Effect of Adding Alcoholic and Nano Alcoholic Extract Of *Moringa Oleifera* Leaves to Drinking Water on the Biochemical Blood Traits for Laying Hens Lohmann Brown

Dakhil Hasan Oraibi[1], Nihad Abdul –Lateef Ali[2]

[1]Scholar Researcher, [2]Prof, Department of Animal Production, College of Agriculture, Al-Qasim Green University, Iraq

Abstract

This experiment was conducted at the poultry farm of the college of Agriculture, University of Al-Qasim Green the experimental field during twelve weeks from 1/ 9 / 2020 to 23/ 11/ 2020, the study was aimed to know the effect of adding alcoholic and nano alcoholic extract of *Moringa oleifera* leaves to drinking water on the biochemical blood traits for laying hens Lohmann brown. The experiment included 120 laying hens of Lohmann brown at the age of 50 weeks, the feed was provided according to the standard requirements mentioned in the Lohmann Brown Layer Managements Guide and distributed randomly to 15 pen with 5 experimental treatments for each treatment of 24 birds. Each treatment included three replicates per 8 birds.

Key words: *alcoholic extract, nano alcoholic extract, Moringa oleifera, laying hens.*

Introduction

The plant kingdom is rich in its secondary products distinguished by its vital activity and its physiological effect as a treatment against incurable diseases that afflict humans and animals [(1)]. Medicinal plants and herbs have benefits that have been recognized by humans thousands of years ago due to the belief that they are reliable and more effective compared to traditional medicines [(2)]. Among these plants is *Moringa oleifera*, whose scientific name is *Moringa oleifera* in the Arabs. It is called the miracle tree or the tree of life because one seed gives a tree up to five meters in height in its first year and is widespread throughout the tropics [(3)]. Its effectiveness lies in containing Flavonoid, Saponins, Tannins, Terpenoids Sterol glycoside, [(4)], tolerates drought and salinity, and is characterized by rapid growth [(5)]. Its leaves are considered edible and are of great nutritional value and therapeutic value due to their rich content of vitamins (A and C) minerals, especially calcium and potassium, and they contain many antioxidants, amino acids and carotenoids [(6)]. As for toxic metals such as mercury, arsenic and cadmium, they are absent from leaves *Moringa oleifera* [(7)]. The alcohol extracts of *Moringa* leaves also have important biological properties and these properties differ according to the type of solvent used to extract the active substances that these leaves contain [(8)], where [(9)] showed that the alcoholic extract of *Moringa* leaves has a significant and more effective effect. On pathological bacteria compared to aqueous extract. In recent years, the poultry industry has witnessed multiple technologies, the most important of which is nanotechnology, which is a promising and emerging technology that has enormous potential for a revolution in the poultry sector around the world. This technology has been used in the field of poultry feeding on a large scale [(10; 11)] and nanoparticles in general. It has dimensions between (1 - 100) nanometers approximately, so these nanoparticles can bypass the physiological methods of distributing and transporting nutrients through tissues and cell membranes, and

Corresponding author:
Nihad Abdul –Lateef Ali
Email: dr.nihad@agre.uoqasim.edu.iq

nanotechnology is developing new products and the possibility of reformulating traditional materials to give effective results [12]. While the volume of the material is very low and this leads to the formation of new physical properties, and these characteristics allow the nanomaterials to be used in a wide range of fields including health, pharmacy, industry and other unlimited fields [13]. Due to the lack of studies on the addition of alcoholic and nano alcoholic extract of *Moringa oleifera* leaves for laying chicken drinking water this study came to determine and evaluate the efficiency of alcoholic and nano alcoholic extract and to study the extent of their effect on the biochemical blood traits for laying hens Lohmann brown

