

Short Communication

Clinical response of broilers placed on varying levels of aqueous *Cassia alata* leaf extract

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This study examined the clinical response of 120 Anak broiler birds to inclusion of *Cassia alata* aqueous extract at different levels in their water (0, 5, 10 and 15 ml/L). The birds were allotted to four treatments of 10 birds each with three replicates. They were fed *ad libitum* and data were collected on haematological and serum parameters (packed cell volume, haemoglobin concentration, red blood cell count, white blood cell count, total protein, urea concentration). There were significant differences ($p < 0.05$) in all the haematological parameters across the treatments. Haematological results indicated that the health status of the birds were normal. Serum biochemistry result shows significant variation ($p < 0.05$) across the treatments. Total protein values across the treatments shows inefficient nutrient utilization. Urea values were significantly higher ($p < 0.05$) in birds placed on *C. alata* extract, this indicates renal damage in the birds. Serum electrolytes shows significant differences ($p < 0.05$) across the treatments with potassium ion showing significantly higher values above the physiological range indicating kidney failure.

Key words: *Cassia alata*, broiler, aqueous extract, kidney.

INTRODUCTION

Traditional medicine using plant extracts continues to provide health coverage for over 80% of the world's population, especially in the developing world. Medicinal plants are known to owe their curative potentials to certain biological active substances, which exist in parts of the plants (Ekpo and Etim, 2009). The chemicals which are referred to as active principles or phytochemical substances (UNESCO, 1998). However, the more current and most effective antibiotics are very expensive and out of reach of many Africans, majority of whom reside in the rural areas. These antibiotics are also

associated with some serious side effects. Emergence of resistance build up by pathogens over continuous usage of conventional antibiotics is a global concern. A medicinal plant, such as *Cassia alata* L. is readily available. It is used in traditional medicine mainly in the tropical areas of the world, such as Malaysia, Brazil, and Indonesia. The leaves of *C. alata* are used as an effective treatment against ringworm and also against other skin diseases such as eczema and chronic skin impurities. *C. alata* leaves contain emodin, kaempferol, aloe-emodin, chrysophanol and isochrysophanol, rhein, ellagitannin,

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Table 1. Haematological parameters of broilers placed on *C. alata* leaf extract.

Treatment parameter	0 ml/L	5 ml/L	10 ml/L	15 ml/L	SEM
Red blood cell ($\times 10^6/\text{mm}^3$)	2.43 ^a	2.41 ^{ab}	2.34 ^{ab}	2.28 ^b	0.05
White blood cell ($\times 10^3/\text{mm}^3$)	29.65 ^b	28.55 ^a	28.60 ^b	28.90 ^b	0.81
Haemoglobin (g/dl)	11.40 ^b	12.30 ^a	11.40 ^b	10.45 ^c	0.08
Packed cell volume (%)	27.50 ^a	27.00 ^b	26.50 ^{ab}	25.50 ^b	0.55

SEM=Standard error of the mean. Within a row, values with different superscripts differs significantly ($p < 0.05$).

phenolic acid and cassiaxanthone, amongst other substances. One of the important flavonoids of *C. alata* leaves is astragalin (AST) (Lee et al., 2011).

AST has lately aroused increased pharmaceutical interest because of its potential as anti-inflammatory agent, in addition to having antimicrobial activity. This study aimed at investigating the effect of administering *C. alata* aqueous extract on the clinical status of broiler birds.

MATERIALS AND METHODS

Extract preparation

Fresh and matured *C. alata* leaves were collected from the school premises. 500 g of the leaves were rinsed in distilled water and was blended with a blending machine. 1000 ml of distilled water was added to the leaf paste for 6 h and the extract was obtained using a cheese cloth. The extract was kept in a bottle with lid inside a refrigerator till the period of usage.

Experimental birds and management

One hundred and twenty (120), one day old Anak broilers fed commercial starter and finisher diet were used for the study which lasted for eight weeks. Birds were individually weighed and randomly allotted to four treatments of three replicates (10 birds per replicate). Control birds were placed on a conventional antibiotic (Neoceryl), while others were placed on 5, 10 and 15 ml/L *C. alata* leaf extract in water. Feed and clean water were given *ad-libitum* throughout the period of the study.

