POTENTIAL OF FORAGE (*PANICUM MAXIMUM) ON NUTRIENT DIGESTABILITY OF YOUNG* PIGS

[1]Uzegbu, H. O. [2]Ewa U. E., [2]Onunkwo D. N., [1]Aliyu, M. A and [3]Odoemelam, V. U.

1. National Agricultural Extension Research Liaison Services Ahmadu University, Zaria, Kaduna State.
2. Department of Nutrition and Forage Science Michael Okpara University of Agriculture Umudike, Abia State.
3. Department of Animal Science and Technology, Federal University of Technology, Owerri Imo State.
4. Corresponding author: hyginusuzegbu@gmail.com. Phone Number: +2347034436114

ABSTRACT

A feeding trial was carried out with a total of 30 pigs to evaluate the potential of fresh forage (*Panicum maximum*) on the appar+ent nutrient digestibility of young pigs. The trial lasted for 63days. Five diets were formulated which contained 5, 10, 15 and 20% levels of the fresh grass forage in diets T1, T2, T3, T4 and T5 respectively. Each diet formed a treatment which was fed to the pigs. Pigs were fed 4% of their body weight, and water given *ad-libitum.* Treatments were replicated thrice and each contained two pigs in a completely randomized design. Faecal and urine data samples were collected by using a metabolizable cage (107cm x 60cm x 50cm). The data collected were subjected to analysis of variance using Statistical Analysis System and significant differences between treatment means were separated using Duncan Multiple Range Test. Parameters measured indicated that crude protein (CP), ether extract (EE) and crude fibre (CF) showed significant ($P<0.05$) differences. The animals fed on diet T_3 (10% inclusion of grass forage) had the highest CP digestibility while there was a decrease in digestibility coefficient of ether extract in diet T_5 (20%inclusion level of grass) but those that were fed on the diets that has a lesser grass forage had more EE digestion. Crude fibre digestion was more on grass contained diets and less in lower grass containing diets. For optimal productivity, 15% inclusion of grass forage in the diets pigs is therefore recommended.

Key words: Pig, grass, digestibility, treatment.

INTRODUCTION

There are many under-utilized grasses forages that are found everywhere in the South eastern Nigeria. These grass forages can be explored for their nutritional values in pig ration to replace the conventional wheat offal, maize offal, Palm Kernel Cake and others(,Duru, 2010) which are expensive. Among the grasses is guinea grass (*Panicum maximum),* a common forage in the derived savannah region of Nigeria. Under food management, its nutritional value is high, having a range of 7.0-12.5% crude protein, 10.2% total digestible nutrients (TDN), high content of calcium, phosphorus and magnesium (Uzegbu *et al*., 2022).

It is a highly productive, palatable, persistence and acceptable forage. The efficient use of protein rich forage is the barrier to the digestibility of protein posed by the presence of lignified cell wall component that provides the supporting structure in most plants (Ogle, 2006).

The forage contains anti-nutritional factors such as phenol, tannin, saponin, phytate and oxalate (Sofowora, 1993). However, these substances can be inactivated to a greater extent by various processing methods, such as heat treatment, sun drying and ensilaging (Balogun, *et al.,* 2001, Toluen and Patrick, 2007). Forage, over the years are being used extensively in ruminant animal feeding because of their ability to digest high fibre diets, but not much attempts has been made to study forage in monogastric animal production. There is this fear that monogastrics do not effectively digest high fibre diets, but report has shown that pigs require some levels of lignocellulose, the major component of fibre, (Kroismayr, 2008). Available findings showed that pig can thrive well on diets containing forage or forage products (Rodriguez *et al.,* 2006). This study was designed to determine the potentials of *Panicum maximum* on nutrient digestibility of young pigs.

MATERIALS AND METHODS

Experimental Location

The experiment was conducted at the Teaching and Research Farm of Department of Animal Nutrition and Forage Science, Michael Okpara University of Agriculture, Umudike, Abia State.

