POLISH JOURNAL OF NATURAL SCIENCES
Abbrev.: Pol. J. Natur. Sc., Vol 36(2): 131–145, Y. 2021

GROWTH PARAMETERS, ECONOMIC ANALYSIS AND BLOOD CHARACTERISTICS OF WEANED PIGS FED CASHEW REJECT KERNEL MEAL

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Key words: cashew, economy, blood parameters, performance, weaned pigs.

Abstract

Growth parameters, economic analysis and blood characteristics of weaned pigs fed graded levels of cashew reject kernel meal (CRKM) were studied in a 42 day trial. Forty (40) weaned pigs with mean weight of 8.67±0.99 kg were randomly assigned into four experimental diets such that Diets 1, 2, 3 and 4 contained 0%, 5%, 10% and 15% CRKM respectively. The chemical profile of CRKM showed 21.10% crude protein, 35.09% ether extract, 9.20% moisture, 6.83% crude fibre, 4.10% ash, 23.67% nitrogen fee extract, 11.69 MJ/kg metabolizable energy, 0.01% tannin, 0.26% saponin, 0.19% phytate, and 19.22 µg/kg ppm aflatoxin. The results showed that feed intake, economic indices, haematological parameters, and serum metabolites like alanine aminotransferase, asparatate aminotransferase, albumin and glucose were significantly influenced ($p < 0.05$). Conclusively, incorporation of up to 15% CRKM in weaned pigs' diet favour growth performance, lowered feed cost, improved economic advantages and was not deleterious to the haematological and serum metabolites.

Introduction

The declining convectional feedstuff production is aggravated by the rising threat of climate change accompanied with geometric population growth (LI and KAISER 2011, COSTER and ADEOTI 2015). Although, crop differs in climatic prerequisite and economic prominence but climate change is affecting productivity. Thus, food/feed security is threatened. For instance, rain starts around March and stabilises in April in south-west, Nigeria but climate has changed and rain does not stabilize until

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late May. This has affected the production of ephemerals crops like maize to a single cycle per year while other orthodox feedstuffs like soybean and groundnut has been affected resulting in decreased productivity, hike in price coupled with competition between man and livestock. Alternative feedstuffs has to be explored.

Cashew (*Anacardium occidentale*), a tropical and subtropical drought resistant tree crop has received economic attention (KGF 2011), because of the industrial potential of the nut which is now an import-export commodity globally (Akinhanmi et al. 2008) with Cote d'Ivoire being the Africa's leading producer of the nuts (FAO 2015, Heuze et al. 2017) after Nigeria lost its place in 2010 (Adesanya et al. 2021). The nut can be separated into the toxic shell and edible kernel (Quirino et al. 2014). The nutritional evaluation of the kernel reveals that it contains protein, fat, energy, amino acids, vitamins and minerals.

The cashew nut processing plants are growing in number especially in exporting countries of Africa, Asia and Latin America (Akinhanmi et al. 2008). Aliyu and Hammed (2008) attributed to the expansion in production to meet local consumption and export. During processing, unsuitable portions of the kernel, unfit for human consumption or export owing to damages are discarded and depending on quality are estimated to be as high as 30% (Akande et al. 2015) of the total kernel processed. Ojewola et al. (2004), FAO (2013) and Akande et al. (2015) proved their suitability as an animal feedstuff. These authors have proved its protein efficiency worth (22–38% crude protein), and comparative advantage (lower cost per kg) over soybean meal and groundnut meal in chickens.

The expansion in cashew production, global output and demand from various countries are a proof that the kernels will be available as a feasible livestock feed ingredient (FAO 2013). However, literature on the use of the kernel in swine diet is scanty. Thus, there is research deficit using cashew kernel because deserved awareness has not been given to it. There is therefore need to investigate cashew kernel as another unorthodox feed material for zootechny. This study venture to unveil the potentials of cashew kernel by evaluating the growth parameters, economic analysis, haematological parameters and serum biochemistry of weaned pigs.

