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EFFECT OF BASIL (*OCIMUM BASILICUM L.*) ON COCCIDIAL INFECTION IN BROILER CHICKS

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ABSTRACT

This study was conducted to determine the effect of basil (Ocimium basilicum L.) and the beneficial inclusion level in broiler chicks coccidial infection. The study was carried out with two hundred and forty chicks for three weeks. The experimental design was a split-plot laid out in Completely Randomized Design. The main polt factors were dry and fresh basil while the sub-plot factors were different basil inclusion levels of 0.0g, 0.5g, 1.0g, 1.5g and 2.0g basil/kg feed and water $^{-1}$. The sub-plot treatments were 180 coccidia challenged chicks replicated thrice with 10 chicks /replicate treated with basil while the control experiment had 60 unchallenged and untreated chicks. Data were collected onlive performance, haematology and oocyst count and were analysed statistically using One way analysis of variance and means separated using Duncan's multiple range test. Feed intake and mortality were not statistically (P>0.05) different while feed conversion ratio and live weight were significantly (P<0.05) different. Haematological parameters were all significantly (P<0.05) different. Oocyst count was also significantly (P<0.05) different. This study recommends prophylactic dose of 5g and a curative dose of 15g basil in feed or in water.

INTRODUCTION

The growing practice of using antibiotics in broiler production creates a two-fold problem for man. The more serious of the two problems unquestionably concerns the emergence of resistance to antibiotics among the enteric bacteria, which are shared by man and his animals; and also, the ability of certain strains to transfer their acquired resistance to others.

Anticoccidial, antifertility drugs and viral vaccines render birds exposed to them unfit for human consumption (Izunobi, 2002). This is unless withdrawal periods are clearly stated by manufacturers and strictly observed by users. To curb these problems, organic farmers utilize a wide range of cultural practices and natural inputs to manage crops in manner they consider safe for the environment and the consumer (Kuepper,2002).

Healthcare for man and his animals has aroused interests in research into alternative sources for medicine. The genus Ocimum Spp contains between 50 to 150 species of herbs and shrubs found in the tropical and sub-tropical regions of Asia, Africa, Central and South America.

Ocimum basilicum has over 50 medicinal activities and is reportedly used to treat over a hundred conditions. Hence,Ocimum basilicum is antibacterial, antiseptic, a febrifuge and a nervine (Herb Society of America, 2004).

MATERIALS AND METHODS

This study was carried out in the teaching and research farm of Michael Okpara Unjversity of Agriculture, Umudike, Nigeria. A total of 240 day-old chicks were used for the study. The experiment was designed to determine:

1. The effect of basil on coccidia.
2. The inclusion level that could be effective against coccidia, and
3. The economic implication of treating coccidia with basil.

The experiment was a split-plot design laid out in Completely Randomized Design with the statistical model: Yijk = μ + Ti + j (T)ij + eijk according to Obi (1995).
Where:
Yijk = any single observation
μ = population mean
Ti = effect of factor A (fresh basil in water)
J = effect of factor B (dry basil in feed)
(T)ij = effect of AB interaction
eijk = experimental error
All chicks were adapted for 1week during which time 180 chicks were infested with coccidia and, then alloted during the begining of the second week to the different treatments and replications. All chicks were raised under the conventional deep litter system. Feed and water were given by day only. Treatment of infected birds started upon confirmation of infection during the second week. Treatments were different inclusion levels of fresh and dry basil which lasted for 4weeks.
Data were collected on performance parameters, haematology, oocyst count and feed economy. All data collected were subjected to One way analysis of variance (Steel & Torrie, 1980) and means separated using Duncan's multiple range test (Duncan, 1955). All post mortem examinations were conducted at the National Veterinary Research Institute Sub-station, Umudike, Abia state, Nigeria; using procedures as recommended by Canning *et al.* (1980).

RESULTS AND DISCUSSIONS

Table I: Effect of basil inclusion levels on productive performance

Parameters	0.0g	5g	10g	15g	±SEM	CV
Feed intake (g)	565.2	568.3	568.8	571.0	8.00	2.4
Feed conversion ratio	1.73b	2.08a	1.71b	1.67c	0.30	3.7
Live weight (g)	302c	352a	340b	278d	9.68	21.6
Mortality (%)	1.00	0.00	0.33	0.33	0.73	12.2

Treatment means on the same row not followed by letters are not significantly (P>0.05) different.

From table I above, feed intake and mortality were not significantly (P>0.05) different. However, there are numerical differences in feed intake. The slight nemerical differences in feed intake of the treatments over the control is in agreement with the Herb Society of America (2004) which states that basil has appetizing properties. This has a positive implication to feed industries and farmers alike, as the feed miller is interested in profit accrued from bulk sales while the livestock farmer is interested in his animals having good appetites for increased consumption. Hence, this indicates possible statistical differences in the finisher phase. Feed conversion and live weight were significantly (P<0.05) different. This result agrees with Rabia (2010), who reported that chicks fed basil diets had

significantly (P<0.05) heaviest body weights than those fed the control and fenugreek diets. They increased as inclusion level increased. This could be attributed to the presence of essential oils in basil. These volatile essential oils have been shown to contain biologically active components (Desphande & Tipnis, 1977). Juvocimere I and II contained in basil have been reported as potent juvenile analogs (Nishida et al., 1984). Several researchers have also reported improved body weight, body weight gain, feed conversion efficiency.

