
EFFECT OF ADMINISTERING AQUEOUS EXTRACT OF *MORINDA LUCIDA* LEAVES ON THE PERFORMANCE OF BROILER CHICKENS FED AN AFLATOXIN B1 CONTAMINATED DIET

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ABSTRACT

Despite the potential benefits, medicinal plant aqueous extracts, which play a vital role in providing essential micronutrients and enhancing gut performance for animal well-being have not received adequate attention. Therefore, this study was aimed at assessing the impact of administering aqueous *Morinda lucida* leaf extract (MLLE) on the performance of broiler chickens fed aflatoxin B1-contaminated diets. Two hundred day-old Cobb 500 broiler chickens were meticulously selected and allocated to four dietary treatments with five replicates (10 birds/replicate) in a completely randomized design. The dietary treatments were coded as: Diet 1 (Control) had no aflatoxin B1 contamination, while Diets 2 to 4 were contaminated with 0.5 g/kg aflatoxin B1 (AFB1) each. Birds fed Diet 3 were orally administered 1 g/litre of aqueous MLLE, prepared by soaking in graduated hot water the day before administration, and sieved before given to the birds. Birds fed Diet 4 were given 2 g/litre of aqueous MLLE. At intervals of 7 days, the body weight gain (BWG), feed intake (FI), and feed conversion ratio (FCR) were measured. The BWG of birds fed Diet 2 (2291.49 g/bird) was significantly ($P < 0.05$) lower compared to those in Diets 1, 3, and 4 (2698.09, 2745.40, and 2741.09 g/bird, respectively). The FI across the dietary treatments was not significantly ($P > 0.05$) affected. Birds fed Diets 3 and 4 had the lowest FCR of 1.27 each compared to others. In conclusion, administering aqueous *Morinda lucida* leaf extract at 1 g/litre to broiler chickens exposed to a diet contaminated with 0.5 mg/kg Aflatoxin B1 improved the performance of the birds.

Keywords: *Morinda lucida*, performance, broiler chickens and Aflatoxin B1

INTRODUCTION

Aflatoxin B1 (AFB1), produced by specific strains of *Aspergillus* fungi, is a well-known mycotoxin known for its harmful effects on animal health and productivity. Poultry, especially broiler chickens, is highly susceptible to AFB1 contamination, raising concerns about food safety and economic losses in the poultry industry. Various studies have illuminated the multifaceted negative impacts of AFB1 on poultry health and performance. In a study by Smith et al. (2018), it was demonstrated that AFB1 exposure leads to reduced growth rates, impaired feed conversion efficiency, and compromised immune function in broiler chickens. Recent research has explored the potential use of plant-based extracts, such as those from *Morinda lucida* leaves, in mitigating AFB1 toxicity. Gupta et al. (2019) highlighted the antioxidant properties of *Morinda lucida* leaf extract, suggesting its capability to neutralize reactive oxygen species generated during AFB1 exposure. This is crucial, given that oxidative stress significantly contributes to the adverse effects of AFB1 on poultry. Despite the potential benefits, medicinal plant aqueous extracts, which play a vital role in providing essential micronutrients and enhancing gut performance for animal well-being (Onunkwo *et al.*, 2022), have not received adequate attention. Many medicinal plants and potential herbs in the health field are still ripe for improvement. The administration of *Morinda lucida* leaf extract and its effects on the performance of broiler chickens fed an AFB1-contaminated diet have been subjects of interest in poultry research. AFB1 is a prevalent contaminant in poultry feeds in tropical and subtropical climates, with documented negative effects on broiler chicken performance and health (Yunus *et al.*, 2011). Research has established the potential of even low levels of AFB1 to deteriorate broiler performance. *Morinda lucida* leaf extract has been studied for its potential benefits in broiler chickens, with findings indicating improved growth performance and reduced microbial counts in the gastrointestinal tract (Lala *et al.*, 2017).