Materials and Methods

Location of the experiment

The swine research unit of the Ladoke Akintola University of Technology, Ogbomoso was used for the experiment. Ogbomoso's vegetation is a derived savannah zone which lies on 4º15'E and 8º07'N with an average yearly temperature of around 27ºC.

Animals

Forty (40) weaned Large white-Landrace cross-bred uncastrated male piglets were acclimatized for 7 days before the start of this study. They were eight (8) weeks old with and an average initial weight of 8.67±0.33 kg at the start of the trial. They were randomly divided into four dietary groups of 10 replicates each while each pig served as a replicate. The animals had access to feed and water *ad-libitum*. The trial lasted for 42 days in a open type house with pens. The weaner pigs were farrowed by 6 Large white sows serviced by the same Landrace boar. They were chosen based on sex and weight. The pigs were handled and managed following the NIH Guide for the Care and Use of Laboratory Animals NIH publication No 86-23, revised 1985 and 1991) and the ethical requirements of the United Kingdom for animal experimentation (*Animals Scientific Procedures*, Act 1986).

Preparation of test ingredient and experiment diet

The cashew reject kernel meals were procured from a reputable processing firm. During processing, kernels unsuitable for human utilization or falling below market standards are termed as reject and were procured for this study. After extraneous materials removal, they were milled prior to mixing with other feedstuffs. Four diets were compounded isonitrogeneously (20% CP) and metabolizable energy ranging from 11.44 to 12.15 MJ/kg ME (Table 1). Groundnut meal was replaced with Cashew reject kernel meal in diet 1 (0.00% CRKM) (w/w) at 5.00%, 10.00% and 15.00% in the Diets 2–4 respectively. Other ingredients were varied in an attempt to formulate iso-nitrogenous diets.

Table 1

Formulation of the experimental diets

Ingredients [%]	Diet 1	Diet 2	Diet 3	Diet 4
Maize	21.00	18.00	12.00	2.00
Soya bean meal	1.00	4.00	7.50	10.50
Groundnut cake	15.00	10.00	5.00	0.00
CRKM	0.00	5.00	10.00	15.00
Palm kernel cake	50.00	50.00	50.00	50.00
Corn bran	11.50	11.50	14.00	21.00
Limestone	1.00	1.00	1.00	1.00
#*Premix blend	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00
Calculated nutrients				
ME [MJ/kg]	11.44	11.84	12.10	12.15
Crude protein	19.58	19.54	19.69	19.72
Ether extract	5.09	6.17	8.42	10.02
Crude fibre	8.26	8.14	8.22	8.59
Calcium	0.49	0.54	0.52	0.64
Lysine	0.70	0.90	1.12	1.33
Methionine	0.33	0.39	0.45	0.51

CRKM – Cashew reject kernel meal, ME – metabolizable energy

supplied the following (per kg feed): vitamin A, 12 500 IU; vitamin D_3, 5 000 IU; vitamin E, 40 mg; vitamin K_3, 2 mg; vitamin B_1, 3 mg; vitamin B_2, 5.5 mg; niacin, 55 mg; calcium pantothenate, 11.5 mg; vitamin B_6, 5 mg; vitamin B_{12}, 25 mg; folic acid, 1 mg; biotin, 50 mg; choline chloride, 500 mg; manganese, 300 mg; iron, 120 mg; zinc, 80 mg; copper, 85 mg; iodine, 1.5 mg; cobalt, 3 mg; selenium, 1.2 mg; anti-oxidant, 120 mg; with (in 1.25 kg/250 kg ration) detoxyzyme, 125 g; superliv, 125 g; prebiotics and probiotics, 62.5 g; herbo-methionine, 125 g and limestone (carrier), 187.5 g

Data collection

Growth parameters and economic analysis

Data taken on growth parameters include feed consumed, weight differences and conversion ratio. Feed left on daily basis was deducted from that given as the intake while weight change was recorded weekly. The relationship between feed intake and weight gain was estimated as feed conversion ratio. Economic analysis was estimated as enumerated by OJEDIRAN et al. (2020a).

