

*Original Research Article*

## **Effects of Cassava Pulp Seviat Meal on the Serum Biochemical Indices of Finisher Broiler Birds**

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### **ABSTRACT**

Sixty 28 days old unsexed Anak breed of broiler birds were used in four weeks feeding trial to assess the effects of Cassava Pulp Seviat Meal (CPSM) as energy source ingredient on serum biochemical indices of the experimental birds. The twenty- eight days old birds were grouped to feed on four treatment diets with four different levels of (CPSM) as T1 (0% CPSM), T2 (10% CPSM), T3 (20% CPSM), and T4 (30% CPSM) respectively. The birds were grouped into four treatments of fifteen birds per treatment group and each group was further replicated three times in completely randomized design of five birds per replicate. Feed and drinking water were supplied regularly and in so doing, adequate medication and sanitation measures were carried out. At the last day of the fourth week of the feeding trial, two birds were randomly selected from each replicate and 10ml bloods were collected from each bird with 10ml sterile syringe. The samples collected were used to assess the serum biochemical profiles of the experimental birds. Results showed that the serum biochemical indices of the experimental birds in glucose, cholesterol, protein, albumin and globulin, decreased as the inclusion levels of cassava pulp seviat meal increased in their diets though it did not show any deleterious effects on the birds. The result also showed that urea creatinine and cyanide increased as the inclusion levels of the CPSM increased in their diets. The inclusion of 20% cassava pulp seviat in finisher broiler bird's diet negatively affected the serum values which resulted to poor performance of the birds. However 20 percent cassava pulp seviat meal appears to be the optimal inclusion level in finisher broiler birds for good result in serum biochemical values of the birds.

**Key words:** Poultry and energy feedstuff source, Cassava Pulp Seviat Meal, finisher broiler birds and serum values.

### **INTRODUCTION**

Inadequate poultry and livestock feed supply and nutrition had been identified as the major constrain to poultry and livestock production in Nigeria. This is so because the conventional livestock feedstuffs sources have been very expensive especially in monogastrics diets such as poultry, pigs and rabbits. However, the

search for locally available feedstuffs that can substitute these conventional energy/ protein feed ingredient at cheap cost is imperative. The insufficient production of the local feed resources coupled with high cost of importation of foreign feedstuffs for poultry also had tremendous increase in the cost of poultry production in Nigeria (Madubuike and Ekenyem, 2006; Obidinma, 2009.)

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Broiler is a type of bird raised specifically for meat; the Anak broiler bird is typically known and bred specifically for efficient meat production and grows much faster than the traditional dual purpose breeds. Kekeocha, (2001), identified that broiler birds have fast growth rate, high feed conversion efficiency and reach market size at eight weeks old at 4-5 kilogram body weight. Energy is the most expensive part of poultry diet and constitutes up to 60 to 75% of the total diet, (Okonkwo and Ahaotu, 2014). Recent researchers have discovered that some agro by-products such as cassava pulp seviate, maize offal, wheat offal, cassava, yam, cocoyam and plantain peels, some plant leaves and animal wastes which hitherto were discarded as waste are now used as livestock feed to partially or totally replace a proportion of conventional energy and protein sources such as maize, sorghum, wheat, oat, soybean and groundnut whose prices have gone higher, (Obidinma, 2009; Ani and Omeje, 2008). Although many alternatives to conventional energy feedstuffs exist such as cassava pulp seviate, wheat offal, maize offal, brewers spent grain etc. consequently, some anti-nutritional factors which can limit their adequate utilization and absorption equally exist, (Apata and Ojo, 2000; Madubuike and Ekenyem, 2006; Obidinma, 2009; Okonkwo and Ahaotu, 2014). However, adequate information on the nutritional indices and acceptability of these unconventional plants and animal by-products is very important.