Material and Methods

This experiment was conducted in the field of Animal Production Department, College of Agriculture / Al-Qasim Green University for the period from 1/9/2020 until 23/11/2020 for the purpose of studying the effect of adding alcoholic and nano alcoholic extract of *Moringa oleifera* leaves on some blood parameters for laying hens Lohmann brown. In this experiment, 120 laying hens of the Lohmann brown type at the age of 50 weeks were used with an average weight of 1550 g and they were in the production stage. They were prepared after being vaccinated with full vaccinations and fed the birds with food treatments (feeds) and after one week of breeding as a preparatory period and adaptation to the hall before the start of the experiment, where data were not collected, laying hens at the age of 51 weeks were distributed on the treatments. The experiment included five treatments within one treatment, three replicates per 8 birds. The hall was equipped with all its requirements during the breeding period and the herd was fed on the ration shown in the table. (1) and the amount of feed intake for the hen was calculated according to what is found in the Lohmann brown breeding guide, and the experiment lasted 12 weeks, and the alcoholic and nano alcoholic extract of *Moringa oleifera* leaves was added to the drinking water, and the temperature was recorded in the laying hens hall for the duration of the experiment daily (eight o'clock) Morning and evening using a thermometer, number (3) placed at the two ends of the hall and another in the middle of the hall, and the lighting system was used 14 hours of light, 10 hours of darkness, according to the recommendations in the breeding guide recommended by the Lohmann company.

The level of globulin in the blood serum was calculated in the [14]. The completely randomized design was used to study the effect of different treatments on the studied traits, the significant differences between the averages were compared using Duncan's Multiple Range Test [15] and the SAS [16] was used to analyze the data.

Table (1) the production Feed materials used during the experiment and its chemical composition

Feed material	percentage(%)
yellow corn	55.56
Soybean cake (44% protein)	29.1
Premix*	2.5
Sunflower oil	2.7
limestone	8.36
Table salt	0.3

Cont... **Table (1) the production Feed materials used during the experiment and its chemical composition**

Di-Calcium Phosphate	1.4
Lysine	0.04
Methionine	0.04
Total	100
Chemical analysis**	
The energy represented in kg / kg	2753
Crude protein(%)	17.52
Available phosphorous(%)	0.60
Calcium(%)	4.02
Lysine(%)	1.0
Methionine %	0.47
Methionine + cysteine%	0.76

*Each kilogram of premix consists of: 4% crude protein, 550 kg energy represented, 16% calcium, 10.6% phosphorus, 4.0% sodium, 2750 mg manganese, 1670 mg iron, 2670 mg zinc, 335 mg copper, 8.35 mg cobalt, 50 mg Iodine, 6.7 mg selenium, 27 mg methionine, 27.6 methionine with cysteine, 1,350 mg niacin, 400,000 international units vitamin A, 85,000 mg vitamin D3, 1,400 mg vitamin E, 100 mg vitamin K3, 85 mg vitamin B1, 200 mg vitamin B2, 400 mg vitamin B6 and 680. 0 mg vitamin B12.

**The chemical composition was calculated according to the feed material analyzes reported in [17].

Results and Discussion

Table 2 indicates, in the first production period (52-55) weeks, a significant improvement (P≤ 0.05) for the second, third, fourth, and fifth addition treatments over the first treatment (control) in the total protein concentration (g / 100 ml serum), either in the productive period. The second treatment, the third and fourth treatments, recorded a significant improvement (P≤ 0.05) over the first treatment (control), as they recorded the highest concentration of total protein and reached 3.91 and 3.84 g / 100 ml serum, respectively, while the first treatment recorded the lowest concentration of total protein. As for the second and fifth treatments. There were no significant differences between it and the rest of the experiment treatments. As for the third productive period (60 - 63) weeks, we notice the improvement of the fourth treatment with a significant difference (P≤ 0.05) over the first treatment (control), which recorded the lowest total protein concentration of 3.66 g / 100 ml. While there were no significant differences between the second, third and fifth treatments for the first and fourth treatments, as for the albumin concentration (g / 100 ml serum), the third and fourth treatments recorded a significant improvement (P≤ 0.05) over the rest of the treatments. Experience while the second treatment outperformed with a significant difference (P≤ 0.05)

over the first and fifth treatments, which recorded the lowest concentration of two albums, the first productive period (52-55) weeks, while in the second production period (56-59) weeks, the third treatment recorded the highest concentration of two albums, which reached 2.06. G / 100 ml serum, with a significant difference (P≤ 0.05) compared to the fourth treatment, which recorded an albumin concentration of 1.48 g / 100 ml serum without a significant difference from the rest of the first, second and fifth treatments, and in the third production period, there were no significant differences between the experimental treatments. As for the globulin concentration (g / 100 ml serum), where the second and fifth treatments recorded a significant superiority of P≤ 0.05 during the first productive period (52 - 55) weeks over the first treatment (control), which recorded the lowest concentration of globulin, which reached 1.54 g / 100 ml. Blood serum, while there were no significant differences between the third and fourth treatments from the rest of the trial treatments, but in the second and third productive periods, there were no significant differences between all the trial treatments.

