

ORGAN AND CARCASS WEIGHT VARIATION IN *EIMERIA TENELLA* INFECTED BROILER CHICKENS TREATED WITH METHANOL EXTRACT OF *PARKIA BIGLOBOSA* ROOT BARK

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ABSTRACT

The experiment was designed to evaluate the effect of methanol extract of *Parkia biglobosa* root in *Eimeria tenella* infected broilers. One hundred and fifty broilers grouped into 6 groups (n = 25) were used for the study as follows: infected treated with extract (A), infected treated with amprolium (B), infected untreated (C), uninfected untreated; (control) (D), uninfected treated with extract (E), and uninfected treated with amprolium (F). Each broiler was infected at 28 days of age with 20,000 infective *Eimeria tenella* oocysts and treated at day 7 post infection with either extract or Amprolium at a dose rate of 200 mg/ml in drinking water for 7 days. Carcass and Organ weights were measured at 35 days of age. The results showed significant difference in the carcass and organ weights ($P>0.05$) between the groups. This study proved that the root bark of *Parkia biglobosa* has no adverse effects on organs of treated broilers, instead improved carcass weight and ameliorated clinical signs of bloody diarrhea associated with *Eimeria tenella* infection in broilers.

Keywords: Broilers, Coccidiosis, Organs, *Parkia biglobosa*, Weight.

INTRODUCTION

Coccidiosis is one of the most economically important prevalent parasitic diseases which has adversely affected the growth and fortune of poultry farmers worldwide (Gharekhani et al., 2014). Coccidiosis affects virtually all domestic and wild species, causing signs such as paleness, diarrhea with or without blood, poor feed conversion, weight loss, and in severe cases even death. *Eimeria*, protozoan parasites of the Phylum Apicomplexa are considered the main risk to avian production since they are the causative agent of avian coccidiosis (Blake et al., 2015). Avian coccidiosis is caused by seven species of *Eimeria*, which parasitize chickens intestine. According to a recent estimate, the global cost of the protozoan to the poultry industry is estimated to be over US\$ 2.4 billion per annum (Ola-Fadunsin et al., 2017). In Nigeria, the disease is caused by *Eimeria tenella*, *E. necatrix*, *E. bruneti*, *E. acervulina*, *E. mitis* and *E. praecox* (Jatau et al., 2012). These species have predilection sites in the different parts of gastrointestinal tract. The management comprises of ionophorous compounds (ionophores) and synthetic drugs (chemicals). However, the increased occurrence of resistance against routine anticoccidial drugs, the toxic effects of these chemicals on poultry and the development of drug residues in poultry meat and egg (Goetting et al., 2011) have left the poultry industry with a renewed challenge for coccidiosis prevention and control. These have propelled the search for alternative strategies among which plant products provide a good alternative. Some of these plants are indigenous to Nigeria and may serve as a source of foreign revenue when exported to developed economies where people are becoming more aware of the toxic effects of using chemotherapeutic agents in producing animal protein. *Parkia biglobosa* is one of such plant alternatives. The stem bark of *P. biglobosa* has been reported to have some coccidiostatic activities (Maikai et al., 2007) and antimalarial effects (Traore et al., 2013). The stem bark is used for treating hypertension (Karou et al., 2011) and listed as having wound healing properties in South-Western Nigeria (Adetutu et al., 2013). A decoction of the root is used in the treatment of coccidiosis by natives in western Nigeria (Olanipekun, 2014). There is no data on the anticoccidial activity of the root bark extract of *P. biglobosa* in broiler chickens. In this study, the anticoccidial activity and the effect of methanol extract of *P. biglobosa* root bark was evaluated in broiler chickens experimentally infected with *Eimeria tenella* oocysts.

RESULT

Carcass yield and organ weight

Data on body weight, carcass weight/dressed and parts of the broilers are shown in Table 1. It is observed that among the infected groups, the body weight was higher in the *P. biglobosa* treated group A (3.2 kg/broiler) and the amprolium treated group B (3.2 kg/broiler). The infected but untreated group C had the least body weight (2.7 kg/broiler). In the uninfected broilers, group E (*P. biglobosa* treated) recorded a higher body weight (3.4 kg/broiler), followed by the amprolium treated group F (3.3 kg/broiler) and lowest the untreated group D (3.1 kg/broiler). In the results, it was also observed that among the infected groups the carcass yield was higher in group A (2.8 kg/broiler), followed by B (2.6 kg/broiler) and lowest C (2.4 kg/broiler) (Table 1). Among the uninfected groups, D (untreated) recorded 2.5 kg/broiler, E (*P. biglobosa* treated) and F (amprolium treated) recorded 2.6 and 2.8 kg/broiler, respectively.

