



## EFFECT OF EUCALYPTUS LEAVES WATER EXTRACT ON SOME PRODUCTIVE TRAITS OF BROILERS

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### Abstract

The study was carried out in farm poultry of research station in College of Agriculture in Al-Muthanna University, A total 240 chicks, one day old of broiler chickens Ross308 were used, were randomly distributed to four treatments by 60 chicks per treatment with three replicates (20 chicks per replicate). The eucalyptus leaves powder water extract treatments were added 0, 4, 6 and 8 ml per 1 liter of drinking water of broilers. The results showed that the existence of a significant increase ( $p \leq 0.05$ ) on some productive performance (body weight, weight gain, feed intake, feed conversion, water consumption and production index), with a significant decrease ( $p \leq 0.05$ ) on mortality in all eucalyptus leaves powder water extract treatments compare with control treatment.

**Key words :** Eucalyptus leaves, water extract, productive traits, broilers.

### Introduction

The development in the poultry industry Due to the low immunity of domestic birds, especially broilers, led to finding ways to support the health of birds, including raising the immune level of chickens to resist various diseases (Schmidt *et al.*, 2009). The use of medicinal plants is one of the methods used by researchers, which had the potential to improve the productive, immunological and physiological characteristics of domestic birds (Al-Gharawi *et al.*, 2014). One of these medicinal plants is Eucalyptus, which is considered an evergreen tree that is cultivated in gardens, parks and on roadsides in many cities of the world, there are wild species (Potts *et al.*, 2001). The medicinal part of the plant is aromatic leaves, which has many benefits, especially in the medical field, from which essential oils, eucalyptol is the most effective compound, aromatic oil contains a ketone group in its composition (Boland *et al.*, 1991). Eucalyptus leaves also contain essential oils and other compounds such as tannin and citronol, It is used to treat respiratory infections and rheumatism, as well as in the pharmaceutical, pharmaceutical, perfumery and soap industries (Niazi, 2016). The aim of this experiment was to study the effect of using different levels of the water extract of Eucalyptus leaf powder in some of the productive characteristics of broilers.

### Materials and Methods

The study was carried out in farm poultry of research station in College of Agriculture in Al-Muthanna University, during the period from 5/10/2018 – 10/11/2018. This study was conducted to determine

the use of different levels of water extract of eucalyptus leaves in drinking water in some productive traits of broiler chicks. 240 chicks, one day old of broiler chickens Ross308 were used, in four-floor batteries, each floor contains a cage measuring 1 x 1.5 m and were randomly distributed to four treatments by 60 chicks per treatment with three replicates (20 chicks per replicate) were rearing in the batteries containing the cage dimensions of 1.5 × 1.0m. The treatments as follows: T1 : (control treatment without any addition). T2: add water extract of eucalyptus leaves at 4 ml/liter of drinking water. T3: add water extract of eucalyptus leaves at 6ml /liter of drinking water. T4: add water extract of eucalyptus leaves at 8ml /liter of drinking water.

The leaves of the eucalyptus plant were collected, the leaves were well washed, dried and grinded by an electric mill (Morter) and the powder was kept in clean plastic bags, mix dry powder of eucalyptus leaves by 1 g: 2 ml distilled water in a 60 °C water bath for 1 hour, leave the solution for 24 hours at room temperature and aspirate the resulting mixture with sterile medical gauze (Hernandes *et al.*, 1994).

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 Discussions

Table (1) shows no significant differences between all experimental treatments at the first week of the age of the chick, at the second week, T4 (8 ml water extract for Eucalyptus leaves/L drinking water) was significant increased ( $P \leq 0.05$ ) on T2 (4 ml water extract of Eucalyptus leaves/L drinking water) which a significantly exceeded ( $P \leq 0.05$ ), no significant differences were observed between T4 and T3 (6 ml water extract of Eucalyptus leaves / L drinking water), and between T2 and T3 on the other hand which significantly ( $P \leq 0.05$ ) on control treatment. Significant increased ( $P \leq 0.05$ ) at the last three weeks continued to favor T4 compared with the rest of the treatments. The T3 treatment significantly exceeded ( $P \leq 0.05$ ) at the expense of T2, which significantly exceeded ( $P \leq 0.05$ ) on T1. A significant increased ( $P \leq 0.05$ ) was observed in the body weight rates for all the treatments in which the water extract was used for eucalyptus leaves and different concentrations compared to the control treatment. The weight of chicks increased in all weeks except for the first week of age. There are significant differences between the coefficients and the differences between them.

