

NUTRIENT DIGESTIBILITY OF CROSSBRED WEANED PIGS FED SUNDRIED CASSAVA STARCH EXTRACT PULP

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Abstract

As the search for alternative sources of energy for monogastrics animals to reduce competitions between humans and industries for available conventional feedstuffs continues, this study was undertaken to investigate the effect of sundried cassava starch extract pulp on nutrient digestibility of crossbred weaned pigs. Cassava starch extract pulp from cassava processing factory in Ado-Awaye near Iseyin in Oyo State were processed into meal by sundrying for three weeks and included in diets at graded levels of 0%, 25%, 50% and 75% in a complete randomized design experiment using eight weeks old crossbred (largewhite x landrace) weaned pigs. Crude protein, ash, crude fibre, ether extract, dry matter, nitrogen free extract similarly gave values on the processed sundried cassava starch extract pulp diets that were comparable or even superior to values on the control diet ($p < 0.05$). Based on the findings of this study, it is concluded that inclusion of sundried cassava starch extract pulp meal in diet at 75% has no deleterious effects on nutrient digestibility of crossbred weaned pigs.

Keywords: nutrients, digestibility, weaned pigs, sundried, cassava starch extract, pulps

Introduction

The high nutritive value, relative cheap cost of production and short gestation period of pig enable pig product (pork) to be the ideal animal protein source for feeding the world human population. Despite this, high feed cost remains a major bottleneck to efficient and improve pig farming. Cribb, (2010) opined that orthodox feed ingredients used in formulating pig diets are in short supply mainly as a result of the increase in human population and unfavorable climatic conditions. The high demand for conventional energy and protein feed ingredients as food by the ever growing world human population and other industrial uses has increased research interest in alternative cheaper ingredients for pig feeding. Cassava pulp is a solid by product of starch production from cassava root. During starch production, cassava pulp yields from 10 – 15% of the root which is a readily available material in major starch producing countries (Khempaka *et al.*, 2009). Cassava pulp is rich in starch ranging from about 54 -70% (Khempaka *et al.*, 2014) and the pulp is reported to contain between 4.40%, 1.30%, 3.15%, and 0.71% of ash, crude protein, crude fibre and ether extract respectively (Ogunbode, *et al.*, 2019). Suksombat *et al.*, (2007) opined that cassava pulp contains 36.7% neutral detergent fibre, 9.8% acid detergent fibre and 3.9% acid detergent lignin. The by- products of cassava processing stand out as cheaper energy substitutes for feed formulation for animals and this would probably enhance the reduction of agribusiness waste which are often discarded indiscriminately in the environment. All these by- products are generally found in the vicinity of factories where cassava tubers are processed into starch. As cassava starch production increases, so does the large volume of waste by – product generated. This study was therefore conducted to investigate the nutrient digestibility of crossbred weaned pigs fed sundried cassava starch extract pulp.

Materials and Methods

The experiment was carried out at the piggery unit of the Teaching and Research Farm, of the Oyo State College of Agriculture and Technology Igboora, Nigeria. The experimental areas lie in savannah forest zone on latitude 7°43'N and longitude 3°28'E in an elevation of 140m, above the sea level. The average minimum temperature is above 21.5°C and maximum average temperature is about 32.5°C. The cassava starch extract pulp was collected from Psalter Farm International along Ado- Awaye Maya Road. The fresh cassava starch pulp collected was sundried for three weeks based on intensity of the sun and environmental temperature after which it was milled using hammer mill and stored for proximate analysis. Sixteen (16) crossbred large white X landrace weaned pigs in their 8th weeks of age was obtained from the piggery unit of the College. The pigs were dewormed to eliminate both endo and ectoparasite using ivermectin at 1ml per body weight and offered feed at 4% of their body weight at the beginning of the experiment and with subsequent increase as the animals' age while water was supplied *ad libitum*. The pigs were allowed three (3) days of acclimatization and were fed twice daily in the morning (7:30am) and evening (4:00pm). The experiment lasted 56 days. Proximate analysis of sundried cassava starch extract pulp was carried out according to the procedure of AOAC (2010). Two pigs per treatment was randomly selected and housed separately in individual pens and were acclimatized for two days prior to the commencement of a five - days metabolic trial. A known weight of feed was fed to the pigs housed in individual pen. Total daily faecal sample was collected once in a day, sundried and later stored for analysis according to the procedure (Mc Donald *et al.*, 2002) as shown below:

Nutrient in feed = Amount of feed consumed x Nutrient of diet analyzed.

Nutrient in faeces = Amount excretal x % of excretal analyzed

$$\text{Nutrient Digestibility} = \frac{\text{Nutrient in feed} - \text{Nutrient in faecal}}{\text{Nutrient in feed}} \times 100$$

The experimental design used was completely randomized design and data collected was subjected to one way analysis of variance and where significant differences exist between the means Duncan Multiple Range Test (Duncan, 1955) was used to separate the means.

