



Effect of Treatment Hatching Eggs with Vinegar on Some Indicators of Hatching and Productive Performance of Quails

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Abstract

THIS research was carried out in the fields of the College of Agriculture and Forestry, University of Mosul, and for a period of 63 days. It aimed to identify the effect of spraying and immersing hatching quail eggs with a 5% vinegar solution for two minutes on some hatching indicators and the productive performance of the progeny with three treatments; T1: control (no treatment) T2: Spray the eggs with a 5% vinegar solution. T3: Immersion the eggs with a 5% vinegar solution. After the eggs hatched, the progeny was raised from one day old until the end of the sixth week at 42 days old. Statistical analysis of the data showed that spraying and immersing eggs showed a significant increase in egg weight loss, a significant decrease in initial egg weight, shell weight, and shell thickness, a significant improvement in body weight, weight gain, and feed conversion factor of the progeny in the immersion and spraying treatments, and a decrease in the hatching rate and embryonic mortality due to the egg treatment Immersion in vinegar solution.

Keywords: Production performance, hatching eggs, spraying, immersion, vinegar

Introduction

In view of the inability to interfere with the development of the embryos, where it occurs largely outside the dam body, and there is no communication between the embryos inside the egg and the breeders. Therefore, it depends on its feeding on the components of the egg only. It was found that the nutrients added as vitamins and others to the dam diet are only transferred (25-30%) to eggs [1] It became important for early feeding, as it was used as a feeding technique for embryos inside the egg by treating fertilized eggs by providing the embryos with nutrients, vitamins, Therefore, amino acids and collagen are involved in the formation of tissues in the embryo and overcoming the stress resulting during the hatching process [2].

The early feeding technique increases the rate of hatching, development of the digestive system and subsequent body weight [3-5] as well as [6] when using the spray and immersion technique to raising stress due to the excessive increase in metabolic temperature during the late part of the incubation period and therefore may be of benefit to the vitality of the embryos during the incubation period [7].

Accompanying the growth process and this stress reduces the weight of the germs between 21-28 days. The concentration of vinegar contains acetic acid, which affects the shell like other acids, which in turn increases the permeability of the shell and increases the rate of metabolic processes inside the egg [8]. This act as growth stimulant, In addition to, the vinegar works to kill the pathogens that grow on the egg shell and are transmitted from the mothers [9] and in the future productive performance of chicks [10], [11], [6] , In this study, quail was used as a dual- purpose bird used to produce meat and eggs, and the annual egg production reaches (250-300) eggs [12], [13] . Acetic acid is a major product in the vital processes of feed metabolism inside the cells, which results in the vital compound [14] for energy production, Vinegar is also considered a sterilizer that kills pathogens and eliminates pollution [15]. This study has been done to find out the possibility of vinegar permeability through the egg shell to the embryos immersing fertilized quail eggs or spraying them before incubation and its effect on growth, which is reflected in the weight of the chicks, increasing the proportion of hatching and reducing the proportion of embryos mortality, in addition to

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possibility of improving the future performance by providing energy needs and growth as a result of raise metabolic processes.

Material and Methods

The aim of the study was to determine the extent to which the vinegar solution reached the embryo by spraying or immersing fertilized eggs before incubation. 810 fertilized eggs were divided three traits, each one 270 eggs with three replicate (90 eggs in each) weighed randomly to register the initial weight of each before subjecting them to the experimental treatments and before placing them in the incubator. the first group was served as a control group (without treatment), the eggs of second group was sprayed with vinegar solution 5% for two minutes, while the eggs of third group immersed in vinegar solution 5% for two minutes.

The duration of spraying and immersion was two minutes and measurements were taken: the difference in shell weight, the difference

in shell thickness, weight of the lost eggs weight at ages (5, 15) days. After the eggs hatched measured the hatching percentage. Embryonic mortality rate, chicks weight (gm), hatching weight, and the average body weight, weight gain, feed consumption, feed conversion factor, mortality rate and production index for Progeny, and The study period lasted 70 days.

