Effect of using different concentrations of (BEDGEN 40.) at different periods in drinking water for broilers and their effect on some physiological characteristics

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Abstract:

This experiment was conducted in the poultry field of the College of Agriculture / Kirkuk University, To study the effect of using two different concentrations of Bedgen 40 at different periods in the drinking water of broilers and their effects on some physiological traits. For the period from 9/30/2021 to 11/11/2021, 280 chicks of the of Ross 308 unsexed were used at one day old, and the average weight was (42 g per chick). The chicks were randomly distributed to seven treatments, with 4 repetitions, and each replicate was 10 birds. Bedgen 40 was added to the drinking water at three different periods, and the experiment parameters were as follows: T1 as the control treatment without any addition, while Bedgen 40 was added in the T2 and T3 treated drinking water at levels of 35 and 45 cc / liter at the age of 6-10 days, The addition of Bedgen 40 in the treated drinking water T4 and T5 at levels of 35 and 45 cc/ liter at the age of 21-25 days, the addition of Bedgen 40 in the treated drinking water T6 and T7 at levels of 35 and 45 cc/ liter at the age of 31-35 days. The addition of Bedgen 40 led to an improvement in the status of antioxidants, as an increase in the level of GSH and a decrease in the MDA metrics for birds treated with Bedgen 40 compared to the control treatment. The addition of Bedgen 40 led to a significant ($P<0.05$) decrease in Triglycerides (TG) and LDL, and a significant ($P<0.05$) increase in HDL concentration for T2,T3,T4,T5 treatments.

Keywords: Bedgen 40, physiological characteristics, broilers

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Introduction :

The use of antibiotics has not been without side effects on animal and human health after consumption of animal products (Dibner and Richards, 2005). Therefore, alternatives such as herbal extracts and medicinal plants have been used in poultry feeding, considering them to be safe and natural (Soltan and Shewita et al., 2008). One of these medicinal plants is the artichoke(Cynara scolymus) , which belongs to the stellate or compound-leaved family (Ben Salem et al., 2015). Where cynara is used in the pharmaceutical industry for its medical importance in treating many diseases because the flower heads and leaves contain the most important active compounds, as contains active phenolic substances, including flavonoids (Tajodini et al. 2015), The cynara contains caffeic acid, chorogenic acid, and cynarin (Kraft, 1997), apigenin, luteolin and inulin (Costabile et al., 2010). It is also a good source of vitamin C (Jimenez et al., 2003) and several minerals such as Ca, K, Na, p, Fe, Mn and Zn (Biel et al., 2020). It is one of the antioxidants that remove free radicals (Schutz et al., 2004). It is used to treat hepatotoxicity in broiler chickens, as a growth promoter and as an antibiotic (Deniz and Turkman, 2007),It also acts as an antibiotic (Costabile et al., 2010). And it has an important

role in lowering cholesterol within the normal level in the blood (Stoev et al., 2002).

Choline is a class of B-complex vitamins (Zesiel and Shear, 1989). Choline has become an essential additive in poultry feed (Calderano et al., 2015). Choline is added to poultry feed in the form of choline chloride (Arvind and Shashi, 2015; Calderano et al., 2015). Choline is essential in most biological processes within the body, involving cell construction and maintenance of its phospholipid structure (Hollenbeck, 2010: Hamid et al., 2014: Kumar and Sharma, 2016), choline confers a methyl group (Kidd et al., 1997; Belay et al., 2006; Jalal and Alnemei, 2017) Choline is also used in the formation of (acetylcholine), which is responsible for the transmission of nerve impulses (Delger et al., 2007). Choline plays an important role in lipid metabolism in the liver and thus prevents the occurrence of fatty liver phenomenon (Hamed et al., 2014; Kumar and Sharma, 2016).Therefore, the current study was conducted to evaluate the use of a commercial product under the name (Bedgen 40), which consists of Cynara scolymus and choline chloride, and to know the effect of using (BEDGEN 40) at two different concentrations and for several different periods when added to the drinking water of broilers and its effect on some Physiological characteristics of broilers.

