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EFFECT OF ADDING CHAMOMILE POWDER TO DIETS ON PRODUCTIVE PERFORMANCE OF BROILER REARED UNDER HEAT STRESS CONDITIONS

Thaer M. Alkado, Anwar M. Al-Hamed, Khalid H. Sultan
Animal Production Dept. College of Agriculture and Forestry / University of Mosul / Iraq

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Correspondence Email:
althuraya771@gmail.com

ABSTRACT

This study was conducted to determine the effect of adding chamomile powder to the diet of broilers (Ross308) raised under heat stress conditions on production performance and economic indicators. Unsexed chicks were raised from one day until 42 days. Chicks were randomly distributed at the beginning of second week on experimental treatments with three replications / treatment as follows: T1: Feeding birds with out adding (Control), T2: adding 9 gm chamomile / kg feed , T3: adding: 15 gm chamomile /kg feed. The statistical analysis of data showed: a significant superiority in the final live body weight rate and the total weight gain rate, an improvement in the weekly and total feed conversion, and the superiority of the production index and the productive factor, while we did no find a significant effect showed in feed consumption rate and the percentage of mortality% and in the production yield per m^2 in Production of one kilogram of live meat. The result indicated that addition of chamomile lead to improve growth performance and reducing the cost per unit of production in conditions of heat stress.

INTRODUCTION

Many recent studies have tended to develop the poultry sector in order to meet the human need for animal protein and have found that the environmental conditions surrounding birds have a direct impact on their production and vitality, leading to a deterioration of their productive and physiological performance. The main contributors to the formation of free radicals that cause cell damage are lipid oxidation and lipogenesis. Peroxidation and its effect on the genetic material of the cell are explained in several studies that have observed an increase in oxidative stress with increased heat stress (Mohammed *et al*., 2013). The use of medicinal plants as feed additives is a way to improve the productive performance of birds (AL-Hamed, ,2021 and Sultan, 2022) instead of using antibiotics and growth stimulants that are deposited in the tissues of the bird's body and thus pass onto the consumer and cause health problems, and the effective use of plants in poultry products has a positive effect on consumer health (Durrani *et al*., 2008). Including Chamomile flowers are one of the medicinal plants used in the past and contain high levels of therapeutic compounds, namely bisabolol chamaxulene, beta-trans-farnesene, and flavone glycosides. Many bioactive phytochemical components were found in Chamomile flower extract, including pentadecanoic acid, a palmitic acid methyl ester with antioxidant activity (Vijisaral and Arumugam, 2014; Gamal et al.,

2017); and -bisabolol (monocyclic sesquiterpene alcohol), which has anti-inflammatory, anti-bacterial, and anti-fungal properties (Kazemi, 2015). Anti-bacterial Chamomile also has positive effects on the digestive and respiratory systems and has an important role in boosting immunity and reducing oxidative stress (Al-Snafi, 2016). The chamomile flower is used to reduce the negative effects of heat stress. According to Hamady et al., (2017) and (AL-Chlabi and Abdul-Rahman, 2019), supplementing broiler ration with chamomile improved the antioxidant status of the birds, which may be due to antioxidant-rich components such as chamazulene (Frat et al., 2018) and luteolin (Frat et al., 2018).

MATERIALS AND METHODS

This study was conducted in the animal field of the College of Agriculture and Forestry / University of Mosul in the Department of Animal Production at the period 20 / 4 /2021 to 2 / 6 / 2021, under heat stress conditions (37± 2)C^0 , In this study, total of 153 broiler Ross 308 one-day-old, included the control and two of adding chamomile in diet with three replicates per group with 17 birds/replicate . A average live body weight, weight gain, feed consumption, feed conversion factor, economic indicators and mortality rate (were studied). Chicks were fed on two diets formed according to the National Research Council (Anonymous ,1994) , the components of starter diet: 22.11% crude protein and 3000 Kcal/KG M.energy and the finisher diet: 20.20% crude protein and 3100 Kcal/KG ME show table 1. The weekly weights of the chicks were taken, the quantities of feed consumed were measured, the weight gain, the conversion factor is extracted and, both the production factor and index were calculated.

