



## Effect of using two concentrations of BEDGEN 40 in drinking water at different periods on some productive characteristics in broilers

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- Part of MS.c. Dissertation for the first author.
- Date of research received 09/04/2023 and accepted 07/05/2023

### Abstract

The experiment was conducted in the poultry field of the Department of Animal Production - College of Agriculture / University of Kirkuk, for a period of 42 days. To study the effect of using two different concentrations of Bedgen 40 at two periods for broilers and their effect on some productive traits. In this study used 280 unsexed one-day-old chicks (Ross 308) were used with an average initial weight of 42 g. The chicks were randomly distributed to 7 treatments with 4 replicates for each treatment, and each replicate contains 10 birds. 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 results showed that there was a significant difference ( $P < 0.05$ ) between the treatments adding Bedgen 40 over the control treatment in the final live body weight. The results showed an increase in live body weight and an increase in weight for two treatments T3, T2 in the third week, and significant superiority for each of the treatments T5, T4, T3, T2 in the fifth week And the superiority of all the addition treatments in the base week, and we note the superiority of two treatments T3, T4 in the rate of feed consumption in the third week, The results also showed a significant improvement ( $p < 0.05$ ) in the feed conversion ratio at the fifth and sixth weeks, As well as for the final or total conversion factor for coefficients T5, T4, T3, T2 compared to the control treatment.

**Key words:** Bedgen 40, productive characteristics, broilers.

**Citation:** Rafiq, N., Ezaddin, I., & BahaAldeen, M. (2023). Effect of using two concentrations of BEDGEN 40 in drinking water at different periods on some productive characteristics in broilers. *Kirkuk University Journal For Agricultural Sciences*, 14 (2), 197-205. doi: 10.58928/ku23.14218.

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## **Introduction**

Despite the positive role of antibiotics in the development of the poultry industry, it was collateral damage to animal and human health after consuming its products [1]. Therefore, the use of herbal extracts and natural plants in poultry feeding was considered safe and natural [2]. Medicinal plants have an important role in stimulating digestion and absorption, promoting the production of bile acids in the liver, and increasing the activity of digestive enzymes [3] and act as antioxidants [4]. Among these medicinal plants is the artichoke, which belongs to the astral family or leaf compound [5]. Artichokes are used in the pharmaceutical industry to treat many diseases because the flower heads and leaves contain the most important active compounds. ), caffeic acid, chlorogenic acid, and cynarin [6], apigenin, luteolin, and inulin [7], and artichokes are also a good source of vitamin C [8] and many elements and minerals such as Ca, K, Na, p, Fe, Mn, Zn [9] It is considered an antioxidant and works to scavenge free radicals [10]. It is used to treat liver toxicity in broiler chickens, as a growth stimulator, and as an antibiotic [11]. Artichoke works as a prebiotic [7]. Choline is one of the substances Classified within the group of vitamin B complex [12] and choline has become an essential substance added to poultry feed [13] and choline is added to poultry diets in the form of choline chloride [14]; [13] and choline is necessary in most of the vital processes within the body as it includes building the cell and maintaining the structure of the cell [15]; [16]; [17], choline has a role in granting the methyl group [18]. Choline is also used In the formation of acetylcholine, choline is responsible for the transmission of nerve impulses and phosphatidylcholine, which is responsible for the integrity of the cell and the preservation of its membranes [19], and choline has an important role in the metabolism of fats in the liver and thus prevents the occurrence of fatty liver [16]; [17] studies have shown that choline increases growth rates [19], and reduces cases of deformity and leg curvature [20].

Most of the previous studies included the effect of using plant extracts or organic

compounds on the performance of broiler chickens, and due to the lack of research and studies on the use of their mixture or their mixture for broiler chickens, so the current study was conducted to evaluate the use of a commercial product under the name Bedgen 40, which consists of L. Cynara scolymu and choline chloride in two different concentrations and for several periods. Different when added to drinking water for broiler chickens and their effect on some productive traits.

