



Effect of Moringa Olivera Leaves Extract on Laying Hens Productive Exposed to Coccidian Challenge

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Abstract

The aim of this study was to determine the impact that aqueous Moringa leaf extract can have on the productive behavior of coccidiosis-infected ISA Brown laying hens. There were 120 hens which were allocated into four groups: control (T1) and three experimental (T2, T3, and T4) groups to which 4, 6 and 8 ml/L of extract were added. The findings revealed that the all extract treatments (T2, T3, and T4) had a significant beneficial effect on productive performance. T3 and T4 performed better than T1 and T2 in the second period as compared to the control during the first period. Moreover, the weight of the egg was significantly and consistently growing throughout the time of treatment in all groups under treatment as compared to the control. There was also extensive improvement in the quality of the eggshell; the T3 and T4 all enhanced shell weight during the first period with a significant increase in all treated groups during the second period. Moreover, the shell thickness was even bigger in T2 and T4 in relation to T1 and T3 in the latter period. Generally, the results indicate that high levels of the Moringa extract can greatly improve the production and quality parameters of eggs in the hen that is experimented with coccidiosis.

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Keywords: Extract of Moringa Olivera Leaves, Laying Hens, Coccidian Challenge

1. Introduction

Although technology has improved, vaccine development and poultry management, as well as the application of artificial intelligence in the poultry industry, the industry is still facing numerous challenges (Al-Jebory *et al.*, 2023 & 2024)^[1, 4]. One of these challenges is the so-called coccidiosis, a parasite that develops in litter of the rearing hall and in the areas with a high moisture of litter a parasite causes the chickens serious damages and thereby lowers the egg production, hinders the digestion and absorption of nutrients due to the injury of the intestinal lining and, consequently, degrades the egg quality and poor egg quality (El Banna *et al.*, 2016)^[14]. The resistance to the widespread use of anticoccidial drugs (Aljohani, 2024)^[6] has been met with drug resistance, which in turn has prompted the need to find alternative medicines, or alternative control strategies. Nevertheless, due to this, the poultry products have been made to be more expensive. In addition, the presence of the remnant of medication or antibiotics in the poultry product may not be a pleasant experience to the consumer. Therefore, it deserves to be said that one may discover a natural substitute that will help to develop without causing and cure coccidiosis without damaging the human body (El Banna *et al.*, 2016)^[14]. The idea of herbal treatments as a means of treating coccidiosis is not new, therefore, research on herbal materials as anticoccidial agents demonstrates that it can replace the existing means of managing coccidiosis in addition to the fact that it may reduce costs of food production in most countries, the Moringa oleifera plant is one of the most (Ola-Fadunsin *et al.*, 2013)^[21].

The given research study was conducted in order to investigate the effects of aqueous extract of the Moringa leaves on productive performance of laying hens due to the fact that the mentioned plant contains active and anti-disease compounds such as quercetin, kaempferol, glucosinolates, and isothiocyanates (Farooq *et al.*, 2007)^[16].

Materials

This paper was carried out in order to determine the consequences of aqueous extract of Moringa leaves on the drinking water of laying hens in a layer hen farm in Babylon Governorate during the period between July 1 st and January 1 st, 2025. The chickens that had been reared on the floor were observed to be infested with coccidiosis. After checking the hens, they were put into four treatments each of which consisted of ninety ISA Browne hens. This was done three times thus providing each treatment with thirty hens. The following were the treatments:

T1: No addition

T2: 4 Moringa leaf aqueous extract /L.

T3: 6 aqueous extract of Moringa leaf +L.

T4: Moringa leaf 8 aqueous extract/L.

The hens (laying hens) were fed on 120g of laying hen food, which contained 2850 kcal of calories, and 16 percent crude protein. The analyzed traits included those that were concerned with productivity and egg quality (Al-Jebory *et al.*, 2023&2024)^[1, 4].

Significant differences between treatments were also established using the Duncan 1955 test and the SAS 2012.

Results and Discussion

1. HD Production

Figure (1) represented the effects of the H.D laying hen that was exposed to coccidian challenge on the moringa olivera leaves as extract. There was significant increase ($P<0.05$) in first, third and fourth periods, T2, T3 and T4 treatment respectively compared to T1 treatment.

