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HAEMATOLOGICAL AND SERUM ANALYSIS OF GOAT FED WITH JATROPHA KERNEL CAKE TREATED WITH *MUCOR INDICUS* AND *ABSIDIA CORYMBIFERA*

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ABSTRACT
A study was carried out to evaluate *Jatropha carcus* kernel cake incubated with *Mucor indicus* and *Absidia corymbifera* on haematological and serum analysis of West African dwarf goat. *The Jatropha curcas kernel cake* was included at 50% and 75% in diets B, C, D and E respectively. Diet A which served as the control has no fungi treated *Jatropha curcas kernel cake* while diets B (50% Mucor treated Jatropha kernel cake + 50% Groundnut cake), C (50% Albisidia treated Jatropha kernel cake + 50% Groundnut cake), D (25% Mucor treated Jatropha kernel cake + 75% Groundnut cake) and E (25% Albisidia treated Jatropha kernel cake + 75% Groundnut cake). Fifteen weaned West African dwarf goat weighing between 5 and 7.5kg were assigned to five experimental diets in a completely randomized design. The experiment lasted for six weeks. Blood samples (5ml) were drawn from the jugular vein of each goat into bijour bottles containing 1mg/ml of anti-coagulant, ethylene diamine tetracetate (EDTA) for haematological determination. The average values for Packed cell volume (% PCV) was 35.83 , 16.67 , 15.67, 10.33 and 16.83 for diets A,B,C,D and E respectively, Haemoglobin (g/dl) was A (9.53), B (3.77), C (3.77) , D (2.47) and E (4.08). The white blood cell and red blood cell were highest for the control diet compared to other diets. The neutrophil, lymphocyte, monocyte and eosinophil followed a similar trend as the white blood cell. The values of creatinine and urea are similar among all diets. The fact that all the reported blood parameters in this study fell within the normal range reported for healthy goat without ill effect on the animal, hence it can be concluded that fungus treatment of Jatropa kernel cake did not pose any threat to the health of the experimental animals.

KEYWORDS: *Mucor indicus, Absida corymbifera, Haematology indices, serum parameters. West African Dwarf Goat, Jatropha curcas kernel cake*

INTRODUCTION

The continuous rise in human population all over the world with an annual average of seven billion has brought an increased demand for animal products and consequently animal protein. In Nigeria, the average daily consumption of 54g protein with 6.5g from animal sources falls below the recommended daily protein intake of 86g and 8.4g of animal protein respectively (Ndubuisi, 1992). It has been reported also that poor quality roughage fed to ruminants without supplementation during the dry season caused considerable weight loss and mortality of the animals (Coffey *et al.,* 2004). Hence, protein supplementation became very vital in livestock ration. The various sources of protein include the conventional sources (Soybean, groundnut *etc*) and the unconventional sources.While the availability and cost of the conventional protein sources in livestock ration are on the high rise due to serious competition between man and livestock. Alternative protein sources that would not compromise quality of the foodstuffs are being researched into by animal nutritionists. One of such novel sources is the *Jatropha curcas* kernel cake. *The Jatropha curcas* of the family Euphorbiaceae is a poisonous shrub which originated in central America and has been spread to other tropical and subtropical countries. It is highly adaptable and has the ability to grow on poor, dry sites receiving very low rainfall (Perry, 1980). However, the Jatropha curcas kernel cake is very rich in basic nutrients, though its use is slightly hindered by the presence of anti-nutrients and toxins like lectin, tannin, saponin, phytates, cyanides, trypsin inhibitor and phorbolester (Markkar and Becker 1997). Much research has since been carried out on the removal of toxins in plants using chemical/biological treatments (Makkar and Becker, 1997). It is then believed that microbial fermentation of *Jatropha curcas kernel cake* can be used to improve the nutritive values by breaking the toxic component, thereby enhancing the cake as efficient and essential feedstuffs in livestock diet (Belewu, 2008). Since blood is a bodily fluid in animals that delivers necessary substance of nutrients to the cell and also transport metabolic waste product from those cells. The blood of animal shows the health status of such animals. Hence the thrust of the study was to evaluate the efficiency of fungi. (*Albsidia corymbifera* and Mucor *indicus*) treated *Jatropha curcas* kernel cake on the blood parameters of West African dwarf goats.