Cassava pulp seviate is one of the agro by-products of great nutritional importance in livestock production as it can help to reduce high cost of maize which is the major energy feedstuff for poultry and other livestock in Nigeria, (Okonkwo and Ahaotu, 2014). Cassava pulp seviate is that part of Cassava tuber which is usually obtained when the outer cover (peel) of the tuber is removed, the tubers are grated into a pulp or mash with metal graters or wooden graters with wooden teeth, put into a sack and subjected under pressure (heavy stone) or pressing machine to remove water (de-watering) which when sieved and extracted the material of interest, (cassava flour) what is remaining which is supposed to be discarded is called seviate (chaff). Cassava pulp seviate is also a by-product of cassava tuber (*manihot esculenta*) and cassava starch, garri and fufu manufacturing. It is low in crude protein, composed of about 70% starch but high in fibre content, (Ogbonna et al. 2000; Anyanwu, 2000; Jimoh et al. 2014). Maize has become multi-purpose farm produce in Nigeria, not only as a staple food for a large population such as Nigeria but also a major raw material for some industries (biscuits, brewing industries etc) among others. Consequently, its prices have continued to rise since its nutritional production level is too far below the demand. Therefore, the search for the product or material that can substitute these conventional sources of energy/protein continues. Importation of these conventional feedstuffs may also increase the cost of poultry production. However, this study assessed the effects of cassava pulp seviate meal as

energy feed ingredient on the serum biochemical values of the Anak finisher broiler birds.

## MATERIALS AND METHODS

### *Location of the experiment:*

This study was carried out at the Poultry Unit of Imo State University Teaching and Research Farm, Owerri, Nigeria which lies between latitude, 5.35<sup>1</sup>N and 6.10<sup>1</sup>N and longitude, 6.40<sup>1</sup>E and 7.11<sup>1</sup>E at 90m above sea level. The area also has an annual mean temperature of 32.18<sup>0</sup>C and rainfall of 192-194cm with relative humidity in the range of 77-78.42% annually (Ministry of Land and Survey, 2004).

### *Preparation of experimental diets:*

The cassava pulp seviates used in this study were collected locally from the garri processing areas and rural farmers from Ohaji Egbema in Oguta Local government of Imo State, Nigeria. The cassava pulp seviates were sun dried and passed through a hammer mill, suitable for incorporation into broiler finisher birds feed. The material was also subjected to proximate analysis according to AOAC (2000) and was used to replace maize at 0, 10, 20 and 30% respectively.

### *Experimental birds and designs:*

A total of one hundred (60), unsexed Anak breed of broiler birds at 28 days of age were used for the study. The birds were reared and managed in a deep litter system. The birds after stabilizing them for 7 (seven) days with conventional commercial broiler finisher feed were divided into four treatment groups of 15 (fifteen birds) per group. However, each group was further divided into three replicates of five birds (5 birds) per replicate in a completely randomized design. The routine management practices were scrupulously followed for instance, water and feed were supplied *ad-libitum*, while appropriate medication measures were carried out and other standard poultry management measures were followed.

### *Data collection and analysis*

Data were collected from the following parameters on the serum indices of the finisher broiler birds:

- Albumin concentration
- Serum urea
- Globulin concentration
- Glucose concentration
- Serum protein (Total protein)
- Serum cholesterol
- Serum creatinine
- Hydrogen cyanide (HCN) concentration

On the 27th day of the feeding trial and before the termination of the trial, two birds were randomly selected from each replicate starved of feed overnight but not water. From the selected birds, 10ml blood sample was collected from each bird through the wing vein (web vein) with 10 ml sterile syringe, the blood so far collected

was used for assessment of serum biochemical indices of the birds. The blood sample was poured into the vial bottles (without anti-coagulant) and this was allowed to coagulate to produce sera which were used for serum indices analysis.

**Table 1: proximate composition of cassava pulp- sievate meal (CPSM)**

Nutrients	Value
Crude protein %	3.36
Crude fibre %	17.59
Ether extract/fat %	4.66
Ash	2.35
Moisture	18.32
Hydrogen Cyanide HCN 28g/100g	58.79
NFE	62.9
Carbohydrate	53.79

## RESULTS AND DISCUSSION

The results of the serum biochemical values of the finisher broiler birds in this study were presented in table 3: the Albumin Concentration of the various treatments were, 30.50, 30.06, 29.16 and 26.30g/dl, for T1, T2, T3 and T4 respectively.

The birds showed significant differences ( $p < 0.05$ ) on their serum albumin values. However, T1 had the highest

value ( $p < 0.05$ ) among the other treatments, followed by T2, the least value was obtained by T4 (26.30g/dl). However, in serum urea indices the values were as follows, T1 3.30, T2 3.36, T3 2.76 and T4 2.70 respectively. Of the birds, T2 was the highest ( $p < 0.05$ ), followed by birds on diet T1, those on diet T4 had the least ( $p < 0.05$ ) value of urea.