Statistical analysis: Completely Randomized Design (CRD) were used in this study and data analyzed with [6], and the differences between treatments was done by Duncan's multiple rang test [17] at probability ($p \leq 0.05$)

Results

Table (1) shows Effect of treated hatching eggs with vinegar on egg weight and egg weight loss statistical analysis of data showed no significant differences between treatment in egg weight before and after incubation. Significant increase ($p \leq 0.05$) in the percentage of initial weight of egg in immersion and spraying hatching eggs in vinegar as compared with control, while it was observed that there was a significant decrease ($p \leq 0.05$) in the percentage of egg weight at 15 days of incubation from the initial weight of the egg, reaching and this was reflected in the weight loss from the egg, as it increased significantly in the two treatments of spraying and immersing the eggs, reaching (1.068, 0.890) gm respectively compared to the control, (0.433) gm, This was reflected in the percentage of egg weight loss, which increased significantly in the spraying and immersion treatments compared to the control treatment.

Table (2): there were no significant effect in immersion and spraying eggs by vinegar compared with control in thickness of the shell, while there was

a significant decrease in weight of the shell after hatching in the egg immersion treatment compared with control, the treatment of spraying eggs with vinegar did not significantly affect in weight of the shells after hatching.

From the same table, it was observed that the difference between the thickness of shell before and after the egg immersion treatment increased significantly ($p \leq 0.05$) compared with the control and treatment of spraying eggs, where it reached (0.083, 0.014, 0.034 mm), respectively, It was also noted that the difference in weight of the shell increased significantly ($p \leq 0.05$) in treatment of immersion eggs in vinegar, reaching 0.410 gm compared with control (without treatment), which amounted to 0.205 gm.

Table (3) shows a significant ($p \leq 0.05$) decrease in the percentage of hatching from fertilized eggs in treatment of immersion eggs in vinegar compared with control and treatment of spraying eggs, which reached (50.62, 77.17, 75.61%), respectively and the embryonic mortality during the early and late period were significantly ($p \leq 0.05$) superior compared to control and with the spraying of eggs treatment with vinegar, and it reached (19.99, 9.0, 8.13%), respectively for the two periods and for the treatments, respectively. While the embryonic mortality for the middle period were significantly increased in the two treatments of immersion and spraying with vinegar compared to control and were (13.75, 13.75, 3.75%), respectively and this was reflected in the percentage of total embryonic mortality, and it was significantly ($p \leq 0.05$) high in the treatment of hatching eggs by immersion compared with control treatment and the spraying of eggs, its reached (49.37, 22.81, 23.53) % respectively. The embryonic growth and hatchability depend on the delivery of the egg shell to water vapor and vital gases.

There was no significant effects in chick weight at hatching and weight of chicks% eggs Wight's, It was also found that the number of hatching hours was early in the treatment of immersing eggs in vinegar (380.33) hours, compared with the control and the treatment of spraying eggs, which amounted to (386.67, 382.0) hours respectively.

From the observation of the Table (4), we find that the average body weight was significantly increase in two treatments of immersing and spraying with vinegar compared with control during the rearing period, while the immersion treatment did not differ significantly from the two previous treatments and reached (283.78, 270.75, 283.78) gm. and that

vinegar can be considered as an anti-stress agent, and spraying with these natural solutions is a good way to improve embryonic development and hatchability .

Table (5) showed the effect of treated hatching eggs with vinegar on the average weight gain statistical analysis of data showed a significant increase in weight gain for T1 and T2 as compared with T3 at the first week , In the second T1 and T3 showed a significant increase in weight gain as compared with T2 .At the third week a significant increase in weight gain at T2 as compared with T3 ,At the fourth week a significant increase in T2 as compared T1 and T3 , but in the sixth week there are a significant decrease in T2 as compared with T1 and T3 and in a total average weight gain showed a significant decrease in T2 as compared with T1 and T3 and reached (252.17, 241.76, 243.11)gm .

This may be due to the development and improvement in bowel functions and It improves the absorption of nutrients and thus is reflected in productive performance.

