

Evaluation of adding commercial compound Mixoil to drinking water on the productive performance of broilers during summer in Iraq

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Abstract:

This study was conducted in the poultry field of the Department of Animal Production, Faculty of Agriculture, University of Kufa, for the period from September 2, 2021 to October 7, 2021, and for a period of 5 weeks. In this study, 300 unsexed broiler chicks, Ross308 hybrid one day old, were randomly distributed to five treatments, each treatment included 60 chicks, three replicates, and each replicate included 20 chicks. The treatments were as follows: Treatment (T1): (control) was given water without addition, treatment (T2): drinking water was given to it with an addition of 0.25 ml/liter of the commercial compound (Mixoil) for 6 hours, treatment (T3). Provide her with drinking water with 0.5 ml/L of the commercial compound (Mixoil) for 6 hours. Treatment (T4): she was given drinking water with 0.75 ml/L of the commercial compound (Mixoil) for 6 hours, treatment (T5): she was given drinking water to which it was added 1 ml/L of the commercial compound (Mixoil) for 6 hours. Water was added to the commercial Mixoil compound daily from 10 am to 4 pm (6 hours per day), the chicks were fed on two diets, a starter during 21 days of age and a final from 22 days of age until the age of marketing (35 days), some productive traits were studied. for broilers during the duration of the experiment. The results of the statistical analysis indicated that there was a The research did not deal with blood traits, so this sentence should be deleted .The results of the statistical analysis indicated a significant improvement at the level ($p \leq 0.05$) in the average live body weight at the fifth week of chick age and in the total weight gain of the treated birds that added different levels of the commercial compound Mixoil daily to their drinking water compared to the control group. T1), The results also indicated a significant increase ($p \leq 0.05$) in the average total feed consumption for the birds of the fourth and fifth treatments compared with the control group, and a significant deterioration in the values of the total feed conversion ratio for the chicks of the control group (T1) compared with treatments T2 and T3. We conclude from the current study that adding different levels of the commercial compound Mixoil to drinking water for 6 hours a day had a positive effect in improving some productive traits of broiler chicks bred in summer in Iraq.

Keywords: broiler, commercial mixoil, productive traits

Introduction:

The high summer temperatures in Iraq are one of the seasonal problems that affect poultry production, where many breeders stop production, which negatively affects the provision of poultry meat in the summer. The exposure of birds to heat stress, negatively affects the productive performance of broilers (3, 6, 10 and 16). Nutritional management in conditions of heat stress plays a vital role in mitigating the harmful effects of heat stress (1 and 5) through the use of nutrients related to lowering the temperature of the bird. Many researchers specializing in poultry nutrition were able to use many plants or their oils used in feeding or treatment, which were considered growth stimulants, which positively affected their productive performance when added to water or diet (1 and 3), among those materials are vegetable oils such as thyme oil and garlic oil (15). Which contains phenolic compounds that play an important role in strengthening the immune system and preventing the formation of free radicals in the body of birds and it works to reduce oxidative stress due to the occurrence of oxidative stress generated as a result of heat stress in order to reduce the damage of reactive oxygen species and thus improve productive performance (1, 13 and 19). Many companies specializing in the poultry industry have resorted to producing many compounds that contribute to reducing the effects of heat stress among these compounds is the commercial compound Mixoil, which consists of a group of vegetable oils of some medicinal plants, such as thyme oil, oregano and garlic (11 and 14). The current study aims at evaluating the use of Mixoil extract in

improving the productive performance of broiler broilers bred in summer in Iraq.

Materials and methods:

This study was conducted in the field of poultry, belonging to the Department of Animal Production, College of Agriculture, University of Kufa, for a period from 2/9/2021 to 8/10/2021 and for a period of 5 weeks. The effect of adding the commercial compound (Mix oil) to reduce the effect of heat stress for broilers was studied. The experiment included 300 unsexed broiler chicks, a Ross308 hybrid one day old, with an average primary weight of 42 g, prepared from Al-Anwar hatchery in El-Moradia, Babylon province. The chicks were divided into 5 treatments, each treatment included 60 chicks and 3 replicates (each replicates 20 chicks). The treatments were divided as follows: The first treatment: (T1) control without adding oil mix, the second treatment (T2) adding ml/ liter of the compound Commercial mix oil into drinking water from 10 am to 4 pm, The third treatment: (T3) adding 0.50 ml. L⁻¹ of the commercial mix oil to the drinking water from 10 am to 4 pm, the fourth treatment: (T4) adding 0.75 ml/ liter of the commercial mix oil to the drinking water from 10 am to 4 pm, Fifth treatment (T5): Add 1 ml. L⁻¹ of the commercial compound mix oil to the drinking water from 10 am to 4 pm.

