EFFECT OF PHYTOBIOTIC ON PROTOZOAN LOAD OF EIMERIA SPP IN BROILER CHICKEN

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Abstract

The impact and contribution of poultry sector in global hunger alleviation cannot be over emphasised. However, it is also plagued by protozoan parasites of the genus eimeria which causes Coccidiosis. Phytobiotics has been proven to be a substantial replacement for antibiotics in poultry industry. This study was conducted to evaluate the effect of phytogenic as feed additives in broiler feed on qualitative analysis of eimeria spp in broilers feaces. About 200 Arbor Acre strains were obtained from a reputable commercial hatchery. The birds were randomly allocated into five treatments with four replicates in a completely randomized design. Each replicate contained 4 birds. The birds were reared on deep litter system for 42 days (6 weeks). Data collected from the parasitological examination of feacal sample were analysed using SAS. The result showed that there is significant difference in treatment 1 of the first group of Phytobiotics among the other treatments. For birds fed with phyllantus amarus, the result showed no significant difference across the treatment. This indicates that at this rate, further inclusion of the phytobiotics (LpCOLg) should be avoided to prevent further economic loss.

Key words: eimeria species, oocyts count, phytobiotics, LpCOLg-lemon peel, curry leave, orange peel, lemon grass

Introduction

Coccidiosis is a disease caused by the protozoan parasite of the genus *eimeria spp*. consisting of seven species, and is one of these most consistence problems faced by the modern poultry industry (Vrba et al., 2011).The global annual poultry production losses are consequently large and are estimated at billions of dollars (Godwin and Morgan, 2014). This disease is one of the most essential and costly diseases of poultry industry worldwide. Intensive chicken farming depends on specific prophylaxis of Coccidiosis with in-feed anticoccidial drugs and live vaccines. Over time, the Coccidiostats has not been more effective due to development of drug resistance. Drug-resistant *Elmeria* strains are responsible for subclinical Coccidiosis and, subsequently, for impaired performance characteristics such as body weight Gain, and feed conversion ratio (Shirzad et al., 2011). The morbidity and mortality in chickens infected with *Elmeria* species can be as high as 80% (Mcdougald et al., 1997). In this case, coccidiosis is considered to be one of the most expensive diseases (Zaman et al., 2012). In the poultry industry, chickens can be infected by any of the seven species of Elmeria, including *Elmeria tenella* (*E. tenella), Elmeria maxima (E. maxima), Elmeria acervulina (E. acervulina), Elmeria necatrix (E. necatrix), Elmeria brunette (E. brunette), Elmeria mitis (E. mitis), and Elmeria praecox (E. praecox) (Shivaramaiah et al., 2014). E. tenella, E. necatrix, E. maxima, E. brunette and E. acervulina* are considered to be highly pathogenic, whereas *E. praecox* and E. mitis are regarded as the least pathogenic (Al-Natour et al., 2002).

The specific identification of *Elmeria* species is important for the diagnosis, disease control, and treatment, as well as for epidemiology and biological studies of chicken populations (Hamza et al., 2015). Therefore, identification and genetic characterization of different species of *Elmeria* are central to prevention, surveillance and control of Coccidiosis (Morris GM et al., 2006). Identification of *Elmeria* species is based on clinical features, specific lesions in certain sites of the intestine, and morphological and biological features as sizes of oocysts, sites of infection, pre-patent period, and sporulation time. Although, *E. maxima* can be easily identified based on oocyst size, while *E. tenella and E. necatrix* produce unmistakable lesions (Hadipour et al., 2011), identification through these parameters only is not always accurate due to overlapping characteristics (Long et al., 1984). Mixed infections are commonly found under field conditions, which pose a problem for the precise discrimination of species using classical methods. Moreover, classical methods are expensive, time-consuming (Haug et al., 2008) and require highly trained personnel (Long et al., 1984).

Records have shown that among the animal production modules, the poultry sector is now the fastest growing. What started as backyard "village poultry industries" during the mid-20th century have evolved into skilful and organized agribusinesses in many developing countries (FAO, 1998; Adene and Oluleye, 2004). Thus, poultry production has greatly expanded in many developing countries in the recent past and expansion is predicted to continue for at least 30 years in Africa and Asia (Blake and Tomley, 2014). Unfortunately, the poultry industry has been adversely

affected by a variety of constraints (McDougald, 2003; Adene and Oluleye, 2004). Of these constraints, diseases play a leading role in hampering the development of poultry production. Hence a substantial way to combat this menace organically is to study the effect of manipulating phytogenics as feed additives on broiler chicken.

MATERIALS AND METHODS

Experimental site and birds

The research was carried out at the Poultry Breeding Unit of The Teaching and Research Centre of the Federal University of Agriculture, Abeokuta. The laboratory experiment was also done at the Biotechnology laboratory of the department of Animal Breeding and Genetics of the Federal University of Agriculture, Abeokuta. The experimental birds that were used for this project consists of 200 broiler chicken. These birds were allocated to different replicate. Different level of inclusion of phytobiotics was also done for the different treatment. The first groups consisted of blended lemon peel, orange peel, lemon grass, and curry leave at inclusion rate of 50, 75, 100, 125grams and feed only(0) respectively. While the second group consist of *phyllanthus amarus* at 75, 100 and 125grams, antibiotic and feed only. Each treatment had four replicate containing five birds each. They were raised for a period of 6 weeks with adequate care which involve the regular supply of feed and water, heat, protection from predator, and good litre management etc.