Table (6) The effect of spraying and immersion hatching eggs in vinegar in feed consumption .Statistical analysis of data indicate a significant decrease in feed consumption in T2 as compared with T1 and T2 in 1st and no significant differences between treatments in 2nd and 4th weeks and significant decrease in T3 in in 3rd and 6th week but in 5th week total consumption a significant decrease in feed consumption in T2 as compared with other treatments and significant increase in T1 as compared with T2 and T3.

Table (7) show the effect of spraying and immersing hatching eggs in vinegar on the average conversion ratio. No significant differences between treatments observed in all weeks of experiment and a significant improvement in T2 and T3 as compared with control in total feed conversion ratio. The improvement in the feed conversion factor may be the result of the treatment with vinegar, as vinegar improves the digestion of protein and its utilization as a nutritional supplement containing elements.

Discussion

The effect of acids in dissolving the shell and increasing its porosity reflect on increase in egg weight loss . These results agreed with [18] ,[19], [6]. And the shell thickness was significantly reduced by increasing the concentration of the vinegar spray solution.

The significant decrease in the hatching rate of fertilized eggs in the immersion treatment and the total embryo mortality rate may occur because embryonic growth and hatchability depend on the egg shell's permeability of water vapor and vital gases [20-22], [19] . This improvement is due to the fact

that providing the embryos with acetic acid led to supplying the embryos with energy, as it is considered a major product (actyl-enzyme A) for vital nutritional processes within cells [14], [23] [19].

The average body weight witnessed a significant increase in the two treatments of immersing and spraying eggs with vinegar compared to the control during the rearing period, as vinegar can be considered an anti-stress agent, and spraying with these natural solutions is considered a good treatment. A method to improve embryo development and hatching [24-27]. It was reported [16] that the shortest period of time for hatching was observed in chicks produced from eggs treated with natural vinegar .The improvement in productive performance was a result of the development and improvement of intestinal functions and improved absorption of nutrients [28], [29] , and [19] , as it was stated that The average weight gain of 14-day-old chicks increased significantly in the vinegar solution immersion treatments compared to the control treatment.

The significant decrease in feed consumption differed with the results of [21],[19], as they stated that feed consumption increases in vinegar immersion treatments.

The improvement in the feed conversion ratio was the result of treatment with vinegar, as vinegar improves the protein digestion process and is used as a nutritional supplement containing elements (P, Mg, Ca, Zn) [30-32] and [19].

Conclusions

It is concluded from this research that using vinegar as an organic solution to treat hatching eggs by immersion and spraying has a positive effect, as the porosity of the egg shell increases and the possibility of organic solutions reaching the inside of the egg increases.

This is reflected in the improvement of the hatching rate and the reduction of the percentage of mortality, and it also improves the productivity of subsequent offspring.

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Conflicts of interest

The author declare that no conflict of interest exists.

TABLE 1. Effect of treated eggs with vinegar on egg weight and egg weight loss

Characters Treatment	Egg weight before incu- bation(gm)	Egg weight after incu- bation at which time 5 or 15 days(gm)	Percentage of eggs weight : initial Wight %	Loss of egg weight (gm)	Loss of egg weight%
T ₁ : Control	11.46± 0.8 ^a	11.06±0.3 ^a	96.46±0.62 ^a	0.433±0.07 ^b	3.938±0.65 ^b
T ₂ : spray eggs 5%	11.44± 0.05 ^a	10.63± 0.24 ^a	93.15±1.62 ^{ab}	1.068±0.06 ^a	9.493±0.41 ^a
T ₃ :immersion eggs 5%	11.54± 0.12 ^a	10.66±0.23 ^a	92.31±1.26 ^b	0.890±0.13 ^a	7.715±1.23 ^a

Values with different letter means significant differences (P≤ 0.05)

TABLE 2. Effect of treated eggs with vinegar on thickness and weight of the shell before and after incubation