Feeding chicks

The chicks were raised in a ground-based breeding hall with a semi-closed system. The chicks were randomly distributed during the first week of sheltering to 5 treatments, with 60 chicks/treatment, and each treatment included 3 replicates (20 chicks/replicate). The chicks were fed on

two diets, a starter for a period of 1-21 days of age and a Finisher diet of 22-35 days of age. The diets were prepared in the

Al Ghadeer Babylon Feed Factory in Babylon province according to the following (Table 1):

Table.1. shows the components and chemical compositions of the diets used in the experiment

Ingredients	Starter diet (1-21 days% (Finisher diet (22-35 days) %
yellow corn	48.2	58.7
local wheat	8	7.5
Soybean meal (44% protein)	28.5	20.5
protein concentrate	10	10
vegetable oil (sunflower)	4	2.5
Limestone	1	0.5
table salt	0.3	0.3
total summation	100%	100%
Computed chemical analysis		
Metabolisable energy (kilocalories/kg)	3079.85	3102.6
Crude protein (%)	21.56	18.87
Lysine (%)	1.04	0.85
Methionine + Cysteine (%)	0.455	0.42
Crude fiber (%)	3.54	3.2
Calcium (%)	1.28	1.07
Available phosphorous (%)	0.42	0.41

*Belgian-origin protein concentrate, one kilogram of which contains 2,200 kilocalories of energy, 40% crude protein, 8% fat, 3.5% fiber, 25% ash, 8% calcium, 1% ready-made phosphorous, 1.2% lysine, 1.2% methionine, 1.4% methionine also contains vitamins and minerals to meet the needs of birds.

The chicks were provided with all the requirements of breeding that provide a suitable environment for the chicks, including the floor of the hall, lighting, ventilation, manholes, and troughs. The birds of the experiment received the necessary health care and vaccinations

from the first day of shelter until the end of the experiment, and the water and feed were Ad-libitum for the duration of the experiment.

Studied traits:

Some productive traits were studied, which included: average weekly live body weight, average weekly and total weight gain, weekly and cumulative feed consumption rate, and weekly and total feed conversion ratio.

Statistical analysis:

Data were analyzed for the studied traits using Completely Randomized Design (CRD) to know the effect of different treatments and significant differences between treatments were tested using Duncan's (1955) polynomial test at the significance level 0.05 and using the SAS (2012) statistical program in the statistical analysis.

Results and discussion:

Average live body weight and weight gain

It can be seen from Table 2. The effect of adding the commercial compound Mixoil on the average live body weight of broilers bred in summer in Iraq at different ages. The results of the statistical analysis

indicated that there were no significant differences in the average live body weight in the first and third week of chick age, but in the second week, a significantly excelled ($p \leq 0.05$) was observed for the birds of treatment T5 on treatment T1. While no significant differences were observed between treatments T1, T2, T3, and T4. In the fourth week, it was noticed that the birds of treatment T2, T3, and T5 significantly excelled on treatment T1. In the fifth week of age of the chicks, all treatments that were added to the drinking water of the commercial compound Mixoil excelled on treatment T1. As for the average of weekly and total weight gain, the results of the analysis indicated that there were no significant differences in the average of weekly weight gain in all experiments for the five weeks respectively. Where, the results indicated a significantly excelled ($p \leq 0.05$) in the rate of total weight gain of the treated birds that were added to their drinking water with the commercial compound Mixoil compared to the T1 control group.