Sample collection and Parasitology examination

Faecal samples was removed directly from the floor where each bird was raised using disposable examination gloves. The samples were collected into plastic bags, labelled and stored at 4 °C until processing. The presence of oocysts in faecal samples was examined with a flotation method using saturated sodium chloride solution (Yu *et al*. 2011).

Statistical analysis

The data were statistically analysed using analysis of variance in a completely randomized design. All statistical analysis was performed using the Statistical Analysis System (SAS 2003). The overall level of statistical significance was set at $P < 0.05$. All values were expressed as statistical means ± standard error of the mean (SEM).

Result and Discussion

Effect of varied level of phytobiotics (LpCOLg)

The result of the effect of varied level of phytobiotics (LpCOLg) in broiler feed on the qualitative analysis of *Eimeria specie* in broiler faeces is shown on figure 1. The result shows that there is significant difference ($p<0.05$) in treatment 1 among the other treatments. No significant difference ($p>0.05$) were observed across treatments 2 to 5.

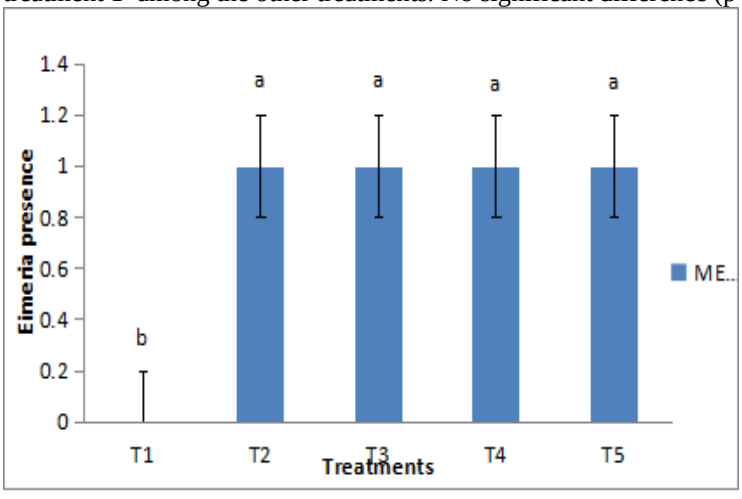

Figure 1: Effect of varied level of phytobiotics (LpCOLg) in broiler feed on the qualitative analysis of *Eimeria specie* in broiler faeces.

a,b= means with different superscript are significantly different ($p<0.05$)

The effect of different level of phyllantus amarus inclusion

Figure 2 Shows the different level of *phyllantus amarus.* The result shows no significant difference (p>0.05) across the treatment.

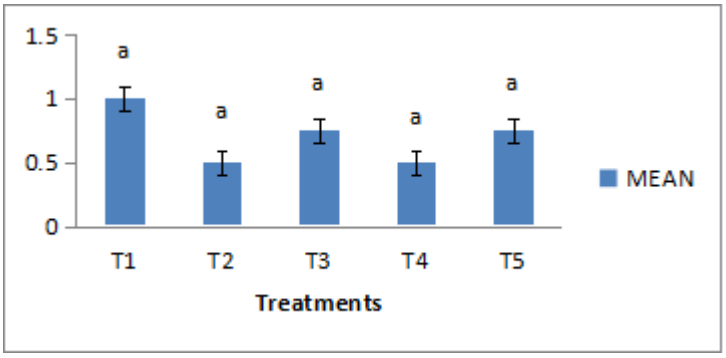

Figure 2. The effect of different level of *phyllantus amarus* inclusion.

a,b= means with different superscript are significantly different (p<0.05)

Medicinal plants are becoming best replacement option for antibiotics. Phytobiotics (LpCOLg) play many roles in the poultry industry which has ccontributed greatly to the gross product. From the result obtained, inclusion rate of 50 grams phytobiotics (LpCOLg) indicate sufficient amount of dosage to prevent for eimeria oocyts activation. This suggest that at this level, *eimeria* protozoan can be controlled which will lead to the reduction of coccidiosis outbreak. This agrees with Gabor et al, 1998 and Szigeti et al, 1999 which research support that supplementing phytogenics into the diet of chicken increases their antibody production which assist to fight against New Castle disease. Further increase in the inclusion level showed no significant difference (p>0.05) in the presence of *eimeria* oocyts found. In respect to this, treatment one should be optimized and incorporated in feed formular due to its economic benefits among others. Result for the different level of *Phyllantus Amarus* shows no significant difference (p>0.05) across the treatment. The fact that the average mean for the first treatment were higher than others indicate that animals of this group became infected at early stage. This infection might be due to native oocyts or by cross contamination from other infected groups. Some of these infections in birds on prophylactic may reflect reduced susceptibility (resistance) to these products by some of the coccidian. Reduced susceptibility to anticoccidials has been demonstrated in many *eimeria* species on commercial broiler farms and the application of vaccines may be too expensive or impractical in large broiler operations (Williams, 1999). Furthermore, at an increased level of inclusion, the average count of emeria oocyts in other birds begins to decrease. This suggests that increased dosage of *phyllantus amarus* might hinder the outset of eimeria oocyts.

Conclusions and recommendation

The findings of these study shows significant difference in the first treatment compared to other treatment fed with the phytobiotics. This tells that at this rate, further inclusion of the phytobiotics (LpCOLg) should be prevented to prevent further economic loss. Despite the various inclusion level of the phytobiotics, eimeria oocyts was still presence at other treatment. This suggest that more precise and specific approach needs to be developed to compact the effect of eimeria species in poultry production. Also, biological mechanism as well as molecular research should be carried out to enhance the genetic resistance of chicken to such economical diseases.

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