



EFFECT OF GARLIC (*ALLIUM SATIVUM*) AND ONION (*ALLIUM CEPA*) WATER EXTRACT ON SOME PRODUCTIVE TRAITS OF BROILERS

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Abstract

This experiment was conducted at the Animal House, Agriculture College, Sumer University from 15/3/2018 to 20/4/2018. A total of 240, one day, unsexed, broiler Ross308 were used, in four-storey batteries, each floor contains a cage of 1 x 1.5 m. The chicks were randomly distributed to 60 chicks per treatment with three replicates (20 chicks each). The treatments were as follows; T1: (control treatment), while T2, T3 and T4 added the garlic and onion water extract with three concentrates 1, 3 and 5 ml/1 L of drinking water, respectively.

All the garlic and onion mixture water extract treatments showed a significant increase ($P \leq 0.05$) on production traits (weekly body weight, weight gain, feed consumption, food conversion coefficient and production index), while a significant decrease ($P \leq 0.05$) on mortality compared with the control treatment, high levels of garlic and onions water extract for (5 ml/1 liter of drinking water) gave the best significantly ($P < 0.05$) results compare with other treatments.

Key words : Garlic, onion, water extract, productive traits, broilers.

Introduction

As a result of the great development in the poultry industry and increased productivity, accompanied by the emergence of a large variety of bacterial pathogens and resistance, due to the indiscriminate use of drugs and antibiotics (Kabir, 2009). Resulting in excessive use of antibiotics, which caused health damage as well as making some bacterial strains resistant to antibiotics (Muir *et al.*, 2000). Adversely affected the consumer and birds health as well as a decline in the performance of broilers (Al-Zubaidi, 2016). Researchers had sought to produce derivatives from some plants used in treatments, one of the most important reasons that researchers were interested in medicinal herbs had an important role in the treatment of several diseases, it also no adverse effects on the health of birds and consumers (Al-Gharawi *et al.*, 2014). Garlic (*Allium sativum*) is a medicinal herbal plant native to East Asia, useful in the prevention and treatment of many infectious diseases (Martin and Ernst, 2003), growth catalyst, lowers cholesterol and triglycerides and elevates total protein in the blood serum, antifungal, Anti-

lead poisoning as a result of the formation of non-sedimentary complexes in the liver and muscle (Krishnaiah *et al.*, 2009). Onion (*Allium cepa*) is a medicinal herbal plant native to Asia (Fleming, 2000). Onion is effective against heart disease, diabetes and osteoporosis, contains compounds against inflammation, cholesterol, cancer and oxidation. The presence of many anti-inflammatory drugs to make treat inflammation (Dorsch *et al.*, 1990). The present study aims to investigate the effect of the garlic and onion mixture water extract on some of the productive traits of broilers Ross308.

Materials and Methods

This experiment was conducted at the Animal House, Agriculture College, University of Sumer, from 17/3/2018 until 22/4/2018. A total of 240, one day, 40 g weight, unsexed broiler Ros308 were used. The chicks were reared inside the animal house, in four-storey batteries, and each floor contained a cage of 1.5 × 1 m, randomly distributed on four experimental treatments with 60 chicks per treatment, three replicates for treatment (20 chick /

replicate). The treatments were as follows: T1: (control treatment), while T2, T3 and T4 added the garlic and onion water extract with three concentrates 1, 3 and 5 ml/1 L of drinking water, respectively.

Garlic and onions were purchased from local markets, chopped with a small by electric grinder, then put in a blender with vinegar by 1 kg onion, 1 kg of garlic with a concentration of 5%, filtered the extract by gauze, and become the extractor ready to use.

The studied production characteristics are the weekly mean weight, weekly weight gain, weekly feed consumption and feed conversion.

Completely Randomized Design (CRD) was used to study the effect of different coefficients on the studied traits, comparison of the mean differences between the means of the Duncan (1955) multiples test under a significant level of 0.05 and 0.01, SAS (2001) was used in statistical analysis.

Results and Discussion

Table 1 shows the effect of garlic and onions mixture water extract no significant differences between all experimental treatments during the first week of the age of the chick on the weekly body weight, in the second

week, all the extracts of the water extract of garlic and onions showed significant superiority ($P \leq 0.05$) compared to control treatment, In the third and fourth weeks of bird life, significantly increased ($P \leq 0.05$) in T4 compared to T2, significantly increased ($P \leq 0.05$) compared to control treatment, at the same time, the results showed no significant differences between T3 and T4 on the one hand and T2 and T3 on the other, at the age of marketing (35 days), treatment T4 showed a significant superiority ($P \leq 0.05$) compared to T3, which was significantly higher ($P \leq 0.05$) than T2 significantly superior to control treatment.