### *Experimental diets*

**Table 2**

Ingredients%	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Yellow maize	60	50	40	30
Cassava pulp sievate meal	0	10	20	30
Groundnut Cake	15	15	15	15
Soyabean meal	5	5	5	5
Palmm kernel cake meal	11.20	11.20	11.20	11.20
Fish meal	4.00	4.00	4.00	4.00
Bone meal	4.00	4.00	4.00	4.00
Common salt	0.30	0.03	0.03	0.30
Premix (Broiler finisher)	0.25	0.25	0.25	0.25
L .Lysine	0.15	0.15	0.15	0.15
DL.Methionine	0.10	0.10	0.10	0.10
	100	100	100	100
% Crude protein	20.08	19.42	18.75	18.09
ME Kcal/Kg	2953.40	2949.35	2885.29	2851.24

**Table 3: Effects of cassava pulp seviate on the serum biochemical indices of the experimental birds**

Parameters	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	SEM
Albumin (g/dl)	30.50 <sup>a</sup>	30.06 <sup>ab</sup>	29.16	26.30 <sup>d</sup>	0.52
Serum Urea (mg/dl)	3.30 <sup>a</sup>	3.36 <sup>a</sup>	2.76 <sup>b</sup>	2.70 <sup>c</sup>	0.12
Globulin g/dl	52.50 <sup>a</sup>	51.13 <sup>b</sup>	39.60 <sup>c</sup>	34.03 <sup>d</sup>	2.35
Glucose mg/dl	138.40 <sup>a</sup>	137.80 <sup>a</sup>	135.20 <sup>ab</sup>	130.50 <sup>b</sup>	0.97
Protein g/dl	83.00 <sup>a</sup>	81.20 <sup>a</sup>	68.30 <sup>b</sup>	60.40 <sup>c</sup>	2.82
Cholesterol mg/dl	135.33 <sup>a</sup>	134.33 <sup>a</sup>	132.00 <sup>ab</sup>	132.00 <sup>ab</sup>	0.48
Creatinine g/ml	1.50 <sup>c</sup>	1.70 <sup>b</sup>	2.33 <sup>a</sup>	2.40 <sup>a</sup>	0.11
Cyanide ml/l	0.00 <sup>c</sup>	0.02 <sup>b</sup>	0.06	0.12	0.01

Abcd: Means with different superscripts on the same row are significantly different ( $P < 0.05$ )

**Note:** SEM: Standard error of means

**T1 to T4** -Treatment groups

**CPSM**- Cassava pulp seviate meal

The following were the values for Globulin, 52.50, 51.13, 39.60 and 34.03 for T1, T2, T3 and T4 respectively.

On globulin concentration, T1 had the highest value of 52.50g/dl, followed by T2 with the value of 51.13g/dl, while T4 had the least value of 34.03g/dl.

On Glucose concentration, the values obtained by the experimental birds were as follows, 138.40, 137.80, 135.20 and 130.50mg/dl for T1, T2, T3 and T4 respectively. However, T1 had the highest value ( $P < 0.05$ ) of glucose among the treatment groups while T4 had the least value of glucose. On the total serum protein, the values obtained include: 83.00, 81.20, 68.30 and 60.40 for T1, T2, T3 and T4 respectively. T1 had the highest ( $P < 0.05$ ) value of total protein followed by T2 and the least was T4 and this differed significantly among the other treatments. On the serum cholesterol, the birds obtained the following values 135.33, 134.33, 132.00 and 132.00 mg/dl for T1, T2, T3 and T4 respectively. T1 had the highest value ( $P < 0.05$ ) of serum cholesterol and the values obtained by T3 and T4 were same ( $P > 0.05$ ) and these differed significantly from T1 value. There were significant differences on creatinine values (1.50, 1.70, 2.40 and 2.33 g/ml), for T1, T2, T3, and T4. However, T3 had the highest ( $P < 0.05$ ) value of creatinine followed by T4, T1 had the least value ( $P < 0.05$ ) among the treatments. Hydrogen Cyanide showed no significant difference ( $P < 0.05$ ) among the treatments even though T4 had the highest ( $P < 0.05$ ) hydrogen cyanide with the values 0.012ml/l.