Table(1): showing the components of the starter and the finisher ration.

feed material	Starter ration %	fisher ration %
Bromix	2.5	2.5
L-Lysine	0.06	0.07
L-Therionine	0.04	0.03
Soybean meal	27.94	22.03
Wheat	30.78	33.83
Wheat bran	5.67	3.78
Wheat flour	10.00	15.00
Corn	20.00	20.00
Soybean oil	1.00	1.00
Limeston 38% Ca	2.01	1.76
Crude protein	22.11	20.20
M.Energy (KCAL/KG)	3000	3100

Statistical analysis

Follow the Completely Randomized Design (CRD) by using SAS system (Anonymous 2001) Duncan (1955) averages to find significant differences between the coefficients at the probability level ($p \leq 0.05$) and according to the model.

Yij = μ + ti + Eij Since: - Yij = Value of observation, μ = Average of observation = Treatment Effect, Eij = Experimental Error.

RESULTS AND DISCUSSION

Table 2 showed the results of the statistical analysis under the load level ($p \leq 0.05$) for the effect of adding chamomile to the ration on the average weekly live body weight , which noted that there are no significant differences between the levels of addition (0, 9, 15) g/kg of ration For all rearing weeks except for the sixth week (marketing age 42 days), also the data showed that average body weight at ^{6th} weeks were increased in the two addition groups as compared with control was reached (3066.62, 3100.73, 2936.11) g, respectively. These results agreed with (AL-Kaisse and Khaled, 2011), where it improved when adding (0.25, 0.5, 0.75)% of chamomile and with (Muhammed, 2013), where it was noticed that the body weight was superior when adding chamomile to the diet by 1% for the period (1 -42) days, as well as (Gamal *et al*., 2017) noted superiority in adding chamomile extract to the diet for the period (1-42) days and differed with (Al-Moramadhi, 2011) and (Dada *et.al*., 2015) where he found no significant differences Between adding (2, 4) g/kg of the diet and not adding it.

Table 3 showed that there are no significant differences in the rate of weight gain for all weeks of rearing, and Significant superiority of the control group over the two addition groups in the second week while the two addition groups (9 and 15) g/kg were superior compared to the control group (without addition) in the sixth week and the total period of rearing (2-6). week and it reached (796.0, 778.49, 660.89) gm, respectively for the sixth week and (3038.18, 2920.74, 2851.99) gm, respectively for the whole period. These results agreed with (AL-Kaisse and Khaled, 2011), where it improved when adding (0.25, 0.5, 0.75)% of chamomile and with (Muhammed, 2013), where it was noticed that the body weight was superior when adding chamomile to the diet by 1% for the (1 -42) days, as well as (Gamal *et. al.*, 2017) noted superiority in adding chamomile extract to the diet for the period (1-42) days and differed with (Al-Moramadhi, 2011) and with (Dada *et. al.*, 2015), where he found no significant differences Between adding (2, 4) g/kg of the diet and not adding it.

It is evident from Table 4 the effect of adding chamomile to the diet on the weekly feed consumption rate and the total period, where a significant differences were observed between the levels of addition, as the feed consumption decreased in the two supplementation groups (9 and 15) g/kg compared to the control group (without addition) in the two weeks, while we note that this effect has faded with the advancing age in weeks (4, 5, 6 and Total feed consumption) as well as in the consumption of feed for the period of total breeding, as there were no significant differences between adding chamomile and not adding it, and the reason may be due to the low acceptance of birds to feed because it contains the angiosperms in the first weeks, then they become accustomed to it in the later and last weeks of the birds' life, so the moral effect disappeared, the results agreed with (AL-Kaisse and Khaled, 2011), there where no significant effect was observed when adding (0.25, 0.5, 0.75)% and with (Gamal *et al*., 2017), where he found no significant differences between adding chamomile extract to the ration and not adding it for the period (1-42) days and bright (Dada, 2015), when adding (2, 4) g/kg diet and between not adding it.

