



The effect of some herbal extracts in the treatment of natural coccidial infection in chicken

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Abstract

The study was designed to investigate the curative properties of water extracts of ginger, pawpaw seed and Mexican Sunflower in the control of coccidiosis in chicken. At the peak of infection which was characterized with mortality, pre-treatment faecal egg count was done and the birds were then divided into five equal groups containing nine birds each and replicated twice. Group A was treated with Embazine forte® while the Groups B, C and D group were given water extracts of *Zingiber officinale* (ginger- rhizome) *Tithonia diversifolia* (Mexican sunflower – leaf) and *Carica papaya* (pawpaw- seed) respectively at the rate of 2.5g/kg. Group E was not given anything to serve as control. The results showed that there was no significant difference ($P > 0.05$) across the treatments with respect to weight gain and feed intake with the conventional drugs having the highest weight gain and feed intake. On the other hand, there was significant difference ($P < 0.05$) for fecal color and mortality for different treatments. It can be concluded that substitution of any of the herbs can give a satisfactory result in combating coccidiosis in chicken especially in areas with little or no access to the conventional drug. (RASPA, 7 (S) : 135-138).

Key – Words: Herbal extracts - Natural coccidial infection - Chicken.

Résumé

Effets d'extraits de plantes sur la coccidiose expérimentale du poulet

Ce travail a été réalisé pour étudier les propriétés curatives des extraits de gingembre, de graines de papaye et de tournesol mexicain sur la coccidiose du poulet. Dans la phase d'état de l'infection caractérisée par la mortalité, un comptage des oeufs a été réalisé et les oiseaux ont ensuite été répartis en cinq groupes égaux de 9 sujets avec deux répétitions de chaque traitement. Le groupe A, a été traité avec Embazine ® forte tandis que les groupes B, C et D ont reçu des extraits de gingembre, de feuilles de tournesol mexicain et de graines papaye, respectivement, au taux de 2,5 g/kg. Le groupe E est le groupe témoin. Les résultats ont montré qu'il n'y avait pas de différence significative ($P > 0,05$) entre les traitements concernant la prise de poids et la consommation alimentaire même si ces paramètres sont meilleurs chez les oiseaux traités à l'Embazine. Des différences de couleur de fèces et de mortalité ont cependant été observées entre traitement. On peut en conclure que ces plantes sont potentiellement exploitables dans la lutte contre la coccidiose surtout dans les régions où les anticoccidiens sont peu disponibles

Mots – Clés : Extraits de plantes – Coccidiose - Poulets.

Introduction

Coccidiosis is recognized as one of the most significant chicken diseases having a huge impact on profitability of the poultry industry. Efforts and growing awareness to boost animal production, precisely poultry production, over the years have been single-handedly frustrated by this disease. It has long been known as important in poultry, and even today, control requires significant financial expenditure [2]. The estimated cost of preventing coccidiosis and losses which occur as a result of infection amount to \$ 300 million annually in both industrialized and tropical countries.

The existence of many anticoccidial drugs such as amprolium, nicarbazine, nitrofurazolidone, sulphaquinoxaline, sulphamethazine and a host of others do not seem to provide a lasting solution to the havoc

caused by coccidiosis because drug resistance is once again tipping the balance in favour of the parasite [10].

Negative impact on laying and hatchability, toxicity to some animal species as well as residue in meat and eggs are generally known facts leading step-by-step to the limited use and even ban of some conventional drugs like nicarbazine, amprolium, metichloripindol etc in European countries [13].

Many folkloric claims have shown that most local herbs contain bioactive compounds that are effective in the treatment of certain ailments TONA *et al.* [12] reported that Mexican sunflower; *Tithonia diversifolia* contains anti-diarrhoeal, anti-amoebic and spasmolytic activities while this same plant has also been reported to contain bioactive compounds that have anti-inflammatory

properties [7]. In china, ginger has been used to aid digestion and treat stomach upset, diarrhea and nausea for more than 2000 years. Since ancient times, ginger has also been used to help arthritis, colic, diarrhoea and heart conditions. Also various part of pawpaw plant, *Carica papaya* have been used in the treatment of diseases in livestock. *Papaya latex* had been tested against *Ascaris suum* and found to be very effective The seed too have been reported to be very effective in expelling worms in livestock [8].

In Nigeria, there are oral reports among farmers linking some of these local herbs with the treatment of different ailments in animals. Water extract of *Tithonia diversifolia* has been reported orally to cure swine of African swine fever. Many of these oral reports sound incredible since there are no documented evidences to support these claims. There is, therefore, a need to validate, through empirical means, some of these folkloric claims by investigating into some of these local herbs.

The present study was therefore to investigate the effectiveness of three selected herbs namely: *Tithonia diversifolia*, *Carica papaya* seed and *Zingiber officinale* in the treatment of coccidian infection in chicken.

100 white cockerels strains used for the experiment were raised from day old in the brooding pen till they were transferred into the experimental pens at three weeks of age.

