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Impact of hatching eggs dipping with *Moringa oleifera* extract on hatching parameters of chicks (Broiler Ross 308)

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Abstract

This study was conducted in Babylon Poultry Hatchery to investigate of immersion of hatching eggs on some hatching traits and qualitative characteristics of hatched chicks. Four groups of 240 broiler hatching eggs were created, with 60 eggs in each treatment. Each group was then subdivided into three replicates, each of which had 20 eggs. Prior to being placed in the incubator, the eggs were submerged in an aqueous extract of Moringa leaves. The experimental treatments were C1 without any treatment, C2, C3, and C4 dipping the hatching eggs with extract of Moringa leaves for one, two, and three minutes respectively, the results of the experiment: significant improvement in the hatching ratio and the embryonic mortality rate for groups C2 and C3. Groups C3 and C4 increased significantly in the weight of hatched chicks. Groups C2 and C3 also increased significantly in the percentage of capped eggs. Significantly, groups C2 and C3 improved in tension immobility, and significantly, groups C2 and C4 improved in umbilical naval status.

Keywords: Moringa leaves extract, broiler hatching eggs, hatching traits, chick quality

Introduction

The importance of treating hatching eggs in different ways, including hatching egg injection (AL-JEBORY *et al.*, 2024) [2, 3, 20, 26] or immersion and spraying (Al-Jebory *et al.*, 2023a; Al-Saeedi *et al.*, 2025) [5, 6, 8, 10-16, 22, 19] is highlighted in the response of embryos to these different treatments through improving hatching characteristics and improving the characteristics of hatched chicks, which is later reflected in their subsequent productive performance (Al-Jebory *et al.*, 2023c; Noor *et al.*, 2025) [5, 6, 8, 10-16, 22, 19, 25]. Medicinal plants have been used medicinally as rich sources of active substances, as a group of herbs have been used for various purposes, including medicine, nutrition and industrial uses. Herbs are still present in most veterinary medicines because they contain active substances that play many roles in the living body, including improving the state of antioxidants in the body (Al-Jebory *et al.*, 2023b; Baqer *et al.*, 2023; Nafel *et al.*, 2024) [5, 6, 8, 10-16, 22, 27] and improve the intestinal microbial community (Merzah *et al.*, 2024) [26]. Given the recent increasing trend towards medicinal plants, whether in their natural form or in the form of extracts, for preventive or therapeutic use, the Moringa Oleifera tree was chosen, which is characterized by high stability towards auto-oxidation, in addition to its antioxidant role and inhibitory effectiveness for many types of bacteria and fungi (Al-husnan and Alkahtani, 2016) [4]. Moringa Oleifera leaves contain high concentrations of polyphenol compounds (Nihad *et al.*, 2016) [28]. Moringa leaves, which are also abundant in flavonoids, were utilized because they contain a variety of components, including carotenoids, phenols, and flavonoids, which can be employed as antioxidants. Flavonoids are widely distributed in plants and serve a variety of purposes (Vongsak *et al.*, 2014) [32]. Sobhy *et al.* (2015) [31] showed that Moringa Oleifera leaves contain many amino acids including methionine, lysine, cysteine, arginine and histidine, which play various vital roles in the fetus's body, in addition to Moringa leaves containing saturated fatty acids and minerals (Ahmad *et al.*, 2018) [1]. Thus, the aim of the current study is to examine how varying times of immersion affect the hatching features and specifications of hatched broiler chicks.

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Materials

This study was conducted in Babylon Poultry Hatchery during the period from 1-22 November 2024 to study the effect of immersion of hatching eggs on some hatching characteristics and qualitative characteristics of hatched chicks. 240 hatching eggs of broilers were used and divided into four groups, each treatment 60 eggs, and each group was divided into three replicates, each replicate 20 eggs. The eggs were immersed in the aqueous extract of Moringa leaves before introducing the eggs into the incubator. The experimental treatments were C1 without any treatment, C2, C3, and C4 dipping the hatching eggs with extract of Moringa leaves for one, two, and three minutes respectively. The aqueous extract of Moringa leaves was prepared according to the method (Peixoto *et al.*, 2011) [30]

The studied traits (hatching rate, embryonic mortality rate, chick weight) were calculated according to (Ajafar *et al.*, 2024) [2, 3, 20]

The phenotypic and qualitative traits of the hatched chicks were measured according to the Tuna scale (Khalil *et al.*, 2022) [24]

The statistical analysis was conducted using the SAS program (2012) and the Duncan test (1955).

Results and Discussion

1. Hatching ratio and Mortality Ratio

Table 1: shown the effect of study in hatching ratio and mortality Ratio, significant ($p < 0.05$) effect for C2 and C3 groups in hatching ratio compared to C1 and C4, while in mortality ratio significant ($p < 0.05$) impact for C2 and C3 groups in hatching ratio compared to C1 group.

Table 1: Impact of hatching eggs dipping with *Moringa oleifera* extract on Hatching ratio % and Mortality Ratio % (mean $\pm$ standard error)

Groups	Hatching ratio %	Mortality Ratio %
C1	80.00 $\pm$ 1.00 b	20.00 $\pm$ 0.63 a
C2	82.52 $\pm$ 0.50 a	17.48 $\pm$ 0.31 b
C3	83.50 $\pm$ 0.65 a	16.50 $\pm$ 1.12 b
C4	80.65 $\pm$ 1.10 b	19.35 $\pm$ 2.00 ab
Significant	*	*
Means with litter deferent at ($p < 0.05$)		

2. Chicks weight

In table 2: noted significant ($p < 0.05$) height for C3 and C4 groups in chicks weight compared to C1 group.