Data collection

Data were collected on blood parameters (packed cell volume, haemoglobin concentration, red blood cell count, white blood cell count, serum total protein, urea concentration, creatinine concentration, glucose concentration, alanine transaminase, potassium ion and sodium ion concentration) blood samples for haematology were collected into sample tubes containing ethylene diamine tetra-acetic acid (EDTA) as anticoagulant, while serological samples were collected in anti-coagulant free tubes. Packed cell volume (PCV) was determined by microhaematocrit method, haemoglobin (Hb) concentration was measured spectrophotometrically using SP6-500 UV Spectrometer. The red blood cell (RBC) and white blood cell (WBC) counts were estimated using haemocytometer (Ewuola and Egbunike, 2008). Serum was obtained after the blood was allowed

to stand for 45 min at room temperature and centrifuged at 2,000 revolutions per minute (r.p.m) for 10 min to separate the cells from the serum. Urea was determined by urease method and creatinine by Folin-Wu filtrate method (Toro and Ackermann, 1975). Total serum protein was determined using Biuret method (Reinhold, 1953), while albumin was determined using Bromocresol green method (Peters et al., 1982). Alanine transaminase (ALT) was determined using spectrophotometric method as described by Rej and Hoder (1983).

Data analysis

Data collected on blood and serum parameters were analysed for variance using the statistical package of SAS (SAS, 1999).

RESULTS AND DISCUSSION

Table 1 shows the values for haematological parameters of broilers placed on different levels of *C. alata* extract, significant differences ($p < 0.05$) exists among the treatment. Values for RBC range between 2.28 and 2.43; the values reduce with increase in inclusion volume of *C. alata* although the values fall, within the normal range of 1.58 to 3.82 (Mitruka and Rawnseley, 1977). The values for RBC indicated that the birds are not suffering from anaemic condition. The WBC was not affected by dietary treatment thereby indicating that no pathological effect was induced by the *C. alata* extract; hence, the health status of the birds was okay. The result of haematological indices from this research work implies that the test extract were able to combat pathogenic infection in the animal system. This agrees with the work of Lee et al. (2011) which revealed that one of the main pharmacological activities of *C. alata* has antimicrobial. PCV reduces with increase in the inclusion level of *C. alata* extract, but all the values fall, within the normal range of 24.9 to 40.7 (Mitruka and Rawnseley, 1977). Haemoglobin ranges between 10.45 and 12.30 g/dl which fall between the normal ranges of 7.40 to 12.2 g/dl indicating efficient oxygen transportation. Table 2 shows significant different ($p < 0.05$) in all the serum parameters except in creatinine. Value for total protein was highest in birds given convectional antibiotics (3.40 g/dl). Total

Table 2. Serum biochemistry parameters of broilers placed on *C. alata* leaf extract.

Treatment parameter	0 ml/L	5 ml/L	10 ml/L	15 ml/L	SEM
Total protein (g/dl)	3.40 ^a	1.95 ^{bc}	2.91 ^{ab}	1.32 ^c	0.43
Urea (mmol/L)	15.69 ^b	20.95 ^{ab}	21.95 ^a	18.45 ^{ab}	1.79
ALT	19.50 ^b	19.00 ^b	19.00 ^b	23.00 ^a	0.18
Creatinine	2.74	2.84	2.86	2.74	0.04
Glucose	145.00 ^{ab}	137.00 ^{bc}	150.50 ^a	131.00 ^c	3.94
Potassium (mmol/L)	5.34 ^b	6.49 ^a	7.51 ^a	6.90 ^{ab}	0.51
Sodium (mmol/L)	142.50 ^a	123.50 ^b	124.00 ^b	138.50 ^a	1.39

SEM=Standard error of the mean. Within a row, values with different superscripts differs significantly ($p < 0.05$).

protein value was lower in birds placed on cassia extract, compared to the physiological range (5.20 to 6.90) reported by Mitruka and Rawnseely (1977).

This result reveals that nutrient utilization was inadequate in birds placed on the plant extract, this can be as a result of the presence of antinutritional factors in the extract. There was significant difference ($p < 0.05$) in the values for urea across the treatment with birds on 0 ml/L *C. alata* having the least value of 15.69 (mmol/L). High urea content in the birds may be due to kidney damage by the increase in the level of *C. alata* extracts due to the presence of antinutritional factors. Inclusion of *C. alata* extract up to 15 ml/L in water does not pose any injury on the liver of the birds. The mean values of the electrolytes showed significant differences ($p < 0.05$). Potassium ion concentration is a major cation of intracellular fluid and function as sodium does by influencing acid-base balance (Adedeji, 1992).

High blood levels of potassium are generally due to kidney failure or endocrine disease rather than from excessive dietary intake. The values for birds placed on *C. alata* were slightly above the physiological range (4.60 to 6.50 mmol/L), indicating improper functioning of the kidney. The sodium ion mean values were within the normal range (148 to 163 mmol/L).

Conclusion

This study has demonstrated that aqueous *C. alata* extract has no deleterious effect on the clinical status of broiler birds as it elicit no adverse effect on the haematological characteristics and serum biochemistry of the birds. Optimum level of its usage should be studied as serum biochemistry shows its potential of kidney damage. Histopathological effect is recommended to elucidate this fact.

Conflict of Interests

The author(s) have not declared any conflict of interests

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