Table (2) shows no significant differences between all treatments in the first week of age, significantly differences at the second week showed that T4 was significantly improved ( $P \leq 0.05$ ) at the expense of T2, which significantly improved ( $P \leq 0.05$ ) on T1, there were no significant differences between T4 and T3, at the third week, T4 showed significant improvement ( $P \leq 0.05$ ) on T3, which in turn improved on T1 and T2 significantly improved ( $P \leq 0.05$ ) on T1, there were no significant differences between T3 and T2. In the fourth week, treatment T4 showed a significant improvement ( $P \leq 0.05$ ) on treatment T2, which improved on T1 treatment. There were no significant differences between treatment T4 and T3 and between treatment T3 and T2 on the other hand. In the last few weeks, T4 showed significant improvement ( $P \leq 0.05$ ) at the expense of T3, which improved significantly ( $P \leq 0.05$ ) at the expense of T2 and the latter significantly improved ( $P \leq 0.05$ ) on treatment T1.

Table 1 and 2 show significant improvement in all body weight and weight gain in all water extracts of Eucalyptus leaves, this may be due to the support of beneficial bacteria at the expense of harmful bacteria inside the gastrointestinal tract, thus increasing the number of beneficial bacteria, especially *Lactobacillus* bacteria, which improves the digestion and absorption coefficient by increasing the secretion of digestive enzymes (Elbestawy *et al.*, 2016), Awaad *et al.* (2016) Eucalyptus oil has an antimicrobial property which

significantly improved body weight, Ibrahim *et al.* (2018) observed when adding eucalyptus leaf oil to broiler chicks significantly improved body weight, this was attributed to the containment of eucalyptus leaves on a compound (1-8, cineol,  $\alpha$ - pinene and pinocarveol-trans), while Zeng *et al.* (2015) confirm that eucalyptus oil is considered as an antioxidant, which improved the body weight and the increase in weight when adding the addition of eucalyptus oil to broiler meat.

Table (3) shows no significant differences between all treatments during the first week of the age of the chick, at the second week, the T4 treatment was significantly higher ( $P \leq 0.05$ ) at the expense of T2, which was significantly higher ( $P \leq 0.05$ ) on T1, there were no significant differences between T3 and T4, in the third week, T4 showed a significant superiority ( $P \leq 0.05$ ) at the T3, which was significantly higher ( $P \leq 0.05$ ) on T2, there was no significant difference between T2 and T1, in the fourth and fifth weeks, T4 was significantly higher ( $P \leq 0.05$ ) on T2, which was significantly higher ( $P \leq 0.05$ ) on T1.

The significant improvement in the coefficients of the water extract of eucalyptus leaves in feed consumption is attributed to the effective compounds (1-8, cineol,  $\alpha$ -pinene and pinocarveol-trans), which increase the consumption of fodder (Ibrahim *et al.*, 2018), Brenes and Roura (2010) confirmed that the essential oils of eucalyptus have an effect on digestion and absorption by increasing the activity of digestive enzymes and thus increasing body weight, this can be attributed to the fact that eucalyptus contains active compounds, especially phenols that act as inhibitors of pathogenic bacteria, thus increasing immunity and weight gain. Makouei and Mehmannaavaz (2018). The eucalyptol compound improves the efficiency of fodder intake.

Table (4) shows no significant differences between the treatments during the first week of age, in the second week, T4 was significantly higher ( $P \leq 0.05$ ) on T2 and significantly higher ( $P \leq 0.05$ ) on the control treatment, there were no significant differences between T3, T4 and T3, T2. In the third week, T4 was significantly higher ( $P \leq 0.05$ ) on T1 and T2 significantly higher than T1. There was no significant difference among T4, T3 and T2. In the fourth week, the T4 treatment was significantly higher ( $P \leq 0.05$ ) at the expense of the T2 treatment, which was significantly higher ( $P \leq 0.05$ ) on T1. There was no significant difference between T4, T3 and T3, T2. In the fifth week, the ( $P \leq 0.05$ ) for the treatment T4 at the expense of transaction T2, which significantly exceeded ( $P \leq 0.05$ ) on control. In the total food conversion coefficient, ( $P \leq 0.05$ ) was superior to T4, which exceeded T3, which significantly exceeded

T3, which significantly exceeded P00.05 on T2 and significantly exceeded ( $P \leq 0.05$ ) on control treatment.