## **Materials and methods**

### **Location and management of the experiment:**

The experiment was conducted in the poultry field of the Department of Animal Production - College of Agriculture / University of Kirkuk, for a period from 9/30/2021 to 11/11/2021 and for a period of 42 days. To study the effect of using two different concentrations of Bedgen 40 on different periods for broiler chickens and their effect on some productive traits. In this study, 280 broiler chicks (Ross 308) were used in one day of age, unsexed, with an average starting weight of 42 gm/chicken.

The Bedgen 40 product was obtained from Kosar Company in Erbil Governorate, the product is manufactured by Bedson Company. The product consists of choline chloride and artichoke plant extract.

### **The transactions were as follows:**

First treatment T1: control (water without additives)

The second treatment, T2: add 35 cc / 100 liters of Bedgen 40 to the drinking water for a period of 6-10 days of age.

The third treatment T3: add 45 cc / 100 liters of Bedgen 40 in drinking water for a period of 6-10 days of age.

Fourth treatment T4: add 35 cc / 100 liters of Bedgen 40 in drinking water for a period of 21-25 days of age.

Fifth treatment T5: add 45 cc / 100 liters of Bedgen 40 in drinking water for a period of 21-25 days of age.

Sixth treatment T6: add 35 cc / 100 liters of Bedgen 40 in drinking water for a period of 31-35 days of age.

The seventh treatment, T7: add 45 cc / 100 liters of Bedgen 40 in drinking water for a period of 31-35 days of age.

Table 1: It shows the proportions of the fodder materials included in the composition of the diets used in the experiment.

Diet material	starter diet 1-21 days	growth diet 22-42 days
wheat	8.3	7.8
yellow corn	48	58.3
protein concentrate	10	10
Soybean meal 48%	28.4	20.3
Vegetable oil	4	2.7
limestone	1	0.6
the salt	0.3	0.3
the total	100	100
Calculated chemical composition		
Energy represented by kilocalories/kg	3074	3105
Crude protein%	22.9	19.9
lysine±%	1.21	1.02
methionine ± cysteine%	0.8	0.7
Calcium%	1.18	0.95
phosphorus %	0.4	0.4

To calculate the values of the chemical composition of the feed materials included in the composition of the diet, was relied upon NRC (1994).

### The studied characteristics:

The characteristics of the live body weight of the birds (gm), the weekly weight gain rate (gm), the weekly feed consumption rate (gm), the feed conversion ratio according to the equation referred to by [21].

### Results and discussion

The results of the statistical analysis are shown in Table (2), which indicates that there are significant differences ( $P<0.05$ ) in the average weekly live body weight (g / bird). It shows that there are no significant differences in the first and second weeks. As for the third week, a significant superiority appeared ( $P<0.05$ ) in favor of two treatments, T2 and T3, compared with the other treatments. As for the fourth and fifth weeks, we notice the superiority of each of the treatments T2, T3, T4, and T5 on other treatments. In the sixth week, we notice that all the addition treatments are superior to the control treatment.

As for the rate of weight gain, Table (3) indicated that there were no significant differences at the level ( $P<0.05$ ) in the first, second, and third weeks, and there was a significant superiority ( $P<0.05$ ) in the two treatments, T2 and T3, compared with the other treatments, as well as in the fourth week. We notice the superiority of each of the T2, T3, T4,

and T5 treatments over the other treatments. As for the fifth week, we notice a significant superiority in each of the T2, T4, and T5 treatments over the rest of the treatments. In the sixth week, we notice that the T5 treatment has outperformed the T1, T6, T7, However, it did not differ with the treatments T2, T3 and T4. As for the total or cumulative weight gain, we note that all treatments of Bedgen 40 addition are superior to the control treatment.