Table 2 Effect of adding alcoholic and nano alcoholic extract of *Moringa oleifera* leaves to drinking water on (total protein concentration / 100 ml of blood serum, Albumin concentration g / 100 ml of blood serum and concentration of globulin g / 100 ml of blood serum) for the period (52-63 weeks) (mean ± standard error)

Treatments	Total protein concentration g/ 100 ml of serum			Albumin concentration g/ 100 ml of serum			Globulin Concentration g/ 100 ml of serum		
	Duration (age in weeks)			Duration (age in weeks)			Duration (age in weeks)		
	first period	second period	Third period	first period	second period	third period	first period	second period	third period
	52-55	56-59	60-63	52-55	56-59	63-60	52-55	56-59	60-63
First Treatment	3.15 b	3.32 b	3.66 b	1.61 c	1.60 ab	2.11	1.54 b	1.72	1.55
	±	±	±	±	±	±	±	±	±
	0.03	0.04	0.29	0.02	0.11	0.35	0.01	0.07	0.05
Second Treatment	3.67 a	3.64 ab	4.14 ab	1.74 b	1.67	2.17	1.93 a	1.97	1.97
	±	±	±	±	±	±	±	±	±
	0.04	0.09	0.26	0.02	0.07	0.25	0.03	0.03	0.04
Third Treatment	3.87 a	3.91 a	4.31 ab	2.03 a	2.06 a	2.13	1.84 ab	1.85	2.18
	±	±	±	±	±	±	±	±	±
	0.06	0.11	0.31	0.02	0.09	0.17	0.09	0.20	0.28
Fourth Treatment	3.79 a	3.84 a	4.55 a	2.04 a	1.48 b	2.19	1.75 ab	2.36	2.36
	±	±	±	±	±	±	±	±	±
	0.11	0.15	0.20	0.02	0.28	0.03	0.12	0.34	0.20
Fifth Treatment	3.74 a	3.67 ab	4.02 ab	1.61 c	1.73 ab	2.15	2.13 a	1.94	1.87
	±	±	±	±	±	±	±	±	±
	0.18	0.19	0.12	0.0.2	0.11	0.36	0.19	0.31	0.43
Significant	*	*	*	*	*	N.S	*	N.S	N.S

The first treatment (control) is drinking water without any addition, the second and third treatment is the addition of the alcoholic extract of the Moringa leaves at a dose of 10 ml / liter of drinking water at a concentration of 1 and 2% respectively, and the fourth and fifth treatment is the addition of the nano alcoholic extract of the Moringa leaves at a dose of 10 ml / liter of drinking water. And with a concentration of 0.01 and 0.02%, respectively. * It means that there are significant differences between the treatments at a significant level of P≤0.05 - NS: it means that there are no significant differences between the treatments

Table 3 there were no significant differences in the concentration of uric acid and glucose between the different treatments and in all the first, second and third production periods.

Table 3 Effect of adding alcoholic and nano alcoholic extract of *Moringa oleifera* leaves to drinking water on Uric acid concentration (mg/100 ml of blood) and Glucose concentration (mg/100ml of blood) For the duration of (52-63) week (Average ± Standard Erorr)

Treatments	Concentration of Uric acid (mg / 100 mL)			Concentration of Glucose (mg/100 ml of serum)		
	Duration (age in weeks)			Duration (age in weeks)		
	first period	Second period	third period	first period	second period	third period
	52-55	56-59	60-63	52-55	56-59	63-60
First Treatment	314.95	362.62	424.96	3.57	4.18	4.45
	±	±	±	±	±	±
	2.48	31.91	33.22	0.21	0.33	0.52
Second Treatment	316.78	332.45	366.44	3.66	3.83	4.22
	±	±	±	±	±	±
	3.23	5.17	11.91	0.30	0.34	0.16
Third Treatment	317.44	331.44	384.37	3.51	3.82	4.38
	±	±	±	±	±	±
	2.10	6.00	7.22	0.15	0.36	0.24
Fourth treatment	311.92	347.26	398.79	3.51	3.97	4.46
	±	±	±	±	±	±
	6.24	2.17	8.96	0.26	0.26	0.11
Fifth treatment	315.03	332.36	395.79	3.50	3.84	4.60
	±	±	±	±	±	±
	1.82	5.53	10.20	0.22	0.31	0.21
Significant	N.S	N.S	N.S	N.S	N.S	N.S