Materials and methods :

This experiment was conducted to study the use of Bedgen 40 in different periods and its effect on the physiological performance of broilers, 280 broiler chicks from ROSS 308 unsexed one-day-old chicks were used, with an average initial weight (42) g These chicks were raised in a closed hall using 28 folds with dimensions of 90 x 190 cm2 on a cardboard mattress, the chicks were randomly distributed in replicates .Chicks were fed during 1-21 days on a starter diet containing 22.98% protein and 3141.6 kcal/kg energy as a representative. On the growth diet for 22-42 days, it contains 19.94% protein and 3164.9 kcal/kg energy. able No. (1) shows the components of the relationship used in the study. The lighting program (23 hours of light and 1 hour of darkness) was used in the first week and from the second week to the end of the experiment the lighting program became (20 hours of light with 4 hours of darkness) and the humidity was within the required limits.

Bedgen 40 was obtained from Kosar Company in Erbil.

The treatments were as follows: 4 replicates per treatment at 10 birds/replicate

The first treatment T1: the control is free of addition

Treatment T2: Add 35 cc/liter of Bedgen 40 in drinking water for a period of 6-10 days of age

Treatment T3: Add 45 cc/liter of Bedgen 40 in drinking water for a period of 6-10 days of age

Treatment T4: Add 35 cc/liter of Bedgen 40 in drinking water for a period of 21-25 days of age

Treatment T5: Add 45 cc/liter of Bedgen 40 in drinking water for a period of 21-25 days of age

Treatment T6: Add 35 cc/liter of Bedgen 40 in drinking water for a period of 31-35 days of age

Treatment T7: Add 45 cc/liter of Bedgen 40 in drinking water for a period of 31-35 days of age

Table (1) The percentages of forage materials included in the formation of the diets used in the experiment.

Feed material %	Starter bush 1 - 21 days	Growth diet 22-42 days
wheat	8.3	7.8
yellow corn	48	58.3
Soybean (49% crude protein)	28.4	20.3

oil	4	2.7
Table salt	0.3	0.3
Limestone	1	0.6
Dicalcium phosphate	2.66	2.41
A mixture of vitamins and minerals	0.10	0.10

Protein concentrate: Each kilogram contains 2107 kilocalories of energy, 40% of crude protein, 8% of calcium, 8% of fiber, 3% of phosphorous, 2% of methionine, 3% of lysine, 2.5% of cysteine.

Result and Discussion

Table (2) indicated that there were no significant differences ($p<0.05$) in the concentration of glucose and total protein. It was found that there was a significant decrease ($p<0.05$) in the concentrations of triglycerides for treatments T2, T3, T4, and T5 compared to the control treatment, as well as a significant decrease in the LDL concentration for the treatments T2, T3, T4, and T5, and there were no significant differences between the treatments T6 and T7 compared to the control treatment. Significant increase ($p<0.05$) in HDL concentration in favor of treatments T2, T3, T4 and T5, and no significant differences were observed between treatments T6 and T7 compared to the control treatment.

Table (2) shows the effect of adding two different levels of Bedgen 40 in different periods on some blood biochemical characteristics in broilers (mean ± standard error)

Transactions	Glucose (mg/dl)	High-density lipoprotein(HDL) (mg/dl)	Low-density lipoprotein(LDL) (mg/dl)	Triglycerides (mg/dl)	Cholesterol (md/dl)	Total protein (g/dl)
T1	2.04 ± 222.01	0.53 ±50.40 a	1.81± 65.60 b	1.01 ± 58.00 a	1.63 ± 127.60	0.13± 4.24
T2	1.47 ± 217.70	0.39 41.35± b	0.40 78.17 ± a	1.37 ±41.75 b	0.29± 128.87	0.06 ± 4.41
T3	1.21 ± 220.87	1.91 ±41.74 b	1.67 76.95 ± a	1.77 ± 44.05 b	0.64 ± 127.50	0.11 ±4.37
T4	2.51 ± 219.17	1.21 ±43.34 b	1.08± 75.32 a	1.39 ± 42.50 b	0.49 ± 127.17	0.08 ±4.34
T5	2.80 ± 218.95	1.37 ±42.34 b	0.58 77.86 ± a	1.72 ± 44.52 b	1.45±129.10	0.10 ±4.46