Procurement and processing of Experimental Materials

The forage for the study was obtained from the university environment. It was cut at its bloom stage, chopped into smaller sizes and supplemented into concentrate feed formulated according Olomu (1995) as shown in Table 1.

Experimental Design and Management of Pigs

Thirty crossbred (Large white x Landrace) grower pigs averaging 18kg were used in a completely randomized design. The animals were divided into five dietary treatments (D_1-D_5) and each treatment replicated thrice with two pigs per replicate.

At the end of 63 days, one pigs with average weight of 40kg were housed individually in a metal metabolizable cage (107cm x 60cm x 50cm) allowing for separate collection of faeces and urine. Each pig was fed 4% body weight during the trial period of 7 days at about 8.00 and 16 hours.

Data Collection

Faeces and urine were collected separately on a daily basis between the hours of 7.00am – 8.00am for a period of 7 days.

Faeces were collected daily for each period in a plastic bags and stored in a deep freezer for each period of 7 days was dried in an oven at 105^0c for 24hours, cooled in a desiccator and weighed.

Urine was also collected daily in well labelled plastic container with record of total weight and volume. Urine collected was stored in 10ml of 10% conc. H_2S_O4 to prevent nitrogen losses by evaporation of ammonia and help the urine pH below 4. The urine was stored in a deep freezer until period of analysis for N_2.

At the end of the first collection period, the procedure was repeated twice with pigs re-allotted to the dietary treatments on a random basis. Ferric oxide powder was added to the feed as an inert marker to identify the beginning and end of each collection period. Water was offered *ad-libitum*.

At the end of the trial, representative feed and feacal samples were analysed in triplicate for proximate composition according to AOAC (1990) procedure.

The data generated were subjected to analysis of variance and significant difference between means was determined by using Duncan's Multiple Rage Test according to SAS (1995).

RESULT AND DISCUSSION

The results of apparent nutrient digestibility co-efficient of pig fed on different levels of grass forage diets are presented in Table 2. Nutrient digestibility coefficient differs significantly ($P < 0.05$) in percentage crude protein (CP), ether extract (EE) and crude fibre (CF), but did not significantly ($P>0.05$) differs amongst dry matter (DM), nitrogen free extract (NFE) and digestible energy (DE)

The highest percentage crude protein digestibility was observed in the animal fed on T3 (10% inclusion level of grass forage). This could be due to optimal microbial fermentation population in the large intestine as have been reported by Jensen (2001) and Uzegbu *et al*., (2022), hence, much protein was extracted from the forage.The increased crude fibre digestibility of the forage supplemented diets could be due to high cellulose and lignocellulose contents (T3, T4 and T5) or increased level of grass inclusion in the diets. This may have stimulated the growth of microbial population. This agrees with the observation of Uzegbu *et al*., (2022) which reported that microbial population in the gut of pigs increased with increasing percentage (%) of grass forage in the diet, thus the increase in digestibility is as the fibre content of the diet increases.

This may have provided enough substrate for microbial fermentation in the gastrointestinal tract (GIT) as reported by Jenson (2001). Moreover, the fibre in the diet may have stimulated the microbial growth in the GIT and production of short chain fatty acid (SCFA). This report agrees with the observation made by Koenou *et al*., (2008) which reported that fibre content in forages stimulate the growth of microflora in the gut of farm animals. This would also be the reason why the faecal moisture content was normal during the trial.

Conclusion and Application

The study showed that *Panicum maximum* forage is essential in improving the nutritional value of pigs. Its 10% inclusion in the diets of pig significantly improved apparent digestibility. It was therefore concluded that its 10% inclusion in the diet is adequate for effective performance of young pigs.