Table 1. Nutrient digestibility of weaned pigs fed sundried cassava starch extract pulp

Parameters (%)	1	2	3	4	SEM
Crude Protein	14.55 ^c	15.40 ^{ab}	14.96 ^{bc}	16.01 ^a	0.23
Ash	10.50 ^c	13.10 ^a	11.04 ^b	11.10 ^b	0.30
Crude Fibre	7.50 ^b	9.80 ^{ab}	8.40 ^{ab}	9.10 ^a	0.29
Ether Extract	3.10	3.30	2.29	3.10	0.80
Dry Matter	90.50	89.77	90.10	90.36	0.10
NFE	64.35	64.17	62.70	60.60	1.09
Digestible Energy (Kcal/g)	1.10	1.12	1.11	1.13	0.00

a, b, c, d means on the same row with different superscript differ significantly (p<0.05)

NFE: Nitrogen Free Extract

Results and Discussion

The results of nutrient digestibility of crossbred weaned pigs fed sundried cassava starch extract pulp meal are presented in Table 1. There were significant ($p > 0.05$) difference in crude protein, ash and crude fibre digestibility. Their improvements observed was as a result of processing techniques employed in reducing the toxins in cassava. Pigs in T4 reported the highest crude protein digestibility value of (16.01%) followed by those in T2 with a value of (15.40%), while the least values from pigs in T3 and T1. Ash digestibility were highest (13.10%) in pigs fed T2 while the least value (10.50%) was recorded for pigs in the control diets. Crude fibre digestibility was highest (9.30%) in pigs maintained on T2 and the pigs on the control recorded the lowest value (7.50%). Ether extract, dry matter and nitrogen free extract digestibility were not significantly ($p < 0.05$) different across the treatment group as the values obtained on test ingredient compared favourably with those on the control. Higher crude protein, ash and crude fibre digestibility observed might be an indication of the better palatability of the diets contrary to the energy-diluting effects of higher dietary fibre in the diets. There was no significant ($p < 0.05$) difference in the ether extract digestibility as the pigs on the test ingredient compared favourably with the pigs on the control diet. Dry matter and digestible energy digestibility follow the same pattern. This indicated that the appetite of pigs was not affected when sundried cassava starch extract pulp was incorporated in the diet up to 75%. Lizardo and Aumaitre (2001) stated that six to twelve percent of beet pulp in piglet diets did not affect total tract digestibility of energy and nitrogen. The values obtained for crude fibre digestibility increased with increased level of inclusion of sundried cassava starch extract pulp. The result implied that the inclusion of sundried cassava starch extract pulp had a positive effect on the digestion of dietary fibre. This result was in line with the findings of Zhang *et al.*, 2013 who opined that fibre digestibility was improved when total dietary fibre increased. The better digestibility of crude protein, ash and crude fibre could be attributed to increased short-chain fatty acid production and absorption in pigs fed with the high fibre diet (Ziemer *et al.*, 2012).

Conclusion and Recommendation

It can be concluded that the inclusion of sundried cassava starch extract pulp up to 75% level has no adverse effect on nutrient digestibility.

References

- AOAC, (2010). Association of Official Analytical Chemists. Official methods of Analysis 16th Ed. Washington DC. Arlington.
- Cribb, J. (2010). The coming famine (The global food crisis and what we can do to avoid it). CSIRO Publishing.
- Duncan, O.B. (1955). Multiple Range and Multiple F Test. Biometrics, 11, Page 1- 42.
- Khempaka, S.K., Thongkratok, S., Okrathok, and Molee, W. (2014). An evaluation of cassava pulp feedstuff fermented with *A. oryzae* on growth performance, nutrient digestibility and carcass quality of broilers. *J. Poult. Sci.*, 51: 71 -79.
- Khempaka, S., Molee, W. and Guillame, M. (2009). Dried cassava pulp as an alternative feedstuff for broiler: Effect on growth performance, carcass traits, digestive organs and nutrients digestibility. *Journal of Applied Poultry Research*. 18: 487 – 493
- Lizardo, R and Aumaitre, A. (2001). Non – starch polysaccharides of sugar – beet pulp improve the adaptation to the starter diet, growth and digestive process of the weaned pig. In: J. Brufau (ed). Feed manufacturing in the Mediterranean region. Improving safety from

feed to food. Cahiers Options Mediterraneennes No. 54. P.185 – 189. Zaragoza: CIHEAM.

McDonald, P., Edwards, R.A., Greenhalgh, J.F.D and Morgan, C.A. (2002). Animal Nutrition, 6th edition.

Pearson, Prentice Hall, UK

Ogunbode, A.A., Akinosun, A.A and Olajide, T.M. (2019). Nutrient and anti- nutrient content of sundried

cassava starch extract pulp. *J. Appl. Sci. Environ. Manage.* Vol. 23 (6).1133-1135

Suksombat, W., Lounglawan, P and Noosen, P. (2007). Energy and protein evaluation of five feedstuffs

used in diet in which cassava pulp as main energy source for lactating dairy cows.

Suranaree J. Sci. Technol. 14: 99 – 107.

Zhang, W., Li, D., Liu, L., Zang, J., Duan, Q., Yang, W and Zhang, L. (2013). The effects of dietary fiber

level on nutrient digestibility in growing pigs. *Journal of Animal Science and*

Biotechnology. 4: 17

Ziemer, C.J., Kerr, B.J., Weber, T.E., Arcidiacono, S., Morrison, M and Ragauskas, A. (2012). Effects of

feeding fiber-fermenting bacteria to pigs on nutrient digestion, fecal output and plasma

energy metabolites. *Journal of Animal Science.* 90: 4020 – 4027.