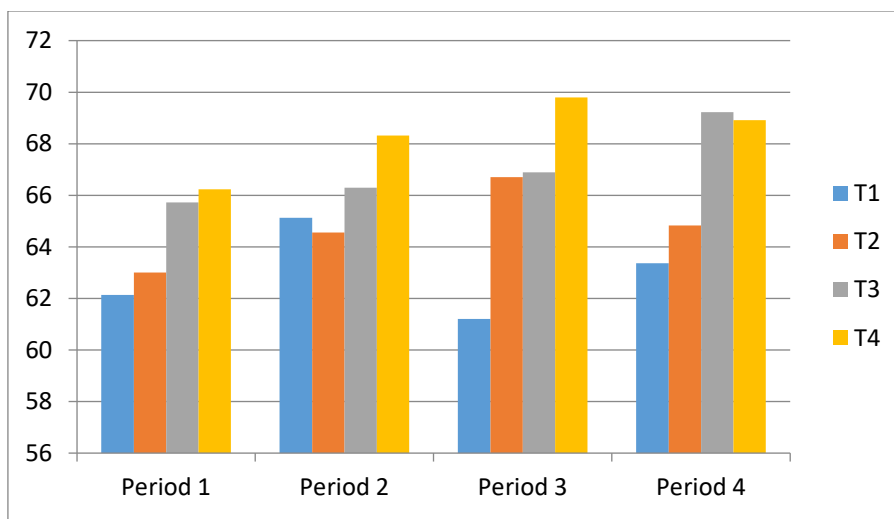


Fig 1: The influence of the moringa olivera leaves extract on H.D laying hens challenged with coccidian.

Egg weight

Figure (2) showed how morph olivera leaves extract affected the weight of eggs of laying hens infected with coccidians. During the first, second, third and fourth period, there was a

significant increase ($P=0.05$) in the T2, T3 and T4 treatments as compared to the T1 treatment, T2 and T4 were found to be the most effective treatments.

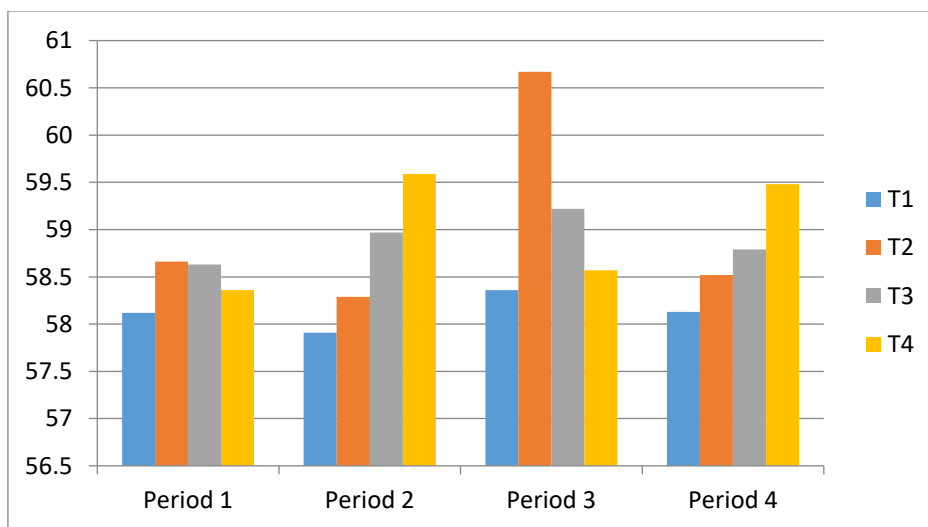


Fig 2: The impact of moringa olivera leaves extract on egg weight laying hens as a result of coccidian challenge Feed conversion ratio

Table (1) shown the effect of moringa olivera leaves extract on FCR of laying hens exposed to coccidian challenge. Noted

not significant deferent between treatments.

Table 1: Effect of moringa olivera leaves extract on FCR laying hens exposed to coccidian challenge

Treatments	1 st period	2 nd period	3 rd period	4 th period
T1	1.892±0.01	1.875±0.12	1.876±0.03	1.884±0.04
T2	1.899±0.03	1.887±0.01	1.865±0.14	1.845±0.02
T3	1.884±0.10	1.813±0.04	1.857±0.06	1.878±0.15
T4	1.892±0.15	1.879±0.13	1.871±0.05	1.849±0.13
Significant	Not significant	Not significant	Not significant	Not significant

2. Egg shell weight and egg shell thick

Table (2) could identify the effect of moringa olivera leaves extract on the egg shell weight and the egg shell thick of laying hens that were challenged with coccidian. In first period T3 and, T4 treatment, there is significant treatment of egg shell weight ($P \leq 0.05$) compared to T1 treatment but in

second period, T2, T3 and T4 treatment there is significant treatment of egg shell weight ($P \leq 0.05$) compared to T1 treatment. Initially, period of egg shell thickness there was no major deferent noted among treatments at first period but at second period, in T2, T4 treatment there was major deferent as compared to T1 and T3 treatment ($P = 0.05$).