Table 2: Impact of hatching eggs dipping with *Moringa oleifera* extract on Chicks weight (mean $\pm$ standard error)

Groups	Chicks weight (gm)
C1	38.37 $\pm$ 0.12 b
C2	40.62 $\pm$ 0.13 ab
C3	41.19 $\pm$ 0.66 a
C4	41.22 $\pm$ 1.43 a
Significant	*
Means with litter deferent at ($p < 0.05$)	

3. Hatching traits

Table 3: shown the effect of study in some hatching traits, noted not significant deferent among groups in abnormal chicks, live piped eggs, and dead piped eggs, while in piped eggs significant ($p < 0.05$) increase for C2 and C3 groups in hatching ratio compared to C1 and C4 groups.

Table 3: Impact of hatching eggs dipping with *Moringa oleifera* extract on some hatching traits (mean $\pm$ standard error)

Groups	Abnormal chicks %	Piped eggs %	Live piped eggs %	Dead piped eggs %
C1	2.00 $\pm$ 0.06	12.00 $\pm$ 1.00 b	1.00 $\pm$ 0.01	11.00 $\pm$ 1.78
C2	1.76 $\pm$ 1.01	15.00 $\pm$ 1.23 a	2.50 $\pm$ 0.25	12.50 $\pm$ 2.00
C3	1.75 $\pm$ 1.25	14.00 $\pm$ 0.13 a	2.00 $\pm$ 1.35	12.00 $\pm$ 1.33
C4	1.00 $\pm$ 0.75	12.00 $\pm$ 0.52 b	1.50 $\pm$ 1.46	10.50 $\pm$ 0.50
Significant	N.S	*	N.S	N.S
N.S.: not significant; means with litter difference at < 0.05				

In table 4, and 5: note the effect of study in some chicks quality traits, there was not significant deferent between groups in chick length, wing length, and leg length.

In table 5: significant ($p < 0.05$) improvement for C2 and C3 groups in tonic immobility compared to C1 group, there was not significant deferent between groups in chicks activity, so as in navel status significant ($p < 0.05$) increase for C2 and C4 groups compared to C1 group.

Table 4: Impact of hatching eggs dipping with *Moringa oleifera* extract on some chicks quality traits (mean $\pm$ standard error)

Groups	Chick length (mm)	Wing length (mm)	Leg length (mm)
C1	17.42 $\pm$ 2.20	4.10 $\pm$ 0.05	4.21 $\pm$ 1.02
C2	17.10 $\pm$ 2.05	4.33 $\pm$ 0.56	3.21 $\pm$ 2.00
C3	17.52 $\pm$ 1.69	4.50 $\pm$ 0.12	4.36 $\pm$ 1.50
C4	16.90 $\pm$ 3.00	4.30 $\pm$ 1.00	4.42 $\pm$ 1.36
Significant	N.S	N.S	N.S
N.S: not significant			

Table 5: Impact of hatching eggs dipping with *Moringa oleifera* extract on some chicks quality traits (mean $\pm$ standard error)

Groups	Tonic immobility (mint)	Activity	Navel status
C1	7.10 $\pm$ 1.00 a	4.12 $\pm$ 0.05	8.00 $\pm$ 1.00 b
C2	5.23 $\pm$ 2.10 b	3.36 $\pm$ 1.09	12.00 $\pm$ 0.50 a
C3	4.10 $\pm$ 0.36 b	4.50 $\pm$ 0.89	11.00 $\pm$ 0.75 ab
C4	6.12 $\pm$ 1.56 ab	4.23 $\pm$ 0.25	12.00 $\pm$ 0.01 a
Significant	*	N.S	*
Means with litter deferent at ($p < 0.05$), N.S: not significant			

Immersing the eggs of these groups in Moringa extract, which would have entered the egg through the shell's pores, may have improved the hatching features and traits of hatched chicks, particularly for the second and third treatments (Al-Jaryan *et al.*, 2023; Al-Jebory *et al.*, 2023 b) [5, 6, 8, 10-16, 22], as Moringa leaf extract contains phenolic compounds, flavonoids and saponins that have a direct and indirect effect on improving embryo growth (Altinterim, 2014) [21]. Moringa leaves also contain antioxidants such as flavonoids and polyphenols that eliminate free radicals and protect the cell from oxidation (Chatterjee *et al.*, 2017) [23]. In addition, the extract contains vitamins E and C, which are found in large quantities in the leaves and are considered among the most effective substances as they stop the reactions of forming oxidative chains that are manufactured by free radicals from cell membranes and secondary cells that are rich in polysaturated fats (Kumar *et al.*, 2004) [25], which may be a food source for egg embryos. The aqueous extract of Moringa contains phenolic compounds, flavonoids and saponins that act as antibacterial, which may be the case that the immersion process was a sterilization process for the eggs before they entered the incubator and prevented bacterial contamination. This is clear from the condition of the navel, which improved in the immersion

treatments with *Moringa* compared to the control (Al-Saeedi *et al.*, 2024). Consequently, this enhances the embryos' health, which promotes better growth, development, and hatching potential. Numerous investigations have demonstrated that certain medicinal plants' constituents have antibacterial properties that are just as effective as antibiotics (Al-Jebory *et al.*, 2023 e-f) [5, 6, 8, 10-16, 22].

Conclusion

It is concluded from the results of the study that immersing hatching eggs in the aqueous extract of *Moringa* leaves improves the hatching rate and the qualitative specifications of the hatched chicks, this is reflected in their subsequent productive performance due to the presence of a positive genetic correlation coefficient between these traits and the weight of the chicks when marketing.

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