Table 2: The effect of adding different levels of the commercial compound Mixoil to the drinking water to reduce heat stress for broiler chicks on the average live body weight / g (mean \pm standard error)

Treatments	First week	Second week	Third week	Fourth week	Fifth week
T1	181.50 2.528 \pm	490.92 ^b 3.979 \pm	910.58 13.238 \pm	1436.50 ^b 20.802 \pm	1915.58 ^b 9.984 \pm
T2	181.83 3.320 \pm	511.75 ^{ab} 7.798 \pm	948.17 17.654 \pm	1547.58 ^a 17.937 \pm	2059.92 ^a 21.835 \pm
T3	181.50 0.520 \pm	521.50 ^{ab} 9.411 \pm	951.75 9.375 \pm	1552.17 ^a 20.092 \pm	2063.50 ^a 15.829 \pm
T4	181.05 1.486 \pm	516.92 ^{ab} 11.871 \pm	933.42 17.761 \pm	1506.33 ^{ab} 28.969 \pm	2023.08 ^a 36.715 \pm
T5	184.25 0.763 \pm	525.83 ^a 14.231 \pm	952.08 16.634 \pm	1541.42 ^a 31.708 \pm	2051.67 ^a 27.051 \pm
significant level	N.S	*	N.S	*	*

Table3. The effect of adding different levels of the commercial compound Mixoil to reduce heat stress on the weekly weight gain (g/bird) at different ages of broiler chicks (mean \pm standard error)

Treatments	Age/week					
	First week	second week	Third week	forth week	fifth week	total weight gain
T1	139.50 2.384 \pm	309.42 10.667 \pm	419.67 10.667 \pm	525.92 32.282 \pm	479.08 12.275 \pm	1873.5 ^b 10.207 \pm
T2	140.25 3.250 \pm	436.92 8.734 \pm	436.42 11.370 \pm	599.42 12.520 \pm	512.33 14.157 \pm	2018.3 ^a 21.846 \pm
T3	140.58 0.463 \pm	339.00 9.090 \pm	430.25 5.651 \pm	600.42 13.205 \pm	511.33 27.426 \pm	2021.5 ^a 15.547 \pm
T4	138.96 1.785 \pm	335.87 13.257 \pm	416.50 6.485 \pm	572.92 46.716 \pm	516.75 10.401 \pm	1981.0 ^a 37.015 \pm
T5	142.41 0.506 \pm	341.58 13.552 \pm	426.25 5.875 \pm	589.33 24.339 \pm	510.25 7.125 \pm	2009.8 ^a 20.743 \pm
significant level	N.S	N.S	N.S	N.S	N.S	*

Many researchers have indicated that the addition of thyme oil has a positive effect on increasing the average live body weight. Some studies have shown that the antioxidant effect of this plant or some of its components is the main reason for improving the productive performance of birds. Thus, it is a catalyst in the elimination of pathological factors, which leads to the emergence of an improvement and rapid growth, and thus a high production efficiency for broiler broilers, as well as the fact that the mixture of oils contains flavonoids that improve the condition of the bird, as reported by several studies conducted on broilers exposed to stress when adding Flavonoids, It showed an improvement in productivity and performance (12) because heat stress leads to a negative impact on the bird's vitality and performance, which works to weaken the bird's immunity, which results in economic losses. One of the biggest

losses caused by heat stress is the decrease in feed intake (13). The birds excelled that were added to the drinking water provided to them may be due to the effective role of the mixture of vegetable oils included in the composition of the Mix oil, which contains a percentage of thyme oil, garlic oil, and oregano oil. Which many previous studies indicated the effective role of vegetable oils as antioxidants, which is positively reflected in reducing the effects of heat stress because they contain some effective compounds such as thymol and carvacrol, which have a role as antioxidants and improve the immune system (7).

Average weekly and total feed consumption

It can be seen in Table 4. Significantly excelled ($p \leq 0.05$) in the average of feed consumed during the first week of the chicks' age, all treatments excelled that

was added to the drinking water of the commercial compound Mix oil, while it was noticed that there were no significant differences in the rate of feed consumed during the second, third and fifth weeks of chicks age. As for the fourth week, treatment T5 significantly excelled on treatment T1, while treatments T2, T3, T4,

and T5 did not differ between them. As for the total feed consumed average, it was noticed that ($p \leq 0.05$) treatment T4, T5 excelled on treatment T1, T2 in the rate of feed consumed, and treatments T1, T2, T3 did not differ between them. These results are consistent with what was indicated by (Al-Mashhadani and Al-Bayati(4).