Characters Treatment	Shell thickness (mm)		Shell weight (gm)		Difference in thickness (mm)	Difference in shell weight (gm)
	Before incubation	After incubation	Before incubation	After incubation		
T ₁ Control	0.253±0.004 ^a	0.239±0.005 ^a	1.240±0.046 ^a	1.212±0.187 ^a	0.014±0.002 ^b	0.205±0.004 ^b
T ₂ : spray eggs 5 %	0.271±0.025 ^a	0.237±0.023 ^a	1.183±0.009 ^a	.847±0.038 ^{ab}	0.034±0.008 ^b	0.347±0.033 ^{ab}
T ₃ :immersioneggs 5%	0.280±0.008 ^a	0.197±0.008 ^a	1.193±0.019 ^a	0.773±0.054 ^b	0.083±0.00 ^a	0.41±0.064 ^a

Values with different letter means significant differences (P≤0,05)

TABLE 3. Effect of treated eggs with vinegar on some hatching indicators , mortality embryonic and hatching hours.

Characters Treatment	Hatching% from fertilized eggs %	Embryonic mortality%			Total embryonic mortality %	Chick weight at hatching gm	chicks weight% from eggs Wight %	Hatching period (hours)
		Early	Med	late				
T ₁ : Control	77.17± 1.42 ^a	9.0 ± 0.46 ^b	3.75± 0.20 ^b	10.07± 0.38 ^b	22.81± 0.31 ^b	8.17± 1.0 ^a	71.38± 8.19 ^a	386.67± 0.88 ^a
T ₂ : spray eggs 5 %	75.61± 1.18 ^a	8.13± 1.08 ^b	13.75± 0.8 ^a	11.65±1.02 ^b	23.53± 1.33 ^b	7.78 ± 0.40 ^a	68.33± 3.28 ^a	382.0 ± 1.15 ^{ab}
T ₃ :immersi on eggs 5%	50.62± 0.93 ^b	19.99± 1.0 ^a	13.75± 0.21 ^a	15.62± 0.69 ^a	19.37± 2.38 ^a	8.74± 0.81 ^a	76.47 ± 6.8 ^a	380.33 ± 1.20 ^b

Values with different letter means significant differences (P≤0,05)

TABLE 4. Showed the effect of treated eggs with vinegar in live body Weight (gm)

Characters Treatment	Live body weight (gm) in weeks						
	1 st	2 nd	3 th	4 th	5 th	6 th	7 th
T ₁ : Control	28.70± 1.61 ^b	57.93± 0.52 ^b	99.20± 2.07 ^a	151.37± 5.11 ^a	197.97± 1.16 ^b	235.99± 12.51 ^a	270.75± 2.42 ^b
T ₂ : spray eggs 5 %	30.78± 0.58 ^{ab}	62.29± 0.80 ^a	100.23± 2.98 ^a	154.13± 1.16 ^a	203.68± 2.12 ^a	240.96± 2.70 ^a	283.78± 1.03 ^a
T ₃ :immersion eggs 5 %	33.79±1.00 ^a	59.99± 0.67 ^{ab}	100.00 ± 1.53 ^a	151.32± 1.09 ^a	198.41± 3.15 ^{ab}	243.00± 5.22 ^a	276.89± 5.94 ^{ab}

Values with different letter means significant differences (P≤0.05)

TABLE 5. Effect of treated eggs with vinegar on the weight gain (gm).

characters Treatment	weight gain (gm) in weeks						
	1 st	2 nd	3 th	4 th	5 th	6 th	Total weight gain
T ₁ : Control	29.23± 2.87 ^a	41.30±3.61 ^a	52.14 ± 2.46 ^{ab}	46.33± 3.30 ^b	38.00± 4.0 ^b	34.76±2.60 ^b	241.76 ± 31.0 ^b
T ₂ : spray eggs 5%	31.51± 1.20 ^a	37.94±2.44 ^b	53.89± 4.69 ^a	49.55± 2.81 ^a	42.00 ± 3.23 ^a	37.28±2.61 ^a	252.17± 26.11 ^a
T ₃ :immersion eggs 5%	26.2± 1.87 ^b	40.01±2.70 ^a	51.33 ± 3.88 ^b	47.09± 3.66 ^b	44.59±1.17 ^a	33.89±2.50 ^b	243.11±18.7 ^b