Blood parameter

Four pigs per dietary treatment group were randomly picked for blood examination. They were bleed prior to feeding: About 5 ml of blood was each siphoned into pre-labelled tubes for haematological and serum examination through the jugular vein puncture method using sterilized needles and syringes. Blood portions for haematology determination were emptied into vacutainer tubes having anti-coagulant, ethylene diamine tetra-acetic acid (EDTA) and gently rocked. Haematological parameters like leucocyte (WBC), erythrocyte (RBC), haemoglobin, haematocrit, mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC) and lymphocyte counts were determined.

Serum metabolites determined include the aminotransferases; Alanine (ALT) and Aspartate (AST), Total protein, Albumin, Globuin, creatinine, Urea, Glucose, Triglycerol, Cholesterol including both High density (HDL) and Low density lipoproteins (LDL). Haematocrit and hemoglobin were ascertained by mirco-hematocrit and cyanmethehemoglobn methods correspondingly (MITRUKA and RAWNSLEY 1977). White blood cell and RBC were estimated employing improved neubauer haemacytometer following apt solvent addition (SCHALM et al. 1975). Mean corpuscular volume, MCV and MCHC were estimated according to the procedure of JAIN (1986). LDL was calculated from the Friedewald model (LDL = cholesterol – tryglycerol/5). The cholesterol, triglycerol and HDL were analyzed according to the procedure of ROSCHLAN et al. (1974). The spectrophotometric method of SCHMIDT (1963) was used to evaluate for ALT, AST and Alanine Phosphatase (ALP). Biuret and Bromocresol green methods explained by (PETER et al. 1982) was used to determine serum protein and albumin respectively while globulin was estimated as the difference between the total serum protein and albumin.

Chemical and statistical analysis

The proximate component of the test ingredient (CRKM) was determined using AOAC (2012). The metabolisable energy (ME) content was determined using formula ME:

$$\text{Kcal/kg} = 37 \cdot \%\text{CP} + 81.1 \cdot \%\text{Fat} + 35 \cdot \%\text{NFE} \text{ (PAUZENGA 1985)}$$

before being expressed in MJ. The concentration of aflatoxin was determined using OPADOKUN (1999) procedure.

Data were analyzed (Analysis of variance, ANOVA) in a completely randomized design using SPSS (2006) package and means were separated using Duncan multiple range test (at 5% level) of the same package.

Results

The chemical constituents of CRKM is presented in Table 2. The CRKM had 9.20% moisture, 21.10% CP, 35.09% ether extract, 9.20%, 6.83% crude fibre, 4.10% ash and 23.67% nitrogen fee extract. It had 18.96 MJ/kg ME, 0.01% tannin, 0.26% saponin, 0.19% phytate, and 19.22 µg/kg ppm aflatoxin.

Table 2

Nutritional and anti-nutritional composition of cashew reject kernel meal

Chemical composition [%]	Percentage composition [%]
Moisture	9.20
Crude protein	21.10
Ether extract	35.09
Crude fibre	6.83
Ash	4.10
Nitrogen free extract	23.67
Metabolizable energy [MJ/kg]	18.96
Tannin	0.01
Saponin	0.26
Phytate	0.19
Aflatoxin [µg/kg ppm]	19.22

The growth parameters of pigs fed CRKM is shown on Table 3. Only the feed intake parameters were significantly affected ($p < 0.05$). The total feed intake increased in pigs fed diets 1 (32.23 kg), 4 (36.81 kg) 2 (37.84 kg), and 3 (39.68 kg in that pattern). The least feed intake was observed in pigs given diet 1 while those offered diet 3 had the highest. Both total and average daily feed intake had similar pattern. The feed intake was higher in pigs offered CRKM.