The improvement in food conversion coefficients in Eucalyptus extract is attributed to its inhibitory effect on microbial pathogenesis in the gastrointestinal tract as well as its support for beneficial microorganisms, particularly Lactobacillus, thus stimulating the secretion of digestive enzymes and thus improving the digestion and absorption coefficient and increasing the digestive enzymes to benefit from the food intake which improves the conversion coefficient of food (Elbestawy *et al.*, 2016). Plant extracts have an antimicrobial effect on the growth of pathogenic microorganisms, thus increasing beneficial microbial growth and thus increasing the secretions of digestive enzymes that provide better

dietary digestibility for (Zeng *et al.*, 2015). The oils have a positive effect on the digestive enzymes and increased absorption and therefore weight gain. The oils have an antioxidant effect and the eucalyptus oil has a positive effect on the food conversion factor because of the possession of eucalyptus oil, anti-microbial properties (Awaad *et al.*, 2016). The eucalyptol (sineol) improves the food conversion factor. The essential oils of the eucalyptus plant have an effect on digestion and absorption by increasing the activity of digestive enzymes and thus increasing body weight. This can be attributed to the containment of eucalyptus Active compounds, especially phenols, act as inhibitors of pathogenic bacteria, thus increasing immunity and gaining weight. (Makouei and Mehmnavaz, 2018).

**Table 1 :** Effect of the use of water extract of Eucalyptus leaf powder in the weekly body weight means (g) of broilers  $\pm$  standard error.

Treatments	Age (week)				
	1	2	3	4	5
T <sub>1</sub>	2.50 $\pm$ 155.00	4.40 $\pm$ 348.33c	7.26 $\pm$ 691.67 d	12.58 $\pm$ 1160.00d	14.53 $\pm$ 1706.67 d
T <sub>2</sub>	1.04 $\pm$ 157.50	4.70 $\pm$ 384.33b	4.09 $\pm$ 761.33 c	7.64 $\pm$ 1305.00 c	8.66 $\pm$ 1875.00 c
T <sub>3</sub>	0.93 $\pm$ 156.83	1.67 $\pm$ 398.33ab	5.00 $\pm$ 780.00 b	2.00 $\pm$ 1343.00 b	2.91 $\pm$ 1944.67 b
T <sub>4</sub>	0.83 $\pm$ 159.17	5.77 $\pm$ 410.00a	3.33 $\pm$ 811.67 a	6.01 $\pm$ 1391.67 a	4.33 $\pm$ 2012.67 a
Sig.	N.S	*	*	*	*

T1: control treatment. T2: Add the water extract of Eucalyptus leaves powder level of 4 ml / liter of water. T3: Add the water extract of Eucalyptus leaves powder level of 6 ml / liter water. T4: Add water extract of Eucalyptus leaves powder level of 8 ml / liter 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 :** Effect of the use of water extract of Eucalyptus leaf powder in the weekly weight gain means (g) of broilers  $\pm$  standard error.

Treatments	Age (week)					Total
	1	2	3	4	5	
T <sub>1</sub>	115.00 $\pm$ 2.50	193.33 $\pm$ 2.20 c	3.33 $\pm$ 343.33 c	6.00 $\pm$ 468.33c	7.26 $\pm$ 546.66d	14.52 $\pm$ 1666.66d
T <sub>2</sub>	117.50 $\pm$ 1.04	5.73 $\pm$ 226.83b	3.51 $\pm$ 377.00 b	4.48 $\pm$ 543.66b	2.88 $\pm$ 570.00c	8.66 $\pm$ 1835.00c
T <sub>3</sub>	0.93 $\pm$ 116.83	0.76 $\pm$ 241.50a	3.33 $\pm$ 381.66 b	6.24 $\pm$ 563.00ab	3.33 $\pm$ 601.66b	2.90 $\pm$ 1904.66b
T <sub>4</sub>	0.83 $\pm$ 119.16	5.06 $\pm$ 250.83a	6.66 $\pm$ 401.66 a	8.66 $\pm$ 580.00a	2.08 $\pm$ 621.00a	4.33 $\pm$ 1972.66a
Sig.	N.S	*	*	*	*	*