T6	1.50 ± 221.92	1.71 ±48.48 a	1.85 67.66 ± b	1.8 ±54.30 a	127.00 ± 1.61	0.06 ±4.24
T7	1.09 ± 220.65	2.27 ±49.02 a	1.46 ± 67.25 b	1.13 ±52.60 a	1.94 ± 126.79	0.09 ±4.30

- The different letters within the same column indicate the presence of significant differences at the level of probability (P<0.05).
- T1: control treatment, T3, T2: add 35 and 45 cc/100 liters, respectively, of Bedgen40 in drinking water for (6-10 days), T5, T4: add 35 and 45 cc/100 liters, respectively, of Bedgen40 in drinking water for (21 days) -25 days), T7, T6, adding 35 and 45 cc/100 liters, respectively, of Bedgen40 in the drinking water for a period of (31-35 days).

The reason for the decrease in triglycerides and low-density lipoproteins (LDL) and a rise in the concentration of high-density lipoproteins (HDL) may be due to the properties of the cynara, as it contains (inulin). Inulin acts as a prebiotic and increases the number of beneficial bacteria in the intestines, and these bacteria secrete an enzyme that breaks down bile salt that breaks down bile salts, thus reducing the amount of bile salts , thus reducing the amount of bile salts, which stimulates the body to produce bile salts from cholesterol in the liver and helps produce cholic acid in the liver, thus lowering the LDL level. (Davidson and Maki, 1999)

Choline chloride has an important role in lipid metabolism by entering the lecithin production process, and this process reduces the level of triglycerides in the blood (Corbinand and Zeisel, 2013).

To show the effect of adding Bedgen 40, we notice from Table (3) a significant decrease at the level (P<0.05) in Malondialdehyde (MDA) for treatments T5, T4, T3, T2 compared to the control treatment, and we note a significant superiority In Glutathione (GSH) at the level (P<0.05) for treatments T5, T4.T3.T2 on the control treatment, the two treatments T7 and T6 did not differ from the control treatment.

Table (3) Effect of adding two different levels of Bedgen 40 at different periods on the concentration of mol/ml glutathione in blood in broilers (mean ± standard error)

Transactions	GSH	MAD
T1	0.36 ± 0.03 c	1.33 0.03± a
T2	0.45± 0.03 ab	1.13± 0.03 c
T3	0.46± 0.02 a	1.15± 0.02 bc
T4	0.46 ± 0.01 a	1.14 ± 0.01 c
T5	0.47± 0.03 a	1.11 ± 0.03 c
T6	0.40 ± 0.04 bc	1.24± 0.04 ab
T7	0.41± 0.02 bc	1.24 ±0.02 ab

- The different letters within the same column indicate the presence of significant differences at the level of probability (P<0.05).
- T1: control treatment, T3, T2: add 35 and 45 cc/100 liters, respectively, of Bedgen40 in drinking water for (6-10 days), T5, T4: add 35 and 45 cc/100 liters, respectively, of Bedgen40 in drinking water for (21 days) -25 days), T7, T6, adding 35 and 45 cc/100 liters, respectively, of Bedgen40 in the drinking water for a period of (31-35 days).

To show the effect of Bedgen 40 on antioxidants, glutathione was measured,The oxidation index was measured, and lipid peroxidation was measured MAD. The reason may be attributed to the decrease in MDA due to the cynara extract containing tannins and taenic acid (Lattanzio et al., 2005). It works to remove free radicals. It also contains the active compounds cynarin, which has natural activity against the production of free radicals (Lattanzio et al., 2009). It also contains flavonoids, the most important of which is apigenin (Schutz et al., 2004).This compound has many functions, including its work on stimulating the production of beneficial bacteria as a result of fermentation processes. It removes free radicals, as well as a catalyst for catalase and glutathione enzymes (Wang et al., 2014). The ability of Bedgen 40 to raise glutathione may be due to the artichoke extract containing vitamins C and E and flavonoids (Jimenez et al., 2003). The cynara also contains apigenin (Farag, 2013). The apigenin works to remove free radicals resulting from toxins and also has anti-oxidant properties as it stimulates the production of antioxidant enzymes and its ability to bind with liver toxins and remove them outside the body (Wang et al., 2014), Choline has an active role as an antioxidant, and it increases antioxidant enzymes It protects the body from oxidants and reduces oxidative stress (Aziz et al., 2019).

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