Table 3

Growth parameters of pigs fed cashew reject kernel meal

Parameter [kg]	Diet 1	Diet 2	Diet 3	Diet 4	SEM	*P*-value
Initial weight	8.76	8.60	8.68	8.64	0.33	0.99
Final weight	19.90	22.88	24.02	23.84	1.03	0.49
Total weight gain	11.14	14.28	15.34	15.20	0.76	0.18
Av. daily gain	0.27	0.34	0.37	0.36	0.18	0.16
Total feed intake	32.23^d	37.84^b	39.68^a	36.81^c	0.63	0.00
ADFI	0.77^d	0.90^b	0.94^a	0.88^c	0.01	0.00
FCR	3.24	2.70	2.63	2.54	0.16	0.44

ab – means with varying superscripts along the same row are significant ($p < 0.05$); SEM – standard error of the mean; Av. – Average; ADFI – daily feed intake; FCR – feed conversion ratio

Economic indices of pig fed cashew reject kernel meal is presented in Table 4. All parameters including feed cost per kg (FC/kg), FC/kg weight gain (WG), income per kg WG, profit per kg WG and economic efficiency of gains were influenced ($p < 0.05$). A linear decrease was observed in the feed cost from diet 1 (₦74.28) – diet 4 (₦57.85). The FC/kg WG was highest in those given diet 1 and least for those on diet 4. No significant difference was observed in those offered diets 3 and 4 ($p > 0.05$) unlike those fed the control ($p < 0.05$) while those on diet 2 were comparable. The income/kg WG observed in pigs fed diets 2–4 were similar ($p > 0.05$) but differ significantly from those fed diet 1. The income per kg weight gain followed the same trend as observed in the income per kg weight gain. A linear increase was observed in the economic efficiency of gain as the CRKM increased with those fed diet 5 having the highest value.

Table 4

Economic indices of pig fed cashew reject kernel meal

Parameter (₦)	Diet 1	Diet 2	Diet 3	Diet 4	SEM	*P*-value
Feed cost per kg	74.28^a	69.19^b	64.34^c	57.85^d	1.55	0.00
Feed cost per kg WG	238.02^a	186.82^{ab}	168.65^b	146.20^b	12.46	0.04
Income per kg WG	1100.8^a	962.76^b	939.66^b	942.63^b	18.95	0.00
Profit per kg WG	862.77^a	775.93^b	771.01^b	796.44^b	11.87	0.01
Economic efficiency of gain	395.05^b	423.94^b	462.75^{ab}	570.52^a	26.05	0.01

ab – means with varying superscripts along the same row are significant ($p < 0.05$); ₦ – Nigerian naira; WG – weight gain

Table 5 shows the hematological parameters of pigs fed cashew reject kernel meal. All parameters differ significantly ($p < 0.05$) except white blood cell count. RBC of pigs given diets 2 and 3 were similar ($p > 0.05$) but were differ from those offered diet 4 ($p < 0.05$) and were comparable to those fed diet 1. Hemoglobin values obtained ranged from 9.70 (diet 3) – 11.45g/dl (diet 2) ($p < 0.05$). Haematocrit values for pigs offered diets 2 and 4 were higher and not different ($p > 0.05$) but differs significantly ($p < 0.05$) compared with those offered diet 3. However, those offered control diet was comparable. Mean corpuscular volume were 56.00, 60.20, 54.75 and 53.55 fl for pigs fed diets 1–4 respectively such that pigs fed diets 2 and 4 were significantly different ($p < 0.05$) while those fed diet 3 were comparable to with those fed diets 1 and 4. Mean Corpuscular Haemoglobin values of pigs fed with diet 3 and 4 were similar ($p > 0.05$) while others varied significantly ($p < 0.05$). Mean Corpuscular Haemoglobin Concentration of pigs fed with diet 1 and 2 did not differ significantly ($p > 0.05$) as with pigs fed diet 3 and 4. However, both pairs differ significantly ($p < 0.05$). The lymphocyte counts showed that pigs fed diets 1 and 3 differ significantly ($p < 0.05$) while others were comparable.