Table (4) shows the effect of using two different concentrations of Bedgen 40 at different times in the drinking water on the rate of feed consumption for broiler chickens, and there were significant differences at the level ( $P<0.05$ ) in the rate of feed consumption (g/bird). And there were no significant differences in the first week in the rate of feed consumption. In the second week, we notice a significant superiority of the T2 and T3 treatments over the rest of the treatments in the consumption of feed. In the third week, the two treatments T2 and T3 were significantly superior ( $P<0.05$ ) in the rate of feed consumption compared to With the rest of the treatments. As for the fourth week, there were no significant differences. As for the fifth week, there was an arithmetic but not significant increase for the two treatments T6

and T7 in feed consumption compared with the two treatments T1, T4, and it was significantly superior to the treatments T2, T3, and T5. We did not notice significant differences between the treatments. In the rate of feed consumption

at the sixth week, as well as the total or cumulative feed consumption, we notice that there are no significant differences between the addition treatments and the control treatment.

Table 2: Effect of adding two different levels of Bedgen 40 at different times on the live body weight (g) of broiler chickens

Treatment	Age/week					
	first	Second	third	fourth	fifth	sixth
T1	144.20±0.83	439.65±1.73	924.62±1.99 b	1513.17±2.90 c	2162.50±10.10 b	2836.18±13.10 d
T2	144.30±0.72	445.25±2.28	954.82±3.37 a	1566.65±1.72 a	2241.50±7.23 a	2960.85±5.01 ab
T3	144.05±1.25	445.25±2.78	947.30±4.45 a	1565.10±2.25 a	2230.80±7.17 a	2946.98±7.32 b
T4	143.95±1.05	438.90±2.27	924.22±3.63 b	1533.55±5.32 b	2230.00±3.85 a	2952.05±7.34 ab
T5	144.45±1.17	439.30±1.69	922.00±3.85 b	1537.00±2.72 b	2239.95±4.23 a	2973.00±4.07 a
T6	144.55±0.51	437.25±1.65	923.97±3.46 b	1514.75±4.76 c	2176.25±5.55 b	2868.00±8.20 c
T7	145.20±1.47	440.01±2.87	926.02±3.14 b	1513.47±5.21 c	2180.75±8.83 b	2882.10±6.01 c

\*The different letters within the same column indicates that there is a significant difference between the treatments at the level of significance  $p>0.05$ , values were Mean±standard error.

\*\*T1: Control treatment, T2, T3: Addition of 35 and 45 cc/100 liters respectively of Bedgen40 in drinking water for 6-10 days, T5, T4: Addition of 35 and 45 cc/100 liters respectively of Bedgen40 in drinking water for 21-25 days, T6, T7 Add 35 and 45 cc/100 liters respectively of Bedgen40 to the drinking water for 31-35 days.

Table 3: Effect of adding two different levels of Bedgen 40 at different times on the rate of weight gain (g/bird) for broilers.

Treatment	Age/week						Cumulative weight gain
	first	Second	third	fourth	fifth	sixth	
T1	102.20±0.83	295.45±1.07	484.97±2.97 b	588.55±2.48 b	649.32±10.50 c	673.6±4.48 c	2794.18±13.10 d
T2	102.30±0.72	300.95±2.07	509.57±4.49 a	611.82±3.98 a	674.85±8.26 b	719.35±17.73 ab	2918.85±5.01 ab
T3	102.05±1.25	301.20±2.01	502.05±3.76 a	617.80±6.07 a	665.70±8.06 bc	716.18±10.99 ab	2904.98±7.32 b
T4	101.95±1.05	294.95±2.63	485.32±5.03 b	609.32±7.76 a	696.45±3.58 a	722.05±6.77 ab	2910.05±7.34 ab
T5	102.45±1.17	294.85±2.30	482.70±3.58 b	615.00±3.51 a	702.95±3.90 a	733.05±5.88 a	2931.00±4.07 a
T6	102.5±0.51	292.70±1.26	486.72±3.46 b	590.77±3.93 b	661.50±3.39 bc	691.75±9.21 bc	2826.00±8.20 c
T7	103.20±1.47	294.81±1.45	486.00±1.42 b	587.45±3.52 b	667.27±5.27 bc	701.3±5.74 bc	2840.10±6.01 c

\*The different letters within the same column indicates that there is a significant difference between the treatments at the level of significance  $p>0.05$ , values were Mean±standard error.

