iron, 20mg; flavomycin, 5mg; DL-methionine, 50gm; Selenium, 0.16gm; L-Lysine 120g; and BHT 5gm

## Results and Discussion

Table 2 shows the organ characteristics of pigs fed on legume forage expressed as a percentage of the dressed weight. All the organ characteristics in the investigation except the lungs showed significant ( $p < 0.05$ ) differences. The organs of the pigs fed on fresh legume forage were higher than the control. The higher differences in the intestine could be due to the higher crude fibre content of the forage diets, which may have increased the activities of the bacteria colonies observed to be significantly higher ( $p < 0.05$ ) in the animal, and the consequent increased digestion, fermentation or general activities of the organ.

Table 2. Effect of legume forage on internal organs of pigs

| Parameters    | T <sub>1</sub>     | T <sub>2</sub>     | T <sub>3</sub>     | T <sub>4</sub>     | T <sub>5</sub>     | SEM  |
|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|------|
| Intestine (%) | 12.20 <sup>b</sup> | 14.51 <sup>a</sup> | 15.36 <sup>a</sup> | 15.71 <sup>a</sup> | 15.45 <sup>a</sup> | 0.37 |
| Heart (%)     | 0.76 <sup>b</sup>  | 0.84 <sup>ab</sup> | 0.92 <sup>a</sup>  | 0.80 <sup>ab</sup> | 0.91 <sup>a</sup>  | 0.02 |
| Liver (%)     | 2.00 <sup>b</sup>  | 5.16 <sup>a</sup>  | 5.60 <sup>a</sup>  | 5.13 <sup>a</sup>  | 5.15 <sup>a</sup>  | 0.15 |
| Spleen (%)    | 0.40 <sup>b</sup>  | 0.45 <sup>ab</sup> | 0.55 <sup>a</sup>  | 0.54 <sup>a</sup>  | 0.60 <sup>a</sup>  | 0.02 |
| Kidney (%)    | 0.42 <sup>c</sup>  | 0.49 <sup>bc</sup> | 0.60 <sup>b</sup>  | 0.77 <sup>a</sup>  | 0.86 <sup>a</sup>  | 0.04 |
| Lungs (%)     | 2.02               | 2.02               | 2.12               | 2.12               | 2.15               | 0.02 |

a-c means along the same row with different superscripts are significantly ( $p < 0.05$ ) different. SEM = Standard Error of Mean

This agrees with Choct (2009) report who noted that microflora in the hindgut could lead to larger caecum due to fermentation activities. Again, the increase in percentage weight of heart could be associated with its increased activity as a result of the presence of anti-nutritional factors contained in the forage (Olohogbo *et al.*, 1993 and Akinmutimi, 2004). The significant ( $p < 0.05$ ) different values observed in legume forage fed animals is in agreement with Olohogbo *et al.* (1993) who reported increased in both weight and length of intestine in monogastric animals fed raw lima beans. This was also attributed to increase in the activity of the organ and presence of anti-nutritional factors which is found in the forage legumes. The increase in liver weight is in agreement with the report by Ukachukwu (2000) and Tuleun *et al.* (2010) who stated that liver is a major detoxification organ and hence increase in its activity may result in the enlargement and possibly increase weight.

## Conclusion

Supplementation of fresh legume forage in the diet of pigs increased the organs of pigs. Going by this, 15% inclusion level of the forage could be adopted for better of pigs.

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