T1:control treatment. T2:Add the water extract of Eucalyptus leaves powder level of 4 ml / liter of water. T3:Add the water extract of Eucalyptus leaves powder level of 6 ml / liter water. T4:Add water extract of Eucalyptus leaves powder level of 8 ml / liter 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 :** Effect of the use of water extract of Eucalyptus leaf powder in the weekly feed consumption means (g) of broilers  $\pm$  standard error.

Treatments	Age (week)					Total
	1	2	3	4	5	
T <sub>1</sub>	1.52 $\pm$ 128.00	1.20 $\pm$ 319.33 c	3.21 $\pm$ 560.00 c	9.52 $\pm$ 814.66 c	13.05 $\pm$ 1081.00 a	21.28 $\pm$ 2903.00 d
T <sub>2</sub>	0.666 $\pm$ 130.33	1.45 $\pm$ 331.33 b	1.45 $\pm$ 572.66 c	9.24 $\pm$ 905.66 b	5.29 $\pm$ 1056.00 b	6.11 $\pm$ 2996.00 c
T <sub>3</sub>	1.73 $\pm$ 129.00	0.333 $\pm$ 340.33 a	2.96 $\pm$ 585.66 b	8.11 $\pm$ 930.33 ab	2.33 $\pm$ 1076.33 ab	6.83 $\pm$ 3061.66 b
T <sub>4</sub>	1.66 $\pm$ 128.33	0.881 $\pm$ 343.66 a	6.48 $\pm$ 607.33 a	11.13 $\pm$ 942.00 a	1.33 $\pm$ 1097.33 a	18.83 $\pm$ 3118.66 a
Sig.	N.S	*	*	*	*	*

T1:control treatment. T2:Add the water extract of Eucalyptus leaves powder level of 4 ml / liter of water. T3:Add the water extract of Eucalyptus leaves powder level of 6 ml / liter water. T4:Add water extract of Eucalyptus leaves powder level of 8 ml / liter 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** : Effect of the use of water extract of Eucalyptus leaf powder in the weekly feed conversion means (g) of broilers  $\pm$  standard error.

Treatments	Age (week)					Total
	1	2	3	4	5	
T <sub>1</sub>	0.004 $\pm$ 1.01	0.011 $\pm$ 1.44 c	0.017 $\pm$ 1.63 b	0.016 $\pm$ 1.73 c	0.008 $\pm$ 1.97 c	0.004 $\pm$ 1.74 d
T <sub>2</sub>	0.005 $\pm$ 1.01	0.032 $\pm$ 1.28 b	0.014 $\pm$ 1.51 a	0.005 $\pm$ 1.66 b	0.010 $\pm$ 1.85 b	0.007 $\pm$ 1.63 c
T <sub>3</sub>	0.005 $\pm$ 1.01	0.003 $\pm$ 1.24 ab	0.006 $\pm$ 1.53 a	0.004 $\pm$ 1.65 ab	0.013 $\pm$ 1.78 a	0.004 $\pm$ 1.60 b
T <sub>4</sub>	0.005 $\pm$ 1.01	0.023 $\pm$ 1.21 a	0.016 $\pm$ 1.51 a	0.009 $\pm$ 1.62 a	0.006 $\pm$ 1.76 a	0.006 $\pm$ 1.58 a
Sig.	N.S	*	*	*	*	*

T<sub>1</sub>:control treatment. T<sub>2</sub>:Add the water extract of Eucalyptus leaves powder level of 4 ml / liter of water. T<sub>3</sub>:Add the water extract of Eucalyptus leaves powder level of 6 ml / liter water. T<sub>4</sub>:Add water extract of Eucalyptus leaves powder level of 8 ml / liter 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.

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