\*\*T1: Control treatment, T2, T3: Addition of 35 and 45 cc/100 liters respectively of Bedgen40 in drinking water for 6-10 days, T5, T4: Addition of 35 and 45 cc/100 liters respectively of Bedgen40 in drinking water for 21-25 days, T6, T7 Add 35 and 45 cc/100 liters respectively of Bedgen40 to the drinking water for 31-35 days.

Table 4: Effect of adding two different levels of Bedgen 40 in different periods on the rate of feed consumption (gm) for broiler chickens.

Treatment	Age/week						Cumulative weight gain
	first	Second	third	fourth	fifth	sixth	
T1	125.87±2.18	374.00±2.11b	646.50±3.87b	949.77±5.17	1303.95 ±5.79abc	1499.00±10.00	4899.10±13.21
T2	125.62±2.24	384.62±3.27a	665.52±5.00a	965.12±4.45	1287.17±10.27c	1497.75±10.41	4925.83±6.60
T3	127.12±3.46	382.12±2.31a	665.50±4.17a	964.12±3.22	1286.40±4.00c	1494.93±9.69	4921.20±8.64
T4	125.12±1.91	374.00±4.12b	651.80±6.86b	960.30±5.02	1297.17±7.91abc	1522.18±15.58	4930.58±20.12
T5	124.37±1.24	375.12±2.86b	647.37±3.30b	960.85±5.02	1289.40±4.98c	1500.03±7.24	4897.15±10.09
T6	125.00±2.16	372.47±2.01b	651.55±2.05b	948.87±5.67	1310.12±8.07ab	1512.50±9.91	4920.51±17.25
T7	126.00±2.38	373.00b±2.82b	644.30±2.40b	949.97±5.50	1312.07±5.15a	1517.30±8.93	4922.65±14.92

\*The different letters within the same column indicates that there is a significant difference between the treatments at the level of significance  $p>0.05$ , values were Mean±standard error.

\*\*T1: Control treatment, T2, T3: Addition of 35 and 45 cc/100 liters respectively of Bedgen40 in drinking water for 6-10 days, T5, T4: Addition of 35 and 45 cc/100 liters respectively of Bedgen40 in drinking water for 21-25 days, T6, T7 Add 35 and 45 cc/100 liters respectively of Bedgen40 to the drinking water for 31-35 days.

The results of the statistical analysis in Table (5) indicate that there are significant differences at the level ( $P < 0.05$ ) between the treatments in the food conversion coefficient. There are no significant differences in the first three weeks. In the fourth week, there is a significant improvement in favor of two treatments T3, T5 in the food conversion coefficient. In the fifth and sixth week and the

final conversion factor, we notice a significant improvement in favor of the treatments T2, T3, T4 and T5 compared to other treatments.

The improvement in body weight, weight gain, feed consumption, and feed conversion ratio may be due to the benefits and properties of Bedgen 40, which is composed of artichoke extract and choline chloride.

Table 5: Effect of adding two different levels of Bedgen 40 at different times on the feed conversion ratio of broiler chickens.

Treatment	Age/week						Cumulative weight gain
	first	Second	third	fourth	fifth	sixth	
T1	1.23±0.01	1.26±0.01	1.33±0.01	1.61±0.01a	2.00±0.04a	2.23±0.06a	1.75±0.01a
T2	1.22±0.02	1.27±0.02	1.30±0.03	1.57±0.01a	1.90±0.02cd	2.08±0.04bc	1.68±0.01bc
T3	1.24±0.04	1.26±0.01	1.32±0.01	1.56±0.01b	1.93±0.02c	2.02±0.08bc	1.69±0.01bc
T4	1.22±0.03	1.26±0.02	1.34±0.03	1.57±0.02ab	1.86±0.01de	2.10±0.02bc	1.69±0.01bc
T5	1.21±0.02	1.27±0.02	1.33±0.02	1.56±0.01b	1.83±0.01e	2.04±0.01c	1.67±0.01c
T6	1.21±0.01	1.27±0.01	1.33±0.01	1.60±0.01ab	1.98±0.01ab	2.18±0.02ab	1.74±0.01ab
T7	1.22±0.03	1.26±0.01	1.32±0.01	1.61±0.01a	1.96±0.02ab	2.16±0.03ab	1.73±0.01ab

\*The different letters within the same column indicates that there is a significant difference between the treatments at the level of significance  $p > 0.05$ , values were Mean±standard error.