MATERIALS & METHODS

Jatropha curcas kernel

The seeds of *Jatropha curcas plant* were collected from Elerijare in Kwara State of Nigeria and some other places like Ipetu-Ile, Ibokun Local Government in Osun State of Nigeria. The seeds were dehusked manually to obtain the kernel. It was later milled using milling machine so as to obtain the meal. The milled kernel was pressed using a hydraulic press to remove the oil. After the removal of the oil, the cake was autoclaved at 121^0C to get rid of any possible microbes and later allowed to be cooled before inoculation and incubation with fungi.

Fungi

Fungi used (*Mucor indicus and Absidia corymbifera*) were collected from Microbiology Department, University of Ilorin. Nigeria into a bijour bottle, subculture of each fungus was obtained by inoculating on Potato dextrose agar (PDA) and also maintained on PDA containing in petri- dishes.

Inoculation and Incubation of the Kernel cake

Autoclaved substrate (JKC) was later inoculated in layers with each of the spores of *Mucor indices* and *Absidia corymbifera* separately. The inoculated substrates were later incubated at ambient temperature for 7 days till when the fungi enveloped the substrate.

Preparation of the Experimental Diets

Fungi treated *Jatropha* kernel cake was used in the formulation of diets for West African Dwarf goats at 50% and 75% inclusion level in replacement of groundnut cake while other ingredients (salt, vitamin premix, rice husk and cassava wastes) were of fixed proportions.

Experimental Animals and Management

Fifteen weaned male West African dwarf goats were used for this study at the Animal Production Pavilion (weighing between 5kg and 7kg). The animals were bought from a local market in Ilorin, Kwara State. They were treated against endo and ecto parasites using Ivomec. The goats were allowed to adapt to the experimental diet for two weeks before data collection.

Statistical Analysis

The data collected was subjected to Analysis of variance of a Completely Randomized Design (CRD) Model while treatment means were separated using Duncan (1955) Multiple Range Test.

RESULTS & DISCUSSION

TABLE 1: Shows the percentage contribution of each ingredient to the experimental diets. Diet A which was the control with no Fungi treated *Jatropha curcas* kernel cake inclusion, Diet B contains-50% Jatropha kernel cake treated with *Mucor indicus*, Diet C contains 50% Jatropha kernel cake treated with *Absidia corymbifera*. Diet D contains 75% Jatropha kernel cake treated with *Mucor indicus*, Diet E contains 75% Jatropha kernel cake treated with *Absidia corymbifera*-

TABLE 1: composition of the experimental diets (%)

Ingredient	A	B	C	D	E
Cassava wate	63.00	63.00	63.00	63.00	63.00
Rice husk	31.00	31.00	31.00	31.00	31.00
Ground nut cake	4.00	2.00	2.00	1.00	1.00
Fungi Treated Jatropha kernel cake	2.00	2.00[a]	2.00[b]	3.00[a]	3.00[b]
Vitamin premix	1.00	1.00	1.00	1.00	1.00
Salt	1.00	1.00	1.00	1.00	1.00
Total	100.00	100.00	100.00	100.00	100.00

Note: a = *Mucor indicus* treated Jatropha kernel cake
b = *Absidia corymbifera* treated Jatropha kernel cake

TABLE 2: proximate analysis of the experimental diets

Diets	A	B	C	D	E
Dry matter	88.96	91.90	91.06	89.17	90.57
Crude protein	6.81	7.84	7.97	7.61	6.94
Crude fibre	42.64	40.02	38.80	42.12	41.92
Ether extract	3.56	4.82	4.10	4.29	4.75
Energy K.cal/g	162.12	188.37	185.9	168.65	175.87

The PVC is an indication of the health and physiological status of animals. It is also used as an index of the toxicity of feed. Hence the PCV value (Table 2) reported herein ranged from 10.5 – 35.83%. However, the PCV value of Diets A, B, C and E fell within the values of 15.0 - 57.4% reported by Orheruata *et al*. (2004); Belewu and Ojo-Alokomaro (2007) Opara *et al*. (2010); Addass *et al*. (2010). These findings suggested that WAD goats have a tendency for compensatory accelerated production (CAP) of PCV in case of Infection and stress. Compensatory accelerated Production has been shown to return PCV to normal following an infection (Dargie and Allonby, 1975, Ganong, 2001, Tambuwal *et al*., 2002)). The haemoglobin value found in Diet A (control) was higher than the value reported by Obua *et al*. (2012) while the values for Diets B-D were lower than the reported value of Administrator GL (2009) and Obua *et al*. (2012). The low haemoglobin count found in Diets B-D is not a sign of illness (Staff, 2004), the animals were healthy and there was not mortality recorded throughout the study period. The white blood cell values reported by Obua *et al*. (2012) was higher than the values of between 5.12 and 10.80 recorded in this study. However, the value fell within value reported by Administrator –GL (2009). The lowest white blood cell value reported for animals on diet D was higher than the value reported by Egbe-Nwiyi *et al*. (2000). The high RBC