The results obtained for serum biochemical indices of the experimental birds indicated the roles of cassava pulp seviate meal (CPSM) and its crude fibre content in poultry (broiler finisher) diets. Madubuike and Ekenyem (2001), Ikeagwu, (2000) and Isikwenu et al. (2000),

observed that the consumption of different types of feed by any specie of animal has some measurable effects on the blood (plasma) and the constituents of the animal blood. However, Iheukwumere et al. (2008) also indicated that any feed consumed by an animal could be used to determine the metabolic state of the animal as well as the quality of the feed. The significant differences ( $P < 0.05$ ) recorded in Albumin values showed that the birds fed the control diet was the highest ( $P < 0.05$ ) among other groups while birds that were fed 10% CPSM recorded the highest ( $P < 0.05$ ) albumin among other treatment groups followed by birds on T2, (20% CPSM) and then T3 (30% CPSM), T4 group (40% CPSM) was the least in albumin value. Obidinma, (2009) observed that higher albumin concentration in the serum of any animal indicates high plane of nutrition. In this study good plane of nutrition were indicated in diets, groups T2 and T3, T2 was comparable to T1 (control) which was the highest in albumin concentration. The albumin level decreased as the level of CPSM increased in the diets of the experimental finisher broiler birds. This also indicated the effects of high fibre diets in the monogastric animal nutrition such as poultry; this also indicated that CPSM has high fibre content at 40% inclusion level in the poultry diet. There were also significant differences ( $P < 0.05$ ) in urea, globulin, protein, cholesterol and creatinine levels of the experimental birds. This agrees with the findings of Anyaehie, (2006), who noted that high plane of nutrition is associated with high levels of albumin, urea, glucose, cholesterol etc. Egwum, (1970) and Oboh (2006) observed that blood urea measurement is a technique for assessing protein quality and usability. However, birds placed on 10% and 20% CPSM, compared favourably on most parameters with birds placed on the control diet (T1 0% CPSM). Higher globulin levels in the serum of the

experimental birds indicated high disease fighting agents in the plasma of the birds. This agrees with the findings of Anyaehie (2006) and Obidinma, (2009) that low globulin in the serum of an animal indicates lower anti nutritional factors of the test material (CPSM), they also observed that anti- nutritional factors and disease agents provoke disease fighting agents in the plasma of animals. Higher serum ( $P < 0.05$ ), Creatinine of birds placed on the experimental diets indicated poor nutrient utilization. This could be as a result of higher fibre levels in diet, T4. This agrees with Obidinma, (2009), who observed that dietary fibre in the diet of broiler or laying hen could be used as energy diluents in an effort to produce lean meat. More so, the relative reduction in serum cholesterol and glucose levels in plasma of the experimental birds on, 30% CPSM, indicated the beneficial effects of fibre diets as it has tendency to reduce diabetics, obesity, cancer and high blood pressure in human beings that consume (lean) meat from broilers that were fed fibre diets. However, the decreasing levels of serum protein and albumin with increasing inclusion levels of CPSM in diets of experimental birds on 30% CPSM indicated the negative effect of high crude fibre and other agro- industrial products in the diets of

monogastric animals such as poultry. The monogastric animals have low capability of handling high fibre diets.

## CONCLUSION

This study shows that inclusion of cassava pulp seviate at 30% level in finisher broiler diet affected the serum biochemical indices of the experimental birds. However, some serum indices even at high inclusion level of CPSM in the diets of experimental birds' diets did not show any negative effect on the performance of the birds. This is because some of the serum indices were still within the recommended standard for broiler birds for example, Sturke et al. (2000) stated that cholesterol normal range for poultry was 100-150mg/dl, urea 3.5-4.13, while the clinical diagnostic,(1990) stated normal range for cholesterol to be between 129-217mg/dl and total serum protein between 70-100mg/dl. This showed that inclusion level of CPSM at 20% level in finisher broiler diets supported serum biochemical indices of the broiler Anak birds, thereby helped to reduce pressure on maize meal which assumed to be the major source of energy in poultry production, in Nigeria.

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