Table 5

Haematological parameters of pigs fed cashew reject kernel meal

Parameters	Diet 1	Diet 2	Diet 3	Diet 4	SEM	*P*-value
White blood cell [$\cdot 10^3/\mu L$]	12.85	13.10	15.25	13.30	0.41	0.13
Red blood cell [$\cdot 10^3/\mu L$]	7.66^{ab}	7.31^{b}	7.41^{b}	8.16^{a}	0.13	0.03
Haemoglobin [g/dL]	10.90^{ab}	11.45^{a}	9.70^{c}	10.55^{b}	0.21	0.00
Haematocrit [%]	42.85^{ab}	44.00^{a}	40.50^{b}	43.65^{a}	0.54	0.05
Mean corpuscular volume [fL]	56.00^{b}	60.20^{a}	54.75^{bc}	53.55^{c}	0.79	0.00
MCH [pg]	14.25^{b}	15.70^{a}	13.10^{c}	12.90^{c}	0.35	0.00
MCHC [g/dL]	25.45^{a}	26.05^{a}	23.95^{b}	24.15^{b}	0.31	0.01
Lymphocytes [g/L]	7.05^{b}	7.65^{ab}	9.45^{a}	8.40^{ab}	0.40	0.16

ab – means with varying superscripts along the same row are significant ($p < 0.05$); MCH – mean corpuscular hemoglobin; MCHC – mean corpuscular haemoglobin concentration

Table 6 showed the Serum metabolites of pigs fed cashew reject kernel meal. Values obtained for alanine aminotransferase, Asparatate aminotransferase, Albumin and glucose differs significantly ($p < 0.05$).

Table 6

Serum metabolites of pigs fed cashew reject kernel meal

Parameters	Diet 1	Diet 2	Diet 3	Diet 4	SEM	*P*-value
ALT [U/L]	59.60^{b}	83.28^{a}	94.23^{a}	80.36^{a}	4.53	0.02
AST [U/L]	121.32^{ab}	131.18^{a}	92.34^{b}	109.21^{ab}	6.13	0.11
ALP [U/L]	59.10^{a}	48.32^{b}	45.82^{b}	54.36^{ab}	1.94	0.03
Total protein [g/l]	5.25	6.25	5.59	5.15	0.20	0.21
Albumin [g/l]	2.38^{b}	3.08^{a}	2.61^{b}	2.49^{I}	0.10	0.02
Globulin [g/l]	2.87	3.17	2.98	2.67	0.14	0.68
Creatinine [mmol/L]	1.51	1.51	1.03	1.23	0.09	0.13
Urea [mmol/L]	3.74	4.19	3.35	5.85	0.44	0.21
Glucose [mg/dl]	99.84^{a}	121.70^{a}	111.58^{a}	87.39^{b}	11.59	0.02
Cholesterol [mg/dl]	166.99	154.37	156.96	150.49	3.85	0.53
Triglycerides [mg/dl]	42.11	50.20	38.46	36.84	3.07	0.47
HDL [mg/dl]	37.80	27.52	35.06	31.55	1.77	0.19
LDL [mg/dl]	120.76	116.81	114.20	111.56	2.79	0.74

ab – means with varying superscripts along the same row are significant ($p < 0.05$);
ALT – alanine aminotransferase; AST – aspartate aminotransferase; ALP – alkaline phosphatase; HDL – high density lipoprotein; LDL – low density lipoprotein

Values recorded for alanine aminotransferase were higher, 80.36–94.23 U/L compared with those offered the control diet (59.60 U/L) ($p < 0.05$). Asparatate aminotransferase in pigs given diet 2 (131.18 U/L) and 3 (92.34 U/L) differ significantly ($p < 0.05$) from each other although, others compared favourably. Albumin in the serum of pigs fed diet 2 were significantly different ($p < 0.05$) from those fed other diets. Alkaline phosphate in pigs offered diet 1 (59.10 U/L) differ significantly ($p < 0.05$) compared to those on 2 (48.32 U/L) and 3 (45.82 U/L). Significant low glucose value was obtained for pigs given diet 4 ($p < 0.05$).