The table 5 showed improved of feed conversion ratio in rearing weeks and in period 2-6 weeks. where it is noted that there are significant differences between the levels of addition. The feed conversion ratio improve significantly in the two addition groups (9 and 15) g compared with the control (without addition), it reached

in the sixth week (1.99 and 1.88) Compared with (2.32), respectively, and it better significantly for the total period of experiment, which amounted to (1.71 and 1.68) compared with (1.84) respectively, This reduces the cost per unit .This is due to the effect of chamomile in improving the metabolic processes inside the body and the activity of the digestive system, which was reflected in the improvement of productive performance. The results agreement with (AL-Kaisse and Khaled, 2011), (Mahammed, 2013), (Al-Moramadhi, 2011) and (Dada *et.al.*, 2015) differed when adding (2, 4) g/kg of the diet and between not adding it and with (Gamal *et al*., 2017), where he found no significant differences between adding chamomile extract to the diet and between not adding it for the period (1-42) days.

Table 6, showed that there are no significant differences in the percentage of mortality for the total period (2-6) weeks between the different levels of addition (0, 9, 15) g/kg diet, while the production index and the production factor have significantly increased their value in the addition group Chamomile by 9 and 15g/kg of diet compared to the control group , it was (364.11,388.49 ,317.34) respectively in the production index and (39.16, 41.38, 28.61) respectively for the production factor, as the addition of 15 g/kg contributed to raising these two economic indications and a reduction in the cost of production of one unit derived from this addition, while we note that the productivity of one kilogram of broiler per square meter of floor space (kg/m^2) did not differ significantly between the different levels of chamomile addition.

Table (2): The effect of adding chamomile to the diet on live body weight (gm)

Weeks / Treatments	Second week	Third week	Fourth week	Fifth week	Six week
T_1:0g⁄kg Chamomile	314.33 a ± 7.70	809.82 a ±31.36	1417.76 a ±33.89	2275.22 a 30.37±	2936.11 b ± 34.98
T_2:9g⁄kg Chamomile	292.93 a ± 8.49	731.27 a ±29.73	1356.11 a ±28.92	2270.67 a ± 24.01	3066.62 a ± 55.08
T_3:15g⁄kg Chamomile	295.00 a ± 5.98	780.74 a ±24.31	1398.88 a ±25.30	2322.80 a ± 25.08	3100.73 a ± 20.27

The values that carry different letters vertically indicate a significant difference at $p \leq 0.05$.

Table (3): The effect of adding chamomile to the diet on weight gain(gm).

Weeks / Treatments	Second Week	Third week	Fourth Week	Fifth week	Sixth week	Total Wight Gain
T_1:0g⁄kg Chamomile	150.38 a ± 5.86	495.49 a ± 32.65	611.93 a ± 28.14	850.82 a ± 50.20	660.89 b ± 29.22	2851.99 b ± 55.16
T_2:9g⁄kg Chamomile	111.30 b ± 7.47	435.43 a ± 29.78	624.93 a ± 18.10	903.40 a ±23.39	796.00 a ± 37.62	3038.18 a ± 64.10
T_2:15g⁄kg Chamomile	114.60 b ± 3.74	485.66 a ± 20.24	618.13 a ± 6.47	923.96 a ± 16.05	778.49 a ± 24.84	2920.74 a ± 29.27

The values that carry different letters vertically indicate the presence of significant differences at $p \leq 0.05$

Table (4): The effect of adding chamomile to the diet on feed consumption (gm).

Weeks / Treatments	Second week	Third week	Fourth week	Fifth week	Sixth week	Total feed consumption
T_1:0g⁄kg Chamomile	719.62 a ± 16.98	1094.17 a ± 35.73	1699.5 a ± 93.42	1540.60 a ±109.29	1540.60 a ± 109.29	5247.3 a ± 67.85
T_2:9g⁄kg Chamomile	565.33 b ± 34.62	968.34 b ± 26.42	1573.9 a ± 77.50	1587.5 a ±107.50	1587.5 a ± 107.50	4823.0 a ± 109.32
T_2:15g⁄kg Chamomile	625.04 b ± 18.22	964.83 b ±23.12	1678.3 a ± 65.23	1489.9 a ± 99.56	1489.90 a 96.33	4880.7 a ± 77.16

The values that carry different letters vertically indicate a significant differences at $p \leq 0.05$.