Values with different letter means significant differences (P≤0,05)

TABLE 6. The effect of spraying and immersion eggs in vinegar in feed consumption(gm/bird / week)

Characters	The age (weeks)						
	1 st	2 nd	3 th	4 th	5 th	6 th	Total feed consumption
T₁: Control	47.66 ± 1.33 ^a	55.75 ± 2.47 ^a	74.04 ± 4.98 ^{ab}	113.97 ± 3.66 ^a	117.67 ± 2.60 ^a	137.22 ± 2.25 ^a	546.31 ± 22.55 ^a
T₂: spray eggs 5 %	47.58 ± 2.62 ^a	51.68 ± 2.26 ^a	75.97 ± 1.18 ^a	108.27 ± 3.47 ^a	110.04 ± 3.12 ^b	114.71 ± 2.84 ^c	508.25 ± 23.11 ^c
T₃: immersion eggs 5 %	39.90 ± 1.11 ^b	56.00 ± 1.66 ^a	71.35 ± 1.30 ^b	115.08 ± 1.64 ^a	119.47 ± 2.17 ^a	122.41 ± 4.88 ^b	524.2 ± 24.23 ^b

Values with different letter means significant differences (P ≤ 0.05)

TABLE 7. The effect of spraying and immersing eggs in vinegar in feed Conversion ratio (gm feed /gm gain) .

Characters	The age (weeks)						
	1 st	2 nd	3 th	4 th	5 th	6 th	Total feed Conversion ratio
T₁: Control	1.63 ± 0.05 ^a	1.35 ± 0.06 ^a	1.42 ± 0.12 ^a	2.46 ± 0.16 ^a	3.10 ± 0.27 ^a	3.95 ± 0.09 ^a	2.26 ± 0.16 ^a
T₂: spray eggs 5 %	1.51 ± 0.12 ^a	1.37 ± 0.02 ^a	1.14 ± 0.18 ^a	2.19 ± 0.38 ^a	2.63 ± 0.32 ^a	3.07 ± 0.30 ^a	2.02 ± 0.18 ^c
T₃: immersion eggs 5 %	1.53 ± 0.02 ^a	1.40 ± 0.05 ^a	1.39 ± 1.30 ^a	2.45 ± 0.21 ^a	2.68 ± 0.12 ^a	3.62 ± 0.09 ^a	2.16 ± 0.15 ^b

Values with different letter means significant differences (P ≤ 0.05)

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تأثير معاملة بيض التفقيس بالخل في بعض مؤشرات الفقس والاداء الانتاجي لطائر السمان

انوار محمد يونس الحامد

قسم الانتاج الحيواني - كلية الزراعة والغابات - جامعة الموصل - العراق.

المستخلص

تم هذا البحث في حقول كلية الزراعة والغابات جامعة الموصل واستمر لفترة 63 يوماً، هدف إلى التعرف على تأثير رش وغمر بيض تفقيس طائر السمان بمحلول الخل 5% لمدة دقيقتين في بعض مؤشرات الفقس والاداء الانتاجي للنسل الناتج بثلاث معاملات هي: T1: السيطرة (بدون معاملة)، T2: رش البيض بمحلول 5% خل، T3: غمر البيض بمحلول 5% خل. بعد فقس البيض تمت تربية النسل الناتج من عمر يوم واحد حتى نهاية الاسبوع السادس بعمر (42) يوماً. أظهر التحليل الإحصائي للبيانات أن رش وغمر البيض أظهر زيادة معنوية في الفقد من وزن البيضة وانخفاض معنوي في وزن البيض الاولي ووزن القشرة وسمك القشرة وتحسن معنوي في وزن الجسم والزيادة الوزنية ومعامل التحويل الغذائي للنسل الناتج في معاملي الغمر والرش وانخفاض في نسبة الفقس والهلاكات الجنينية لمعاملة البيض بالغمر بمحلول الخل.

الكلمات الدالة: الاداء الانتاجي ، بيض التفريخ، الرش، الغمر ، الخل.