Discussion

The chemical composition of CRKM affirms it moderate protein content (AKANDE et al. 2015). The ether extract content showed it can be classified as an oil seed like *Jatropha curcas* kernel (OJEDIRAN et al. 2014). ODDOYE et al. (2012) observed a high fibre content of 27.50% than reported in this study. This can be linked to processing efficiency. The ash content and nitrogen free extract recorded is like that observed by AKANDE et al. (2015). The metabolizable energy in CRKM is similar to 19.89 MJ/kg for groundnut cake as observed by AKANDE et al. (2015). Tannin interfere with protein digestion, saponnin interfers with taste while phytate reduces availability of mineral bioavailablity in monogastric animals. However, the level of these anti nutrients were tolerable not to elicit negative response (FDA 2011, AQUILINA et al. 2014). The processing methods employed in the processing of CRKM since determined for human consumption may have played a role in the low tannin, saponin, phytate and the aflatoxin content. However, AKANDE et al. (2015) cautioned that long storage may raise the content of aflatoxin.

Observed growth results are similar to that of OJEDIRAN et al. (2020a) where supplemented palm kernel diet was assessed. LI and PATIENCE (2017) attributed such changes in intake to feed factors like energy concentration amidst other non-dietary factors. HENRY (1985) had earlier asserted that energy density determines feed intake. This was corroborated by ORESANYA et al. (2007, 2008) and BLACK et al. (2009) established that apart from reduced intestinal motility caused by dietary fat content, increased fatty acyl-CoA in the brain hypothalamus results in changes in hormone thus decreased feed consumption. The voluntary feed intake peaked at 10% CRKM inclusion in the feed. The ether extract content of the feed may have played a role rather than to the metabolizable energy. OJEDIRAN et al. (2020b) reported a non-significant weight changes and feed conversion similar to this study and affirmed that enzyme supplementation in a PKC based diet may not be necessary. This established that weaned pigs may well tolerate PKC based (50–55%) diets with adequate energy and protein.

Economic indicators studied showed the advantages in the use of CRKM over the control diet. Consensually, inclusion of non-conventional feedstuff or ingredients in diet formulation lowered feed cost (DONKOH et al. 2004, OJEWOLA et al. 2004). CHOI et al. (2015) established that for increased profitability, unconventional feedstuffs are needed to lower the production cost which accounts for 64.8–75.2% in a pig enterprise. The cost of convectional feed ingredients like maize, a food crop and biofuel feedstock (De Gorter et al. 2013) is hiked because of low production in the face of population growth. The feed cost in relation to weight increment and reduced income and profit in pigs fed diets 2–4 is attributable to the feed consumed and conversion ratio. Satisfactory performance from lowered feed cost in economic terms is of utmost importance (Adesehinwa 2009) as demonstrated by the economic efficiency of gain as the use of CRKM increased. This revealed that incorporating cashew reject kernel meal in the diets of pig up to 15% bears a relevant and practical use for a commercial pig production.

Hematological parameters associates blood and its producing organs (Waugh and Cirant 2001), thus signals the functional condition and health state of the livestock (Eze et al. 2000). Blood haematological constituents are responsive to the quantity and quality of feed or level of anti-nutrients inherent in the feed (Ani et al. 2013, Nse Abasi et al. 2014). The results on haematological parameters showed that the values reported were of range for healthy pigs (Gianotti et al. 2010, Coronado 2014). Pigs with normal blood parameter values are believed to display good performance (Buzzard et al. 2013). But, Dlamini et al. (2017) said lower haematological values could be due to malnutrition resulting in to anaemia. In this case the animals were not anaemic. White blood cells are critical in the defensive mechanism of pigs (Nse Abasi et al. 2014, Ojediran et al. 2020). However, CRKM exert no adverse effect on the immune system of the pigs. Recorded numerical quantities for RBC, Hb, PCV, and the corpusculars indicated that the pigs were not anaemic as reported by Ojediran et al. (2020b) who fed pigs with biscuit dough and attributed such to the fact that the dough since meant for human consumption had no or tolerable anti-nutrients. For heametocrit values above 30% indicate adequate blood ion status (Perri et al. 2016). Therefore, since erythropoiesis of the RBC was not impaired, thus oxygen carrying capacity in the animals showed that the pigs were in good health. Lymphocyte values were within normal range for pigs and such indicative of antibody function (Dlamini et al. 2017).