Table 2 shows the effect of onion and garlic water extract on the weekly weight gain of the broilers, there were no significant differences between all treatments in the first week of the age of the chick, in the second week there was a significant improvement ($P \leq 0.05$) in the onion and garlic extracts compared to the control treatment. In the third and fourth weeks, treatment T4 was significantly higher ($P \leq 0.05$) on T2, ($P \leq 0.05$) on the T3 treatment, which is significantly higher ($P \leq 0.05$) than T2, which in turn significantly exceeded ($P \leq 0.05$) on control treatment. There were no significant differences between T4 and T3, T3 and T2 on the other, In the fifth

Table 1 : The effect onion and garlic water extract on weekly body weight (g) of broilers \pm standard error.

Treatments	Age (week)				
	1	2	3	4	5
T ₁	0.71 \pm 111.51	b 1.74297.21	bc4.42596.03	c 8.811148.42	c 13.031831.59
T ₂	0.77 111.08	a 2.08 302.54	a 5.06616.11	b 8.501202.19	b 12.721934.01
T ₃	0.80 111.15	a 1.96 303.78	ab5.13 620.02	ab9.01 1210.28	ab 12.661952.52
T ₄	0.66 111.21	a 1.84 304.33	a 4.82622.76	a 9.671219.46	a 13.151970.02
Sig.	N.S	*	*	*	*

T1: control treatment. **T2:** added the onion and garlic water extract with 2 ml / L drinking water. **T3:** added the onion and garlic water extract with 3 ml / L drinking water. **T4:** added the onion and garlic water extract with 5 ml / L drinking water. **N.S:** no significant differences. * The different letters within the same column indicate significant differences between the totals at the probability level of 0.05.

Table 2 : The effect onion and garlic water extract on weekly weight gain (g) of broilers \pm standard error.

Treatments	Age (week)					Total
	1	2	3	4	5	
T ₁	70.85 \pm 0.59	186.36 \pm 0.92 b	298.82 \pm 1.63 c	552.39 \pm 3.76 c	683.17 \pm 4.35 d	1791.59 \pm 12.67 d
T ₂	71.08 \pm 0.62	191.46 \pm 1.04 a	313.57 \pm 1.74 b	586.08 \pm 3.55 b	731.82 \pm 4.20 c	1894.01 \pm 13.22 c
T ₃	71.15 \pm 0.75	192.63 \pm 1.11 a	316.24 \pm 2.01ab	590.26 \pm 3.88ab	742.24 \pm 5.03 b	1912.52 \pm 12.39 b
T ₄	71.21 \pm 0.69	193.12 \pm 0.97 a	318.43 \pm 1.72 a	596.70 \pm 3.63 a	750.56 \pm 4.79 a	1930.02 \pm 12.52 a
Sig.	N.S	*	*	*	*	*

T1: control treatment. **T2:** added the onion and garlic water extract with 2 ml/L drinking water. **T3:** added the onion and garlic water extract with 3 ml/L drinking water. **T4:** added the onion and garlic water extract with 5 ml/L drinking water. **N.S:** no significant differences. *The different letters within the same column indicate significant differences between the totals at the probability level of 0.05.

Table 3 : The effect onion and garlic water extract on weekly feed conversion (g feed consumption/ g weight gain) of broilers \pm standard error.

Treatments	Age (week)					Total
	1	2	3	4	5	
T ₁	116.46±0.88	311.69±1.90b	513.97±3.66b	983.25±7.66 b	1304.85±10.55c	3230.22±26.32d
T ₂	117.03±0.72	313.54±2.02a	526.79±4.92a	1013.92±8.04a	1346.55±10.20b	3317.83±27.01c
T ₃	117.12±0.80	313.66±1.83a	528.12±3.79a	1015.25±7.92a	1350.27±11.04ab	3324.42±26.84b
T ₄	117.16±0.77	313.82±1.88a	528.59±3.92 a	1017.17±7.81a	1354.73±10.36a	3331.47±26.77a
Sig.	N.S	*	*	*	*	*

T1: control treatment. **T2:** added the onion and garlic water extract with 2 ml / L drinking water. **T3:** added the onion and garlic water extract with 3 ml / L drinking water. **T4:** added the onion and garlic water extract with 5 ml / L drinking water. **N.S:** no significant differences. * The different letters within the same column indicate significant differences between the totals at the probability level of 0.05.

Table 4 : The effect onion and garlic water extract on weekly feed conversion (g feed consumption/ g weight gain) of broilers \pm standard error.

Treatments	Age (week)					Total
	1	2	3	4	5	
T ₁	116.46±0.88	311.69±1.90b	513.97±3.66b	983.25±7.66 b	1304.85±10.55c	3230.22±26.32d
T ₂	117.03±0.72	313.54±2.02a	526.79±4.92a	1013.92±8.04a	1346.55±10.20b	3317.83±27.01c
T ₃	117.12±0.80	313.66±1.83a	528.12±3.79a	1015.25±7.92a	1350.27±11.04ab	3324.42±26.84b
T ₄	117.16±0.77	313.82±1.88a	528.59±3.92 a	1017.17±7.81a	1354.73±10.36a	3331.47±26.77a
Sig.	N.S	*	*	*	*	*

T1: control treatment. **T2:** added the onion and garlic water extract with 2 ml / L drinking water. **T3:** added the onion and garlic water extract with 3 ml / L drinking water. **T4:** added the onion and garlic water extract with 5 ml / L drinking water. **N.S:** no significant differences. * The different letters within the same column indicate significant differences between the totals at the probability level of 0.05.

week and cumulative weight gain, the mental superiority ($P \leq 0.05$) was higher in T₄, which exceeded T₃ and T₂, ($P \leq 0.05$) on the control treatment.