To meet the nutritional requirements of the cockerels during the experimental period, a complete basal diet was formulated. It contained neither growth enhancers nor coccidiostats and was presented in a mash form.

Three different herbs used were sunflower leaves (*Tithonia diversifolia*), ginger rhizomes (*Zingiber officinale*) and pawpaw seeds (*Carica papaya*). The herbs were oven-dried: sunflower at 30°C for 24 hours, papaya seeds at 30°C for 3 days and ginger rhizomes at 40°C for 5 days. Each of these oven-dried herbs was ground in mortar and sieved with 2-mm sieve.

Birds were randomly divided into five groups after a pre-treatment faecal egg count using McMaster oocyst counting technique to establish the presence of coccidia in their faeces at five weeks of age. The groups were tagged A, B, C, D and E. Each group contained nine birds and was replicated twice. Embazine Forte®, a conventional drug was given to group A at a dosage recommended by the manufacturer while each of B,C and D was given oral dose of ginger, sunflower, and pawpaw seed extract at the rate of 2.5g per kg body weight of the birds. E served as the control experiment. Treatments were administered for seven days and the birds were monitored for 14 days. Average weight of the birds, mortalities, faecal colours average daily feed intake, faecal coccidian counts were recorded pre and post treatment. Data obtained were statistically analyzed with the general linear model of SAS package and the Duncan option of SAS (1985) and multiple range tests were used to detect significant difference among the means [11].

Materials and Methods

The experiment was carried out at the poultry unit (experimental pens) of the Obafemi Awolowo University Teaching and Research Farm. The

Results

Table 1: Average feed intake of the experimental chicks

Day	Treatments					SE
	A	B	C	D	E	
1	50.00 ^a	50.00 ^a	43.50 ^b	35.50 ^c	41.00 ^b	2.72
2	47.00 ^b	47.00 ^b	47.00 ^b	55.00 ^a	47.50 ^b	1.31
3	47.00 ^a	44.00 ^a	44.00 ^a	41.00 ^a	37.00 ^a	6.72
4	47.00 ^a	55.00 ^a	53.00 ^a	55.50 ^a	50.00 ^a	2.63
5	55.00 ^a	55.55 ^a	55.50 ^a	44.00 ^b	43.50 ^b	0.69
6	50.00 ^a	52.50 ^a	55.50 ^a	41.00 ^a	46.50 ^a	7.11
7	52.50 ^a	49.50 ^a	52.50 ^a	49.50 ^a	47.00 ^a	6.81
8	55.55 ^a	51.50 ^a	47.00 ^a	50.00 ^a	34.00 ^b	6.03
9	58.00 ^a	52.50 ^a	52.50 ^a	47.00 ^a	34.00 ^b	6.02
10	60.50 ^a	55.50 ^a	52.50 ^{ab}	52.50 ^{ab}	42.50 ^b	6.05
11	50.00 ^a	44.00 ^a	45.00 ^a	47.00 ^a	55.00 ^a	11.41
12	50.00 ^a	44.00 ^a	52.50 ^a	52.50 ^a	50.00 ^a	6.31
13	56.00 ^a	50.00 ^a	56.00 ^a	47.50 ^a	54.00 ^a	13.03
14	56.50 ^a	50.50 ^a	55.00 ^a	52.50 ^a	56.00 ^a	4.96
Mean	53.04 ^a	50.07 ^{ab}	50.82 ^{ab}	47.82 ^{bc}	45.57 ^c	

SEM: Standard error of mean. a,b,c: means with the same superscripts are not significantly different

Table 2: Percentage Mortality of the Experimental Chicks

Day	Treatments					SEM
	A	B	C	D	E	
1	0.00 ^a	0.00 ^a	0.00 ^a	2.78 ^a	0.00 ^a	2.44
2	0.00 ^a	0.00 ^a	2.78 ^a	0.00 ^a	2.78 ^a	2.98
3	0.00 ^a	2.78 ^a	0.00 ^a	0.00 ^a	0.00 ^a	2.43
4	0.00 ^a	0.00 ^a	0.00 ^a	0.00 ^a	0.00 ^a	0.00
5	0.00 ^a	0.00 ^a	0.00 ^a	5.56 ^a	2.78 ^a	5.98
6	0.00 ^a	2.78 ^a	0.00 ^a	0.00 ^a	5.56 ^a	5.97
7	0.00 ^a	0.00 ^a	2.78 ^a	0.00 ^a	2.78 ^a	2.98
8	0.00 ^a	0.00 ^a	0.00 ^a	2.78 ^a	0.00 ^a	2.44
9	0.00 ^a	0.00 ^a	0.00 ^a	0.00 ^a	2.78 ^a	2.44
10	0.00 ^a	0.00 ^a	0.00 ^a	0.00 ^a	0.00 ^a	0.00
11	0.00 ^a	0.00 ^a	0.00 ^a	0.00 ^a	0.00 ^a	0.00
12	0.00 ^a	0.00 ^a	0.00 ^a	0.00 ^a	0.00 ^a	0.00
13	0.00 ^a	0.00 ^a	0.00 ^a	0.00 ^a	0.00 ^a	0.00
14	0.00 ^a	0.00 ^a	0.00 ^a	0.00 ^a	0.00 ^a	0.00
TOTAL	0.00 ^c	5.55 ^c	5.55 ^c	11.12 ^b	16.68 ^a	

abc: means with the same superscripts are not significantly different.; SEM: Standard error of mean.