Table (5): The effect of adding chamomile to the diet on feed conversion.

Weeks / Treatments	Second week	Third week	Fourth week	Fifth week	Sixth week	Total feed conversion
T_1 : 0g⁄kg Chamomile	1.25 a ± 0.01	1.53 a ± 0.06	1.76 a ± 0.04	1.97 a ± 0.07	2.32 a ± 0.19	1.84 a ± 0.07
T_2 : 9g⁄kg Chamomile	1.15 a ± 0.01	1.27 b ± 0.06	1.58 b ± 0.02	1.74 b ± 0.03	1.99 b ± 0.06	1.71 ab ±0.06
T_2 : 15g⁄kg Chamomile	1.15 a ± 0.02	1.32 b ± 0.04	1.59 b ± 0.02	1.73 b ± 0.06	1.88 b ± 0.03	1.68 b ± 0.04

The values that carry different letters vertically indicate a significant differences at $p \leq 0.05$.

Table (6): The effect of adding chamomile to the diet on Mortality, and Economic Indicators.

Weeks / Treatments	Mortality %	Live ability%	Production Index 6th	Production Factor 6 th	Productivity kg⁄m^2 6th
T_1 0 g/kg Chamomile	3.67 a ± 0.33	96.33 a ± 1.33	317.34 b ± 32.74	28.61 b ± 3.26	35.92 a ± 0.87
T_2: 9g⁄kg Chamomile	2.00 a ± 0.15	98.00 a ± 1.15	364.11 a ± 9.33	39.16 a ± 0.73	37.66 a ± 1.02
T_2: 15g⁄kg Chamomile	1.00 a ± 0.05	99.00 a ± 0.58	388.49 a ± 12.33	41.38 a ± 1.58	37.55 a ± 0.53

The values that carry different letters vertically indicate a significant difference at $p \leq 0.05$.

CONCLUSIONS

The addition of chamomile to the broiler diet contributed to the improvement of the feed conversion ,increase in the value of the production index and the production coefficient

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CONFLICT OF INTEREST

The authors declare that no conflict of interest exists .

تأثير اضافة مسحوق البابونج الى العليقة في الاداء الانتاجي لفروج اللحم المربى تحت ظروف الاجهاد الحراري

ثائر عبد الباقي القدو انوار محمد يونس الحامد خالد حساني سلطان

كلية الزراعة والغابات /جامعة الموصل / العراق

الخلاصة

أجريت هذه الدراسة لمعرفة تأثير إضافة مسحوق نبات البابونج إلى علف فروج اللحم المربى تحت ظروف الإجهاد الحراري على الأداء الإنتاجي والمؤشرات الاقتصادية ربيت الافراخ الغير مجنسة من عمر يوم واحد ولغاية نهاية التربية 42 يوم، وزعت الافراخ في بداية الأسبوع الثاني بشكل عشوائي على المعاملات التجريبية. وبثلاث مكررات / معاملة وكالتالي: T1: تغذية الطيور على علف بدون إضافة (Control)، T2: إضافة 9 غم بابونج / كجم علف الى العليقة، T3: إضافة: 15 غم بابونج / كجم علف الى العليقة. تبين من نتائج التحليل الإحصائي: تفوق معدل وزن الجسم الحي والنهائي ومعدل اكتساب الوزن الكلي و تحسن في معامل التحويل الأسبوعي وإجمالي استهلاك الأعلاف لفترة التربية، وتفوق مؤشر الإنتاج ومعامل الإنتاج ، بينما لم نجد أثراً معنوياً على معدل العلف المستهلك ونسبة الهلاكات وعائد الإنتاج لكل متر مربع في إنتاج كيلوغرام الواحد من الوزن الحية. بشكل عام أشارت النتائج إلى أن إضافة البابونج إلى أعلاف فروج اللحم كان له أثر إيجابي في تحسين الاداء الانتاجي ورفع المؤشرات الاقتصادية مع تقليل التكلفة لكل وحدة إنتاجية في ظروف الإجهاد الحراري.

الكلمات المفتاحية : البابونج، الاجهاد الحراري ، الاداء الانتاجي ، فروج لحم.

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