\*\*T1: Control treatment, T2, T3: Addition of 35 and 45 cc/100 liters respectively of Bedgen40 in drinking water for 6-10 days, T5, T4: Addition of 35 and 45 cc/100 liters respectively of Bedgen40 in drinking water for 21-25 days, T6, T7 Add 35 and 45 cc/100 liters respectively of Bedgen40 to the drinking water for 31-35 days.

Artichoke extract contains phenolic compounds, including a chlorogenic compound that acts as an antioxidant, which prevents It damages the mucous layer of the intestine and prevents oxidative stress for the bird. This helps the bird to grow and build the body [22]. It also contains the active substance cynarin, which has natural activity against the production of free radicals [23]. It also contains active compounds. Flavonoids, the most important of which is apigenin [10], and this compound has many functions, including its work to stimulate the production of beneficial bacteria as a result of fermentation processes and the removal of free radicals, as well as a catalyst for catalase and clathionone enzymes [24]. In addition, the active substance inulin acts as a prebiotic and promotes the growth of beneficial bacteria [7].

It stimulates the intestinal flora and thus improves growth [25] and works to increase the length of the villi in the intestine, which have a role in the absorption process and increase the surface area of the intestine, which improves the increase in the absorption of

nutrients and thus improves growth [25]; [26]. The reason for the improvement in these characteristics may be due to the use of Bedgen 40 at different levels is that the artichoke plant contains essential amino acids, including methionine, lysine, and threonine [27]. Where methionine is the first determinant in poultry feed, as it is used in building proteins involved in building body tissues, which leads to weight gain and improved growth [28], as well as the role of the amino acid (lysine) in the activation and growth of skeletal muscles [29]. Artichoke extract also contains the amino acid (threonine), which has an important role in increasing the production of growth hormone [30], and the reason may be due The role of artichoke as an antibiotic and anti-inflammatory, which leads to growth stimulation [31]. Artichoke works in the treatment of liver toxicity, an antibiotic, and a growth stimulator, especially in the early stages of the chicks' life [11]. In view of the benefits of artichoke and its content of antioxidant compounds, it contributes to strengthening the body's immunity and thus raising the

productive performance of broiler chickens [32].

The improvement in live body weight, weight gain, and the food conversion factor may be due to the role of choline chloride, as choline is an essential and necessary source for the cell in donating a methyl group that is important for the manufacture of methionine and creatine.[33]; [34] and also choline has an important role in the metabolism and metabolism of liver fats, preventing the occurrence of fatty liver and activating the liver process [16] and choline has a role as an antioxidant and reducing oxidative stress [35]. The reason for the superiority in weight, weight gain, and feed conversion ratio in the first period may be due to the essential amino acid leucine, which activates the synthesis of proteins involved in the structure of muscles by activating the enzyme rapamycin, which is necessary in building skeletal muscles, especially in the early stages of the age of chicks. This pathway may slow down with age. Age, as the amount of protein accumulation in the muscles decreases with age and is higher in newly hatched birds [36]. It may be due to the development of lactic acid bacteria, as it was found that the highest rate of growth of the small intestine is on the ninth and tenth day and the development of lactic bacteria and the importance of Organ physiology and the development of beneficial microorganisms in the first ten days of chicken life [37]. As for the increase in weight when adding Bedgen 40 in the second period, it may be due to the increase in food additives stimulating satellite cells (muscle cells), which leads to an increase in muscle size and growth [38] by increasing myoblasts and this leads to This leads to an increase in the diameter of the muscle fiber, and as a result, the white meat increases and the weights of the thighs and wings increase [39] and that the reason for the improvement in productive performance in the growth stage is the presence of artichokes in the diet, which encourages the secretion of digestive system enzymes and enhances the digestion of nutrients, which increases the rate of nutritional absorption [40], as it was shown that the number of beneficial bacteria increased at the

age of 21 days, as the concentration of bifidobacterium and Lactobacillus increased in the ileum [41].