Table 1: Composition of experimental Diet Supplemented With Grass Forage

Ingredients	**T_1**	**T_2**	**T_3**	**T_4**	**T_5**
Concentrates (%)	100.00	95.00	90.00	85.00	80.00
Grass (%)	0.00	5.00	10.00	15.00	20.00
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
Analysed Composition					
Dry Matter (%)	86.16	86.70	86.98	86.34	85.33
Crude Protein (%)	20.18	19.54	18.90	18.25	17.61
Ether Extract (%)	3.76	3.86	3.96	4.61	4.17
Crude Fibre (%)	5.38	6.95	8.57	10.17	11.76
Ash (%)	9.5	9.63	9.75	9.88	10.00
Nitrogen Free Extract (%)	54.47	54.51	54.30	54.04	53.05
Gross Energy ((kcal/kg)	4.00	3.97	3.94	3.90	3.87

Table 2: Nutrient Digestibility of Pigs fed on graded levels of grass forage

Parameters	**T_1**	**T_2**	**T_3**	**T_4**	**T_5**	**SEM**
Crude protein (%)	66.15^{c}	64.41^{c}	71.69^{a}	65.75^{c}	68.76^{b}	0.54
Ether extract (%)	69.41^{a}	69.43^{a}	68.20^{ab}	66.67^{ab}	65.22^{c}	1.29
Crude fibre (%)	55.16^{c}	64.80^{b}	67.21^{b}	69.32^{a}	69.03^{a}	1.29
Dry Matter (%)	86.16	86.70	86.98	86.34	85.33	0.29
Nitrogen free extract (%)	54.47	54.51	54.30	54.04	53.05	0.22
Digestibility Energy (kcal/kg)	70.75	70.25	69.79	69.23	68.74	1.26

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

References

A.O. A. C. (1990). Official Method of Analysis 14th ed. Washington DC.

Balogun, T. F, Kaankuku, F. G. and Bawa, G. S. (2001).effect of period of boiling full fat soyabean on its amino acid profile on performance of pigs. Nig Journal of Animal Production 2891): 45-51.

Jensen, b. b. (2001). Possible ways of modifying type and amount of product from microgrid fermentation in the gut of pig. In Piva A., Bach – Knudsen, K. E., Lindberge, J. E. 9Eds.) Gut environment of pig. The Nottinggham Univ. Press. Nottinggam. 181-200.

Keonou, S., Phengsavanah, P. Stur, W., Kapinski, J and Lethorme, P. (2008). Performance of the Loe local pig breed 'Moolat" fed a nutrient dense diet. Livestock research centre, N. A. f. r. i. Vientiane Lao. PDR.

Kroismayr, A. (2008). Lignocllulose-fresh wood as dietary fibre. Pig progress 4 (24): 33-35.

Ogle, B. (2006). Forage For Pigs. Nutritional physiological and practical implementations. Workshop on forage for pigs and rabbit. Dept. of Animal Nutrition and Mgt.. Swedish University of Agric. Sci. Sweden.

Olomu, J. M. (1995). Non-Ruminant Animal Nutrition. Nachem, Nigeria. Pp. 159 -170.

Rodriguez, L., Peniche, I. and Preston, T. R. (2006). Digestibility and Nitrogen balance in growing pig feed a diet of sugar conc. Juice and fresh leave of new cocoyam (*Xanthosomonas sagititolium*) as partial or complex replacement for soyabean protein. Workshop on forage for Pig and rabbit. Santander – Sur Columbia. Pp 1-7.

SAS (1995). Statistical Analysis System. Institute Inc. Users Guide. Statistcis version 6th ed. Carry. North Carolina, USA.

Sofowora, A. (19981). Medicinal Plants and Traditional Medicine in Africa (2nd edition). Spectrum Books Ltd. Ibadan Nigeria P. 289.

Tuleum, C. D. and Patrick, J. P. (2007). Effect of duration of cooking mucuna utilis seeds on proximate analysis, levels of anti-nutritional factors and performance of broiler chicken. Nig. Journal of Animals Production 34(1) 45-53.

Uzegbu, H. O. and Ukonu, E. C. (2022). Evaluation of the potential of *Panicum maximum* forage on the gut microbial population of pig. 47th Annual Conference of NSAP 2022 (Jos). Pp 1336-1338.