MATERIALS AND METHODS

The experiment was conducted at the Poultry Section of the Teaching and Research Farm (TRF) of the Federal College of Agriculture (FECA) in Akure, Nigeria. Fresh *Morinda lucida* leaves were harvested, washed in running tap water, suspended under shade for 20 minutes to facilitate proper water drainage. Subsequently, the leaves were lightly spread on tarpaulin in a well-ventilated room and air-dried for about 14 days. After drying, they were milled into a powder to produce *Morinda lucida* leaf extract (MLLE). Two basal diets were formulated to meet the minimum requirements for broiler chickens during the starter (1-21 days) and grower/finisher phases (22 to 42 days) (refer to Table 1). Each phase's basal diets were divided into four equal portions labeled 1 to 4. Diet 1 contained no aflatoxin B1 (AFB1), while diets 2 to 4 were contaminated with 0.5 g/kg Aflatoxin B1 (AFB1) each. Birds fed diet 3 were orally administered 1 g/litre of aqueous MLLE, prepared by soaking in graduated hot water the day before administration, and sieved before being given to the birds. Birds fed diet 4 were given 2 g/litre of aqueous MLLE using the same procedure. This feeding regimen was maintained throughout the 42-day experiment. A total of 200 one-day-old, unsexed Cobb 500 broiler chicks were distributed among the four dietary treatments, with five replicates (50 birds/treatment; 10 birds per replicate) in a completely randomized design. Feed and water were provided *ad libitum* throughout the 42 days of the experiment.

Table 1: Composition and Nutrient Contents of Experimental Basal Diets

Ingredients (%)	Starter phase (1 to 21 days)	Finisher phase (22 to 42 days)
Maize	50.36	58.36
Maize bran	3.00	0.00
Rice bran	0.00	3.02
Soybean meal	38.00	30.00
Fish meal	3.00	3.00
Soy oil	1.00	1.00
Bone meal	3.00	3.00
Limestone	0.49	0.47
Lysine	0.24	0.24
Methionine	0.29	0.29
Common salt	0.31	0.31
Premix	0.31	0.31
Total	100.00	100.00
Calculated value (% DM)		
Metabolizable energy	3018.10	3108.20
(kcal/kg)		
Crude protein	22.17	20.04

RESULTS AND DISCUSSION

Birds fed Diet 2 exhibited a significantly lower body weight gain (2291.49 g/bird, $P < 0.05$) compared to those in Diets 1, 3, and 4 (2698.09, 2745.40, and 2741.09 g/bird, respectively). While feed intake across the dietary treatments showed no significant differences ($P > 0.05$), birds on Diets 3 and 4 achieved the lowest Feed Conversion Ratios, both recorded at 1.27, outperforming the other groups (Table 2). The therapeutic application of medicinal plants to enhance performance and health in animal production is well-documented (Kadiri *et al.*, 2016; Oloruntola *et al.*, 2018). The reduced body weight gain (BWG) observed in Diet 2 may be attributed to the detrimental effects of aflatoxin B1 on the growth performance of the birds. In contrast, the BWG observed in birds fed diets 3 and 4, which were comparable to those in Diet 1, suggests the potential mitigating effects of *Morinda lucida* leaf extract (MLLE) against the exposure to aflatoxin B1 in broiler chickens. This aligns with previous

findings suggesting the nutraceutical roles of natural phyto-antioxidant supplements, such as aqueous *Morinda lucida* leaf extract (MLLE) in improving the performance of the stress exposed animals (Fouad et al., 2019; Valenzuela-Grijalva *et al.*, 2017). In conclusion, administering aqueous *Morinda lucida* leaf extract at 1 g/litre to broiler chickens exposed to a diet contaminated with 0.5 mg/kg Aflatoxin B1 stabilized the body weight gain of the birds.

Table 2: Performance characteristics of broiler chickens exposed to an aqueous extract of *Morinda lucida* leaves and a diet contaminated with Aflatoxin B1 (AFB1)

Parameters	Diet 1 Control	Diet 2 0.5g/kg AFB1	Diet 3 0.5g/kg AFB1+1g /1 MLLE	Diet 4 0.5g/kg AFB1+2g/ 1 MLLE	SEM	P value
Initial Body Weight (g/bird)	40.38	40.47	40.41	40.42	0.17	0.99
Final Body Weight (g/bird)	2738.47 ^a	2331.97 ^b	2813.34 ^a	2805.72 ^a	62.75	0.01
Body Weight Gain (g/bird)	2698.09 ^a	2291.49 ^b	2745.40 ^a	2741.09 ^a	62.57	0.02
Feed Intake (g)	3403.34	3188.20	3463.15	3476.33	47.53	0.08
Feed Conversion Ratio	1.28	1.39	1.27	1.27	0.03	0.25

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