Table 2: Effect of moringa olivera leaves extract on egg shell weight and egg shell thick laying hens exposed to coccidian challenge

Treatments	Egg shell weight		Egg shell thick	
	1 st period	2 nd period	1 st period	2 nd period
T1	5.14±0.25 b	5.71±0.18 b	0.46±1.05	0.47±0.01 b
T2	5.68±0.10 b	6.42±0.16 a	0.48±0.11	0.52±0.03 a
T3	6.11±0.12 a	6.53±0.28 a	0.50±0.09	0.49±0.01 b
T4	6.09±0.08 a	6.44±0.31 a	0.51±0.10	0.53±0.02 a
Significant	$P < 0.05$	$P < 0.05$	Not significant	$P < 0.05$

3. Yolk Index

In Table (3), the effect of moringa olivera leaves extract on the yolk index of coccidian challenged laying hens were represented. Significant increase ($P 0.05$) at first period of T3

over other treatment and significant increase ($P 0.05$) at first period of T2 and, T4 over T1 treatment and in second period, significant increase ($P 0.05$) at second period of T2 over T1 treatment, and T3 treatment.

Table 3: Effect of moringa olivera leaves extract on yolk index laying hens exposed to coccidian challenge

Treatments	Yolk Index	
	1 st period	2 nd period
T1	0.36±0.02 c	0.39±0.02 b
T2	0.39±0.03 b	0.44±0.04 a
T3	0.43±0.01 a	0.41±0.01 b
T4	0.40±0.02 b	0.42±0.01 ab
Significant	$P < 0.05$	$P < 0.05$

The Eimeria (coccidia) are obligatory intracellular parasites that need to be attached and to penetrate the intestinal epithelial cells in order to reproduce. Competition on these sites of attachment can be induced by adding beneficial, alterable microorganisms to the gut and this is the one that is effective in minimizing the tissue damage that results due to the presence of the parasite. Hens that were exposed to field infection in this study had a significant reduction in egg production and were badly affected by coccidiosis, which was indicated by low feed conversion ratios and clinical manifestations including watery bloody diarrhea. The administration of 4-8 ml of Moringa oleifera leaf extract in enhancing egg production, however, increased it by 3-4 percent over the control group and improved the quality of eggs in general. This implies that Moringa is easier to absorb nutrients, and it acts as a protective coating to the intestinal mucosa.

The treatment groups continued to get healthier over the course of the study, presumably because of the decrease in intestinal oocysts and consequent decrease in the destruction and hemorrhaging of the mucosal tissue. The anticoccidial activity of Moringa oleifera is similar to that of the

anticoccidial activity in the other Apicomplexa parasites, including the ones that cause malaria and leishmaniasis (Farooq *et al.*, 2007; Singh *et al.*, 2015) [16, 25]. The strong antioxidant profile (flavonoids, phenols, carotenoids, and ascorbic acid) protects cells against oxidative stress and alleviates the severity of the Eimeria tenella by modulating intestinal lipid peroxidation (Allen *et al.*, 2015). Although excessive amounts of reactive oxygen species (ROS) and nitric oxide are the expected results of infection (Ovington and Smith, 1992) [22] which causes cytotoxicity, tissue damage and vasodilation, Moringa seems to be able to reverse these conditions.

Uninfected birds treated with the extract showed an improved level of output and body weights because they did not show the nutrient malabsorption that was observed in untreated infected birds, which had reduced eggshell qualities and decreased production. This is aided by the fact that the nutritional content of the Moringa is dense in nature and contains a considerably high content of crude protein (ranged between 17.01 to 27.51), carbohydrates and vitamins (Ogbe and John, 2012; Oduro *et al.*, 2008) [20, 19]. Such basic amino acids and nutrients do not only increase the ratio of feed to

grain, they also promote the process of recovery and increase consumption, which allows the birds to counteract the physiological burden of the infection.

Conclusion

Because of this, the study also concludes that the Moringa leaf extract enhanced egg production and egg weight by 3-4 percent in all concentrations applied to treat the birds. In-depth research on laying hens is still needed to research the histological sections and immunohistochemical features of laying hens treated with Moringa extracts.

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