Pig blood metabolites can be affected by nutrition (Etim et al. 2014). Transaminases, ALT and AST are liver serum markers and when they are elevated, they suggest liver impairment (Unigwe et al. 2018). Elevated ALT was observed in pigs fed CRKM. Other organs found to produce ALT are the heart, kidney and muscles but Unigwe et al. 2018) proved that it is more liver specific while AST is a direct indicator of other cell damages including the liver (Rochling 2001). Alanine amino transaminase and AST has been found to be elevated in biliary duct obstruction, medications, diseaseas and fatty liver (steatohepatitis). However, increased muscular activity has been reported to cause increased AST in blood serum and UNIGWE et al. (2018) attributed such in feed with more energy and protein availability. Rise in serum ALP was attributed to cholestatic disease, a situation HYDER et al. (2013) believed that ALP is made mostly in the liver and osteoblasts in hepatic bile duct obstruction. The pattern in the AST and ALP rules out a liver damage because AST falls within normal range for the class of pigs and ALP were not high as in pigs offered the control.

DVORÀK (1986), proved that weight gain and albumin synthesis are interdependent in piglets as influenced by nutritional status. The link between nutrition and albumen level was demonstrated by FUHRMAN et al. (2004) as albumen levels lowers during malnutrition. ELBERS et al. (1992) and CAPRARULO et al. (2020) revealed that in pigs, albumin level is a predictor of growth response. Albumin and insulin synthesis are directly correlated (CHEN et al. 2016) because insulin is connected with muscle protein synthesis (Davis et al. 2010). The observation by CAPRARULO et al. (2020) buttressed the findings among the CRKM fed pigs. CAPRARULO et al. (2020) attributed such to values within physiological range (ELBERS et al. 1992)) thus positively affected the weight gain. Reduced glucose with increased CRKM level could be associated with fibre level in the feed as noted by ADESEHINWA (2007). However, ether extract and nitrogen free extract may have played a role. MANELL et al. (2016), DAVIE (2003), CHRISTENSEN et al. (2011) and KAWADA et al. (2017) supposed that butyrate level triggers histone deacetylase inhibition activity in glucose homeostasis or release via pancreatic β-cells.

Observed urea and creatinine levels in this study showed that CRKM did not affected the kidney functions. This is similar to the report of ADESEHINWA (2007). It implied that there were no muscular wastage as the feed was well utilized. The cholesterol, triglycerides, HDL and LDL levels also showed that CRKM was well tolerated by the pigs akin to the result of Hellwing et al. (2007). AKANDE et al. (2015) observed that high ether extract may not translate to high cholesterol or fractions because it is crucial in homeostasis and in series of metabolic cycle. HDL has been identified by PODREZ (2010) and NAVAB et al. (2011) to exhibit and promote cholesterol efflux which causes reverse cholesterol movement by affecting foam cell formation owing to it anti-atherogenic effects. Triglycerides being fatty acids with high energy chains important for fueling cell functions are at high levels believed to cause hearth diseases (YUE et al. 2015). RAUW et al. (2004) proved that a positive relationship between HDL and triglyceride exist in pigs. These relationship may have been responsible for the observation in this study.

Conclusion and recommendation

It could be concluded that weaned pigs could tolerate up to 15% cashew reject kernel meal inclusion because of the performance in terms of growth and economics indices. Also the blood parameter were not deleteriously affected. Further research could look into the use of cashew reject kernel meal in other phases of growth.

Accepted for print 9.08.2021

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