Table 3: Average biweekly body weight gain per bird in gram

Period	Treatments					SEM
	A	B	C	D	E	
1	0.38 ^a	0.27 ^a	0.29 ^a	0.35 ^a	0.34 ^a	1.79
2	0.42 ^a	0.31 ^a	0.32 ^a	0.35 ^a	0.33 ^a	2.58
3	0.58 ^a	0.69 ^a	0.63 ^a	0.77 ^a	0.49 ^a	2.89
4	0.40 ^a	0.39 ^a	0.24 ^a	0.12 ^a	0.34 ^a	1.33
Overall mean	0.45	0.41	0.37	0.40	0.37	

abc: means with the same superscripts are not significantly different.; SEM: Standard error of mean.

Table 4: Faecal colour of the experimental chicks

Day	Treatments				
	A	B	C	D	E
1	1.00 ^c	2.00 ^{ab}	2.50 ^{ab}	3.50 ^a	2.50 ^{ab}
2	2.00 ^a	2.00 ^a	3.00 ^a	3.50 ^a	4.00 ^a
3	1.00 ^c	1.00 ^c	3.00 ^b	3.50 ^{ab}	4.00 ^a
4	1.00 ^b	1.00 ^b	1.00 ^b	3.00 ^a	3.50 ^a
5	1.00 ^a	1.00 ^a	2.00 ^a	2.50 ^a	3.00 ^a
6	1.00 ^b	3.00 ^a	1.00 ^b	2.50 ^{ab}	3.00 ^a
7	1.50 ^b	1.00 ^a	2.00 ^a	1.00 ^b	2.00 ^a
8	1.00 ^{ab}	1.00 ^a	1.50 ^a	2.00 ^a	3.00 ^a
9	1.50 ^a	1.50 ^a	3.00 ^a	2.00 ^a	2.50 ^a
10	1.00 ^a	2.00 ^a	1.50 ^{ab}	1.00 ^a	2.00 ^a
11	1.00 ^a	2.00 ^{ab}	1.50 ^a	1.00 ^a	2.00 ^a
12	1.00 ^a	2.00 ^{ab}	2.00 ^{ab}	2.00 ^{ab}	3.50 ^a
13	1.00 ^c	3.50 ^{ab}	2.50 ^b	4.00 ^a	4.00 ^a
14	1.00 ^b	2.00 ^{ab}	3.00 ^{ab}	3.00 ^{ab}	4.00 ^a
TOTAL	1.14 ^d	1.79 ^{bc}	2.11 ^c	2.46 ^b	3.14 ^a

Colour: 1- normal, 2 – yellowish, 3 – brownish, 4 – bloody. abc: mean with different superscripts are significantly different

Discussion

The feed intake of group A and B decreased the first two days post treatment and fluctuated till day 10 before a progressive increase in intake was experienced while Group E had the lowest feed intake. This could be as a result of rapid multiplication or reproductive potential of coccidian as reported by FLOCK and HORN [4]. Mortality was highest in group E and this was recorded between the 5th and 7th day. This was in conformity with the findings of KETEELARS *et al.* [5] who reported high mortality as one of the clinical symptoms of coccidiosis in acute form. The effectiveness of the conventional drug over the herbs is seen in the zero level of mortality recorded by birds in group A. Insignificant statistical difference recorded across the treatments could be adduced to the potential of the herbs to depress activities of coccidian in the intestine as reported by SOUSLBY [10].

There was no significant different ($P > 0.05$) between means of the body weight gain by the chickens though group A had the highest mean and group E the low. Group A had the least mean in the colour ranking while E had the highest. The bloody nature of group E birds' faces could be due to severe lesion as reported by ALLEN *et al.* [1]. Variation a departure from the normal colour of blood from the damage intestinal walls could be due to the localization of lesion.

The mean egg per gram of faeces in the pretreatment egg count was higher than the post treatment and this is expected since the birds were samples for coccidian eggs are the peak of infection [14].

Across the group, there was a progressive reduction in the number of egg in the faeces with the conventional drug group having the least number of eggs. This is in consonance with the findings of Mc DOUGALD and REID [6] that the severity of infection is determined by the number of infective oocyst present. Statistically in significant difference of treatment B and C with A is however buttressed by the findings of CHRISTAKI *et al.* [3] that some of these natural herbs have a potential to protect against or moderate the effect of coccidian infection.

Conclusion

From the result of this study it can be concluded that the extracts of these three herbs can in no way be absolutely

substituted for conventional drugs for effective and optimal coccidial control although the result is quite encouraging. Ginger has the best result of the herbs and is almost equipotent like the conventional drug.

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