DISCUSSION

The slight difference observed by the decrease in weight of the carcass parts (thigh, back and neck, wings) in group C and D (Table 1) may be due to the lack of treatment of the broilers with either the *P. biglobosa* or amprolium. Also significant weight difference ($P < 0.05$) existed in group B among the weight of the organs, where the liver (1.8%), heart (0.6%) and the spleen (0.2%) weighed more than those in the other groups as shown in Table 1. The variation in weight of the organs in group B may be due to a compensatory mechanism in relation to treatment with amprolium and the coccidian infection. *Eimeria tenella* is a very pathogenic chicken coccidia that parasitize caecum of young chickens and is characterized by acute onset manifested by clinical signs of bloody diarrhea due to invasion of the mucosal lining of the caecae by the second generation merozoites and the associated microscopic changes due to coccidiosis which include congestion of the mucosa of the intestine, diffuse or patchy haemorrhagic enteritis, lymphocytic and mononuclear cells infiltration of the intestinal mucosa and sloughing of epithelial lining (McDougald and Reid, 1997). Also, it is a known fact that the weight of organs in broilers is indicative of the response of birds to the feed intake in relation to their age or growth of broilers. The weight of organs in broilers also reflects the anatomical response of broilers to the type of diets consumed, such as the use of whole grains in feed or large high fibre particles (Atteh, 2004).

CONCLUSION

In conclusion, this study has shown that the methanol extract of *Parkia biglobosa* root bark may have improved the carcass yield of broilers and also ameliorates clinical signs of bloody diarrhea consistent with *Eimeria tenella* infections in broiler chickens. The root bark of *P. biglobosa* has no harmful or adverse effect on the organs of treated broilers with or without *Eimeria tenella* infection. It is recommended that further research on the potential use of the root bark of *P. biglobosa* for the control of coccidiosis in broiler chickens be carried out. *P. biglobosa* root bark may be recommended to poultry farmers in the absence of conventional anticoccidial drugs.

References

- Adetutu A, Morgan W, Corcoran O (2013). Ethnopharmacological survey and in vitro evaluation of wound-healing plants used in South-western Nigeria. *Journal of Ethnopharmacol* 137 (1): 50 - 56.
- Atteh J.O (2004). Critical review of the activities of feed enzymes in Nigeria. *Bio-ingredients (Nig.) Ltd Seminar* held on 21st May, 2004 at Airport Hotel, Ikeja, Lagos State.
- Blake D.P, Clark E.L, Macdonald S.E, Thenmozhi V, Kundu K, Garg R ...Fiona M (2015). Population, genetic, and antigenic diversity of the apicomplexan *Eimeria tenella* and their relevance to vaccine development. *Proceedings of the National Academy of Sciences of the United States of America* 112 (38): 5343 – 5350.
- Gharekhani J, Sadeghi-Dehkordi Z, Bahrami M (2014). Prevalence of coccidiosis in broiler chicken farms in western Iran. *Journal of Veterinary Medicine*, 1-4.
- Goetting V, Lee K.A., Tell L.A (2011). Pharmacokinetics of veterinary drugs in laying hens and residues in eggs: a review of the literature. *Journal of vet. Pharmacol. Therapeutics*.34, 521–556..

- Jatau I.D, Sulaiman N.H, Musa I.W, Lawal A.I, Okubanjo O.O, Isah I, ... Magaji Y (2012). Prevalence of Coccidia Infection and Preponderance *Eimeria* Species in Free Range Indigenous and Intensively Managed Exotic Chickens during Hot-wet Season, in Zaria, Nigeria. *Asian Journal of Poultry Science* 6: 79 - 88.
- Karou S.D, Tchacondo T, Tchibozo M.D, Abdoul-Rahaman S, Anani K, Koudouvo Komlam B, Comlam D (2011). Ethnobotanical study of medicinal plants used in the management of diabetes mellitus and hypertension in the Central Region of Togo. *Pharmacological Biology* 49 (12): 1286 – 1297
- Maikai, Victor, Adeiza, Abubakar, Maikai B.V (2007). Preliminary Studies of Anticoccidial Effect of Mahogany (*Khaya senegalensis*) and African Locust Beans Tree (*Parkia biglobosa*) Aqueous Bark Extracts on Chicken Infected with Coccidia. *Savannah Journal of Agriculture* 2: 43 – 51.
- McDougald L.R, Reid W.M (1997). Coccidiosis in Chickens. In: Diseases of Poultry, Calnek, BW, HJ Barnes L.R McDougald, Saif Y.M (Eds.). Iowa State University Press, Ames, Iowa, USA. 865 - 878.
- Ola-Fadunsin S.D, Ademola I.O (2013). Direct effects of *Moringa oleifera* Lam (*Moringaceae*) acetone leaf extract on broiler chickens naturally infected with *Eimeria* species. *Tropical Animal Health and Production* 45 (6): 1423–1428.
- Olanipekun M.K (2014). Survey And Chemical Composition Of Plants Used As Herbal Remedies In Managing Poultry Animal Diseases In Ekiti State, Nigeria. *IOSR Journal of Agriculture and Veterinary Science* 7 (11): 10 - 16.
- Traoré M, Baldé M, Oularé K, Magassouba F, Diakité I, Diallo A,.... Balde A.M (2013). Ethnobotanical survey on medicinal plants used by Guinean traditional healers in the treatment of malaria.. *Journal Ethnopharmacology* 150 (13) 1145 – 1153.