Perhaps the reason is attributed to the improvement obtained when adding Bedgen 40 in the second period (21-25), as artichoke extract and choline reduce the stress obtained after switching feed and vaccine as mentioned [11].

### Conclusion

We conclude from this study that the use of 35 and 45 cm<sup>3</sup> / liter of Bedgen 40 in drinking water for the age period of 6-10 days and 21-25 days led to an improvement in the productive characteristics, the average live body weight and the rate of weight gain, as well as a significant improvement in the feed conversion coefficient for broiler chickens.

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## تأثير استخدام تركيزين مختلفين من Bedgen 40 في ماء الشرب لفترات مختلفة

### على بعض الصفات الانتاجية لفروج اللحم

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#### الخلاصة

أجريت التجربة في حقل الدواجن التابع لقسم الانتاج الحيواني - كلية الزراعة /جامعة كركوك ، ولمدة 42 يوم . لدراسة تأثير استخدام تركيزين مختلفين من مادة Bedgen 40 على ثلاث فترات مختلفة من عمر طيور فروج اللحم وتأثيرها على بعض الصفات الانتاجية. استخدم في هذه الدراسة 280 فرخا من فروج اللحم ( Ross 308 ) في عمر يوم واحد وغير مجنسة وبمعدل وزن الابتدائي 42 غم /فرخ ، وزعت الافراخ عشوائيا على 7 معاملات بواقع 4 مكررات لكل معاملة وكل مكرر يحتوي على 10 طيور .

تم استخدام Bedgen 40 بمستويين 35 و45سم<sup>3</sup>/100لتر من ماء الشرب ولمدد عمرية مختلفة . وكانت معاملات التجربة كالاتي : T1 : معاملة السيطرة (بدون اضافة ) و: T2 اضافة 35سم<sup>3</sup> من المادة /100لتر في ماء الشرب خلال المدة العمرية 6-10 يوم، T3 : اضافة 45سم<sup>3</sup> من المادة /100لتر في ماء الشرب خلال المدة العمرية 6-10 يوم، T4 : اضافة 35سم<sup>3</sup> من المادة /100لتر في ماء الشرب خلال المدة العمرية 21-25 يوم، T5 : اضافة 45سم<sup>3</sup> من المادة /100لتر في ماء الشرب خلال المدة العمرية 31-35 يوم، T6 : اضافة 35سم<sup>3</sup> من المادة /100لتر في ماء الشرب خلال المدة العمرية 21-25 يوم، T7 : اضافة 45سم<sup>3</sup> من المادة /100لتر في ماء الشرب خلال المدة العمرية 31-35 يوم. بينت النتائج وجود تفوق معنوي ( $P < 0.05$ ) بين معاملات اضافة Bedgen 40 ومعاملة السيطرة في وزن الجسم الحي النهائي. إذ اظهرت النتائج ارتفاع معنوي في وزن الجسم الحي والزيادة الوزنية للمعاملتين T2, T3 في الاسبوع الثالث وتفاوت معنوي لكل من المعاملات T2, T3, T4, T5 في الاسبوع الخامس وتفاوت جميع معاملات الاضافة في الاسبوع السادس، وتفاوتت معاملتان T3, T4 في معدل استهلاك العلف في الاسبوع الثالث ، وكذلك بينت النتائج وجود تحسن معنوي ( $p < 0.05$ ) في معامل التحويل الغذائي في الاسبوعين الخامس والسادس وكذلك لمعامل التحويل النهائي أو الكلي للمعاملات T2, T3, T4, T5 مقارنة بمعاملة السيطرة.

**الكلمات المفتاحية :** Bedgen 40، الصفات الإنتاجية ، فروج اللحم