The increase in body weight and weight gain in onion and garlic water extracts may be attributed to the active substances in onions and garlic that increase appetite, which increases the consumption of feed and thus improves body weight, or it may be due to its antimicrobial properties, which improves the properties of digestion (Goodarzi and Nanekarani, 2014). The onion and garlic are a natural antibiotic that is effective against pathogenic bacteria and harmful microorganisms, thus reducing the number of harmful microorganisms compared to beneficial bacteria, which improve digestion efficiency and facilitate the process of absorption where the tanins stimulate some of the enzymes secreted by the stomach to facilitate digestion (Karangiya *et al.*, 2016).

Table 3 indicates the effect of the use of onion and garlic extract on the weekly feed consumption of broilers, no significant differences between all treatments during the first week of the age of chicks, In the second week significantly superiority ($P \leq 0.05$) in all the onion and garlic

extracts showed a control treatment. In the third and fourth and fifth weeks of the age of birds, the significant improvement ($P \leq 0.05$) in the feed consumption ratio for T₄ was significantly higher ($P \leq 0.05$) on T₂, which significantly exceeded ($P \leq 0.05$) on control, while the differences between T₄ and T₃, T₃ and T₂ showed no significant differences, in the cumulative feed consumption, significantly superiority ($P \leq 0.05$) was the fourth treatment, while T₃ exceeded on T₂, which significantly exceeded ($P \leq 0.05$) on the treatment of control.

Significant improvement in onion and garlic extracts in feed consumption due to active alkaloids, which increase bird appetite, which increases feed consumption (Javandel *et al.*, 2008), Horton *et al.* (2008) Garlic were rich in pectin compounds and have an active role in increasing appetite, which increases the intake of food, or because of the ability of garlic to increase the effectiveness of digestive enzymes in the digestive system of birds, which prompts birds to increase feed consumption.

Table 4 shows the effect of using onion and garlic extract in the feed conversion coefficient of broiler, there

Table 5 : The effect onion and garlic water extract on mortality (%) and production index of broilers \pm standard error.

Treatments	Mortality(%)	Production Index
T ₁	a 0.17 8.88	c 0.82 264.91
T ₂	b 0.09 4.44	b 1.01 301.42
T ₃	b 0.11 4.44	b 0.75 306.06
T ₄	c 0.13 2.22	a 0.62 318.13
Sig.	*	*

T1: control treatment. T2: added the onion and garlic water extract with 2 ml / L drinking water. T3: added the onion and garlic water extract with 3 ml / L drinking water. T4: added the onion and garlic water extract with 5 ml / L drinking water* The different letters within the same column indicate significant differences between the totals at the probability level of 0.05.

were no significant differences in all onion and garlic water extracts during the first week of life, in the second and third weeks of the age of the broiler was the significant superiority ($P \leq 0.05$) in all the onion and garlic extract treatments on the control treatment, in the fourth and fifth week, the significant superiority ($P \leq 0.05$) was in T4, which surpassed on T2, which significantly exceeded ($P \leq 0.05$) on control treatment, while there were no significant differences between T4 and T3 on the one hand and T3 and T2 on the other hand, significantly exceeded ($P \leq 0.05$) was also obtained in the cumulative feed conversion coefficient for all the onion and garlic extracts on the control treatment.

The improvement in the food conversion coefficient in the onion and garlic extract may be attributed to its inhibitory activity in the gastrointestinal microbiology, as well as support for beneficial microorganisms, which stimulates the improvement of the secretion of digestive enzymes, thus improving the efficiency of digestion to benefit from the food intake which improves the feed conversion coefficient (Aji *et al.*, 2011). It has an antimicrobial and inhibitory effect on the growth of pathogenic microorganisms, thus increasing the number of beneficial microorganisms, Increased digestive secretions that provide better digestion efficiency for food intake, this was a positive result on the food conversion factor (Kumar *et al.*, 2010).

Table 5 shows the effect of using onion and garlic extract on mortality and the production index of broilers, all the onion and garlic water extract showed a significant effect ($P \leq 0.05$) in reducing the mortality in all treatments extracted compared to control treatment, a significant increase ($P \leq 0.05$) was also found in the value of the T4 production index compared to the rest of the treatments during the trial period, no significant differences between T3 and T2, significantly exceeded ($P \leq 0.05$) on control

ratio in the production index.

The cause of the decrease in the mortality in the onion and garlic extract transactions may be attributed. Because it contains the tannins that have an active role in preventing injury through cell membrane breakdown of pathogenic bacteria, as well as preventing the effective positions of some of the enzymes within the living cells of the bacteria, which were essential for their growth and activity, which is reflected positively on the vitality and health of birds, and the low rate of loss (Ebesunun *et al.*, 2007).

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