The reduced mortality of the treatments which decreased as basil inclusion levels increased could be due to absence of intercurrent diseases like gumboro which increases the severity of coccidiosis (Stroom & Wiebe, 1999). The 0.0% mortality of 5g treatment could be attributed to minimal toxicity and the ability of the chicks to better utilize nutrients particularly, vitamin A. Deficiency of vitamin A causes outbreak of coccidiosis severity (Junger, 1945) in Banfield and Forbes (1999). This is due to the negative effect of vitamin A deficiency on the immune system (Vitacost.com, 2005). Basil is rich in vitamin A (Nutrition Data, 2004).

Table II: Effect of basil inclusion level on haematology

Parameter	0.0g	5g	10g	15g	±SEM	CV
Mean cell volume (µm3)	85.30b	92.30a	85.30b	81.50c	10.09	20.3
Mean cell haemoglobin(Pg)	28.00c	28.30c	29.70b	32.40a	3.09	18.1
Packed cell volume(%)	22.50b	26.33a	25.50b	19.50b	1.99	14.7
Mean cell haem. conc. (%)	33.62b	30.47b	34.13b	40.15a	2.53	12.6
Haem. (g / 100ml)	7.57b	7.97b	8.73a	7.10b	0.49	10.8
Red b. Cell(x 103/mm3)	2.73b	3.02a	3.03a	2.22b	0.29	17.9
White b. Cell (x 106/mm3)	3.40b	4.80a	4.20b	3.40b	0.27	11.7
Oocyst count (x 104)	25.80a	11.20b	8.40c	4.80c	1.56	21.5

Treatment means on the same row not followed by letters are not significantly (P>0.05) different.

From table II, all parameters studied which include mean cell volume, mean cell haemoglobin, Packed cell volume, Mean cell haemoglobin concentration, Haemoglobin, Red blood cell and White blood cell were significantly (P<0.05) different. Packed cell volume was highest in the 5g basil treatment. There was more haemoglobin concentration in 15g treatment than in the other treatments while Haemoglobin was highest in the 10g treatment against the other treatments. Red blood cells and White blood cells were highest in 10g and 5g basil treatments as against the other basil inclusion levels.

Table III: Interaction due to route of administration of basil on broiler chicks

Parameters	Factor	B				±SEM
	A	0g	5g	10	15g	
Oocyst	A1	303a	140b	87c	26d	5.54
	A2	212a	83b	81b	69b	
FCR (%)	A1	1.71a	1.67b	1.66b	1.30c	0.36
	A2	1.75a	1.68b	1.76a	2.08c	
FI (g)	A1	547.7	554.0	555.0	554.0	36.42
	A2	552.7	582.7	582.7	587.3	
LW (g)	A1	262b	345a	341a	276b	22.14
	A2	242c	359a	340a	280b	
Mortality (%)	A1	2.0	0.0	1.33	4.33	1.08
	A2	0.0	0.0	0.33	0.33	

Treatment means on the same row not followed by letters are not significantly (P>0.05) different.

From the table above, there is interaction in the route of administration of basil on oocyst count. It implies that the application of both routes of administration in a single dose are effective against coccidial infection in broiler chicks. This implicates the activities of volatile basil fractions in the fresh basil. These volatile fractions could be responsible for the negative effect on oocyst.

Table IV: Interaction due to route of administration of basil on broiler chicks haematology

		0g	5g	10g	15g	±SEM
MCV	A1	78.2c	104.3a	81.0c	86.3b	17.36
	A2	92.4	80.3	89.6	76.6	
MCH	A1	35.1a	34.0b	28.7c	24.7d	4.05
	A2	29.7	28.0	30.7	31.9	
HB	A1	7.13d	8.67a	8.27b	7.37c	0.66
	A2	8.0	7.27	7.2	6.83	
MCHC	A1	32.53c	32.43c	34.47b	41.6a	2.66
	A2	34.7	32.5	33.8	31.7	
PCV	A1	21.0c	27.67a	26.0b	23.33c	3.66
	A2	20.0	23.0	24.0	21.6	
RBC	A1	2.73c	2.63b	2.87a	2.10d	0.38
	A2	2.53c	3.40a	3.20b	2.33d	
WBC	A1	3.77c	5.00a	4.40b	3.07d	0.39
	A2	3.60d	4.53 a	4.00b	3.73c	

Treatment means on the same row not followed by letters are not significantly (P>0.05) different.

From the table IV above, there are interactions in the route of administration of basil. The results indicates that basil can be administered fresh in water or dry in broiler chick feed.

CONCLUSION

Basil is a herb used medicinally all over the world, and the medicinal benefits can be useful in livestock nutrition and health. This study has revealed the potentials of basil both as a nutrient contributor and also in the management of coccidial infections in broiler chicks. The study has also implicated basil as an appetite stimulant, and thus could find hope in both animal and human nutrition. The application of 5-10g $^{kg-1}$ basil in feed and or in water will have beneficial effects in broiler chicks production.

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