noted for Animal on diet A showed that the goats are not anaemic. The value of the Red Blood Cell could be due to the Age of the Animals used in this experiment. Tambuwal *et al*. (2002) reported that age has a significant effect on Red blood cell. The Haemoglobin content which was high in diet A could be due to the fact that Diet A contains no Fungi treated Jatropha kernel cake but other diets like B, C, D, and E followed similar trend which was in agreement with Tambuwal *et al.* (2002).

TABLE 3: haematological parameters of the experimental animals

Parameter	A	B	C	D	E	±SEM
PCV (%)	35.83^{b}	16.67^{a}	15.67^{a}	10.33^{a}	16.83^{a}	5.82*
WBCx10^{9}/1	10.80^{a}	5.12^{b}	5.12^{b}	3.53^{c}	7.65^{ab}	2.25*
RBCx0^{9}/1	6.00^{b}	2.85^{b}	2.85^{a}	1.50^{a}	3.33^{ab}	1.05*
Hb(g/dl)	9.53^{b}	3.77^{a}	3.77^{a}	2.47^{a}	4.08^{a}	1..54*
NEUTROPHILS (%)	66.67^{b}	45.837^{ab}	45.83^{a}	22.50^{a}	43.33^{aB}	13.91*
LYMPHOCYTE (%)	31.17^{b}	17.83^{aB}	17.83^{a}	10.83^{a}	23.00^{aB}	6.61*
MONOCYTES (%)	1.17	0.50	0.50	0.00	0.83	0. 53NS
EOSINOPHILS (%)	1.00^{b}	2.50^{b}	2.50^{a}	0.00^{a}	0.17^{a}	0.52*

a-b: Means in the same rows with different superscripts differs significantly (P<0.05)

TABLE 4: serum analysis of the experimental animals

Parameter (mM01/L)	A	B	C	D	E	+SEM
Serumprotein	67.83^{b}	40.33^{ab}	38.67^{ab}	19.00^{a}	37.00^{ab}	12.04*
Creatinine	76.00	65.17^{b}	72.67	31.00	77.00	21.84NS
Urea	1.70	1.43	1.62	0.83	1.43	0.5NS

a-b: Means in the same rows with different superscripts differs significantly (P<0.05)

The neutrophils value of the experimental diets (A – D) ranged between 22.50 and 66.67%. The value reported herein fell between 23 and 48% reported by Egbe-Nwiyi (2000) and Administrator GL (2009). Contrarily, the value of the lymphocytes found in this study was not in agreement with the value reported by Egbe-Nwiyi (2000). The highest Neutrophils and Lymphocyte recorded for diet. A showed that the cellular digestion of offending agents like bacteria was more compared to other diets. Other blood parameters like Monocytes and Eosinophils followed a similar trend.

The Serum Protein and Urea were higher in diet A compared to other Diets and this could be due to the fact that diet A did not contain any treated Jatropha kernel cake. This was not in agreement with Chivandi *et al.* (2006) who recorded highest values of Serum Protein and Urea. The high Creatinine value recorded for diet E could be due to high work rate of Liver and Kidney in detoxifying the Toxin contents of the *Mucor indicus* and *Absidia corymbifera* treated Jatropha curcas based diet. This supported the assertion that Creatinine helps in evaluating the Liver function and diseasesv(Chivnadi *et al.*, 2006).

CONCLUSION & IMPLICATION

Underutilized seeds can be used for ruminant feeds when proper and effective processing measure is employed. *Jatropha Curcas*, which is very common in our environment, could be effectively utilized by ruminant animals when properly detoxified so as to reduce the greater dependency on most conventional feed-stuffs.

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