The first treatment (control) is drinking water without any addition, the second and third treatment is the addition of the alcoholic extract of the Moringa leaves at a dose of 10 ml / liter of drinking water at a concentration of 1 and 2% respectively, and the fourth and fifth treatment is the addition of the nano alcoholic extract of the Moringa leaves at a dose of 10 ml / liter of drinking water. And with a concentration of 0.01 and 0.02%, respectively. - NS: it means that there are no significant differences between the treatments

Conclusion

The addition of the alcohol and and nano alcoholic extract of *Moringa* leaves to drinking water recorded a significant increase ($p \leq 0.05$) in the total protein concentration, globulin concentration, and decrease in albumin concentration. While there were not significant differences between all experimental treatments for the concentration of uric acid and the concentration of glucose.

Conflict of Interest: None

Funding: self

Ethical Clearance: Not required

References

1- Hassan, Susan Kamran. The effect of anise seed oil and extracts on some microorganisms. Diyala Journal of Agricultural Sciences, 2010. 2 (2): 9-17.

2- Alsarhan A, Sultana N, Al-Khatib A, Kadir MR. Review on some Malaysian traditional medicinal plants with therapeutic properties. Journal of Basic and Applied Sciences. 2014 Apr 18;10:149-59.

3- Olugbemi TS, Mutayoba SK, Lekule FP. Evaluation of Moringa oleifera leaf meal inclusion in cassava chip based diets fed to laying birds. Livestock Research for Rural Development. 2010;22(6):1-6.

4- Nazmy S, Hassan B, Nihad AA, Abeer E, Abd Elhamid EM, Farid M. Biochemical Studies on Moringa Oleifera Leaves Extract. Journal of Biology, Agriculture and Healthcare. 2016. 6, (16):33-42.

5- Donkor AM, Kwame Glover RL, Addae Daniel, Kubi KA. Estimating the nutritional value of the leaves of Moringa oleifera on poultry. Food and Nutrition Sciences. 2013. 4: 1077– 10 83.

6- Alnidawi NA, Ali F, Abdelgayed S, Ahmed F, Farid M. Moringa oleifera leaves in broiler diets: effect on chicken performance and health. Food Sci. Quality Manag. 2016;58:40-8.

7- Murro JK, Muhikambele VR, Sarwatt SV. Moringa oleifera leaf meal can replace cottonseed cake in the concentrate mix fed with Rhodes grass (Chloris gayana) hay for growing sheep. Livestock Research for Rural Development. 2003;15(11):1-4.

8- Doughari JH, Pukuma MS, De N. Antibacterial effects of Balanites aegyptiaca L. Drel. and Moringa oleifera Lam. on Salmonella typhi. African Journal of biotechnology. 2007;6(19): 2212- 2215.

9- Bukar A, Uba A, Oyeyi T. Antimicrobial profile of Moringa oleifera Lam. extracts against some food–borne microorganisms. Bayero Journal of Pure and Applied Sciences. 2010;3(1): 59-67.

10- Al-Jaafari, Zahra Muhammad Kazim. The effect of adding two levels of organic selenium and nano-selenium particles in the diet on the productive and physiological performance of broiler broilers, Ross 308 Master Thesis - Faculty of Agriculture, Al-Qasim Green University. 2018.

11- Abbas, Nibras Kazem. The effect of adding different levels of nano-boron particles in the feed on the production, physiological and tissue performance of Ross 308. Master's Thesis - Al-Qasim Green University, College of Agriculture. 2019.

12- Troncarelli MZ, Brandão HM, Gern JC, Guimarães AS, Langoni H. Nanotechnology and antimicrobials in veterinary medicine. Formatex. 2013;13:543-56.

13- Richard PF. There's Plenty of Room at the Bottom. InAnnual Meeting of the American Physical Society,(1959), December 29 1959.

14- Ewadh MJ, Kadhum NH, Al Hamdani KJ, Alawad AS. Relationship between antioxidants glutathione and total α-L-fucose as tumor markers in breast

cancer patients. Medical Journal of Babylon. 2009;6(1):164-75.

15- Duncan DB. Multiple range multiple F-test-Biometeics. 1955. 11:1 – 42.

16- SAS. Statistical Analysis System, User's Guide. Statistical. Version 9.1th ed. SAS. Inst. Inc. Cary. N.C. USA. 2012.

17- National Research Council (NRC). Nutrient requirement of poultry gth Edn. National Academy press. Washington. D. C. USA. 1994.