Table4. Effect of adding different levels of oil-Plants, not weeds extract Mixoil to reduce heat stress on the average of feed consumed g/brid at different ages of broiler chicks (mean \pm standard error)

Treatments	Age/week					
	First week	second week	Third week	forth week	fifth week	total feed consumption
T1	162.03 ^b	405.43	576.08	835.42 ^b	982.17	2964.18 ^b
	1.763 \pm	8.174 \pm	3.863 \pm	11.953 \pm	35.849 \pm	38.271 \pm
T2	168.33 ^a	395.50	589.83	889.75 ^{ab}	1016.67	3060.08 ^b
	1.210 \pm	8.574 \pm	14.714 \pm	19.198 \pm	10.994 \pm	47.654 \pm
T3	169.50 ^a	401.092	607.67	873.42 ^{ab}	984.33	3036.87 ^{ab}
	0.577 \pm	11.776 \pm	4.903 \pm	10.088 \pm	40.361 \pm	51.257 \pm
T4	169.25 ^a	411.83	598.67	896.00 ^{ab}	1024.00	3099.75 ^a
	0.433 \pm	9.956 \pm	15.532 \pm	14.166 \pm	5.346 \pm	10.125 \pm
T5	170.91 ^a	422.75	608.75	902.83 ^a	1003.33	3108.58 ^a
	0.463 \pm	8.086 \pm	9.132 \pm	29.620 \pm	9.269 \pm	36.837 \pm
significant level	*	N.S	N.S	*	N.S	*

These results may be due to the fact that medicinal and aromatic plants and their oils contain compounds that play an antimicrobial role that may lead to raising the immunity of the immune system, which will positively affect the health of the bird and obtain better productive performance for broilers (9).or, it may be due to the medicinal plants and their oils containing phenolic compounds, which are one of the effective compounds that have a vital and important role in improving the health of birds exposed to heat stress, as well as reducing the risk of disease. These compounds are also highly effective antioxidants, which leads to the disposal of

free radicals. Dalla and Shaibon(7)It is also due to the mixoil containing the active substances thymol and carvacrol, which stimulate appetite and digestion in the bird, thus improving feed intake (2).

Feed conversion ratio

The results are shown in Table 5.Third treatment T3 improves compared to the control treatment T1, while the treatments T1, T2, T4 and T5 did not differ between them. Whereas, no significant differences were observed in the values of the feed conversion ratio during the 3, 4, and 5 weeks of the age of the chicks among all the experimental treatments. As for the

total feed conversion ratio, third treatment improves compared to the control treatment, while the treatments T1, T2, T4 and T5 did not differ between them. The improvement in the values of the feed

conversion ratio of T3-treatment birds may be due to the increase in the average live body weight of T3-treatment birds compared to treatment T1.

Table 5. Effect of adding different levels of oil Plants extract Mixoil to reduce heat stress on the feed conversionratio g feed/g weight gain at different ages of broiler chicks (mean \pm standard error)

Treatments	Age/week					total feed conversion ratio
	First week	second week	Third week	forth week	fifth week	
T1	1.162 ^b	1.308 ^a	1.381	1.598	1.966	1.581 ^a
	0.019 \pm	0.029 \pm	0.028 \pm	0.075 \pm	0.076 \pm	0.018 \pm
T2	1.201 ^{ab}	1.199 ^{ab}	1.352	1.486	1.987	1.516 ^{ab}
	0.020 \pm	0.006 \pm	0.032 \pm	0.049 \pm	0.054 \pm	0.007 \pm
T3	1.206 ^{ab}	1.188 ^b	1.412	1.456	1.982	1.502 ^b
	0.005 \pm	0.054 \pm	0.015 \pm	0.037 \pm	0.026 \pm	0.018 \pm
T4	1.218 ^a	1.227 ^{ab}	1.437	1.581	1.982	1.566 ^{ab}
	0.012 \pm	0.019 \pm	0.027 \pm	0.107 \pm	0.030 \pm	0.033 \pm
T5	1.200 ^{ab}	1.240 ^{ab}	1.428	1.533	1.966	1.546 ^{ab}
	0.006 \pm	0.043 \pm	0.021 \pm	0.026 \pm	0.019 \pm	0.004 \pm
significant level	*	*	N.S	N.S	N.S	*

The results that were reached are in agreement with the findings by Al-Mashhadani and Al-Bayati(7), which obtained a significant improvement in the total feed conversion ratio of broilers when using essential oils. The reason is incorrect because flavonoids are present in all the treatments and in a more or less way than in T3. Which contributed to improving the internal digestive environment of the bird by improving the metabolic rate as a result of reducing the spread of free radicals that inhibit metabolism (13).

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