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# EFFECT OF USING DIFFERENT WAYS TO PROVIDE THE IRAQI PROBIOTIC ON SOME PRODUCTIVE TRAITS OF BROILER

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## Abstract

This study was conducted in Poultry farm of agriculture research station to evaluate the effect of using different ways to provide Iraqi probiotic on some productive traits of broiler from 27/9/2016 till 1/11/2016. A total of 360 Ross broiler chicks, one day old, randomly divided to six groups of 3 replicates each (20 bird/rpt), (T1) control treatment, (T2) spraying Chicks with Iraqi probiotic at one day old (T3) Oral dosage of chicks with Iraqi probiotic at one day old (Iraqi probiotic with distilled water and 20% skim milk with dosage of $10^7$ bacterial cells per chick injected in the mouth by 5 ml syringe and 0.2 ml per chick), (T4) injecting chicks with Iraqi probiotic in vent opening at one day old (Iraqi probiotic with distilled water and 20% skim milk with dosage of $10^7$ bacterial cells per chick injected by vent opening by 5 ml syringe and 0.2 ml per chick), (T5) providing Iraqi probiotic with feed from one day old to marketing age (35 days) by 100 g probiotic per 100 kg diet, (T6) providing Iraqi probiotic with drinking water from one day old to marketing age (35 days) by 100 g probiotic per 100 liters of drinking water. Results showed the following appearance a significant value (pd"0.05) in the productive traits. The best results were obtained in traits is the addition of Iraqi probiotic to drinking water (1887.36 g of final body weight) compare with other treatments (1691.39, 1794.79, 1823.40, 1745.41 and 1745.41g of T1, T2, T3, T4 and T5 treatment respectively), they providing the Iraqi probiotic by diet and followed by spray and oral dosage chicks by Iraqi probiotic, injecting via vent opening has given less impact in traits in comparison with a control treatment.

***Key words :*** Iraqi probiotic, productive traits, spraying, oral dosage, injecting, diet, drinking water.

## Introduction

Poultry is one of the leading farm animals in the rapid processing of animal protein, to be established the poultry industry which improved productive breeds, produced fast-growing broiler led to increased nutritional and health requirements (Naji, 2006). Make use of excessive antibiotics**,** the emergence of some pathogenic bacterial strains resistant to some antibiotics. The World Health Organization has banned the excessive use of antibiotics (Reuter, 2001). Several studies have been conducted to reduce the use of antibiotics and improve the performance of the broiler, one of these studies is the use of probiotics (Sarker and Yang, 2011), it is a useful microorganism (bacteria, yeast and mold), have the ability to adhesion In the inner walls of the intestines (Pelicano *et al*., 2005), thus blocking the receptors in front of pathogenic bacteria, this mechanism is one of the keys in preventing pathogens (Bernet *et al*., 1994), not satisfactory and non-toxic (Donkor *et al*., 2006), it works to balance the natural microorganisms of the digestive tract (Pascual *et al*., 1999), ability to resist intestinal secretions and bile secretions, Stimulate body immunity and increase resistance against diseases (Parra *et al*., 2004), producing organic acids, especially lactic acid and acetic acid and Reduces pH to provide an acidic environment unsuitable for the growth of disease pathogens (Conway, 1996). The idea started with the use of probiotics by Dr. Saad Abdul-Hussein Naji, use of microorganisms useful single or mixed, a several microbial studies, the idea of the process of manufacturing probiotics was named Iraqi Probiotic (IP) was used only in scientific research. Currently, it uses commercial fields and all farm animals (Naji *et al*., 2012), this product contains many microorganisms and the most important *Lactobacillus acidophilus* $10^8$, *Lactobacilli* $10^9$, *Bacillus subtilus* $10^8$ and *Saccharomyces serevisiae* $10^8$ (Al-Gharawi, 2012). This probiotic has the ability and efficiency to outperform its foreign boosters such as Biomin, Biotronic (Al-Qaissi and Ali, 2007), it was added only to feed, now mixed with water and injected into hatching eggs. It became the first

Iraqi Probiotic manufactured inside Iraq (Naji *et al*., 2011).

The present study was aimed to set the best way to give the Iraqi Probiotic (drinking water, feed, spraying of the chicks, cholecystectomy or through the opening of the outlet) to study effect on the production characteristics of broiler Ross 308.

## Materials and Methods

### Preparation of feed

Birds were fed on two types of diets (table 1). Starter diet from 1 to 21 days (22.09% protein and 2,906 kcal / kg metabolism energy) and finisher diet from 22 to 35 day (19.98% protein and 3004 kcal/ kg metabolism energy), feed and water provide ad libitum during the life of birds.

### Broiler husbandry and experimental design

Experiment was carried out at poultry research farm-agriculture college- university of Al-Muthanna, Iraq, during the period from 27-9-2014 till 1-11-2014 and aimed to effect of using different ways to provide the Iraqi probiotic in some productive traits in broiler. 240 broiler chicks, one day old Ross308 broiler chicks were randomly distributed in the six experimental groups (3 replicate for each treatment) were as follow:

**1. First treatment :** Control treatment.

**2. The second treatment :** spraying Chicks with Iraqi probiotic at one day old (Mixing Iraqi probiotic with distilled water and 20% skim milk with dosage for every chick of $10^7$ bacterial cells and sprayed chicks by hand-spraying of 0.2 ml per chick).

**3. Third treatment :** Oral dosage of chicks with Iraqi probiotic at one day old (Iraqi probiotic with distilled water and 20% skim milk with dosage of $10^7$ bacterial cells per chick injected in the mouth by 5 ml syringe and 0.2 ml per chick).

**4. Fourth treatment :** Injecting chicks with Iraqi probiotic in vent opening at one day old (Iraqi probiotic with distilled water and 20% skim milk with dosge of $10^7$ bacterial cells per chick injected by vent opening by 5 ml syringe and 0.2 ml per chick).

**5. Fifth treatment :** Providing Iraqi probiotic with feed from one day old to marketing age (35 days) by 100 g probiotic per 100 kg diet.

**6. Sixth treatment :** Providing Iraqi probiotic with drinking water from one day old to marketing age (35 days) by 100 g probiotic per 100 liters of drinking water.

All birds reared in battery cages (1 × 1.5 m) with 4 floor each cage, rooms were controlled a 24-h. by temperature, humidity and light.

**Table 1 :** The chemical composition of basal diet*.

| Basal Diet | | Items |
|---|---|---|
| 23 to 35 d | 1 to 22 d | |
| 45 | 50 | Corn |
| 22 | 12 | Wheat |
| 5 | 5 | Protein concentrate** |
| 24 | 30 | Soybean meal (48%) |
| 1 | 1 | Limestone |
| 2 | 1 | Sunflower oil |
| 1 | 1 | Dicalcium phosphate |
| 100 % | 100 % | Total |
| **Calculated analysis** | | |
| 19.70 | 21.92 | Crude protein (%) |
| 3004 | 2906 | Metabolism energy (kilo calorie per kg. Diet) |
| 0.75 | 0.75 | Calcium (%) |
| 0.43 | 0.42 | Phosphorus (%) |
| 0.51 | 0.53 | Methionine (%) |
| 1.02 | 1.06 | Lysine (%) |
| 0.87 | 0.75 | Methionine + Cysteine (%) |
| 150.38 | 131.55 | c/p ratio |

* produced by Ghadeer Babylon, calculated analysis according to NRC (1984).

** Contains: 40% crude protein, 2000 kcal/kg diet, 3% fiber, 3% calcium, 3% phosphorus, 3.7% methionine, 3.9% lysine, 2.2% sodium, 200000 IU Vit. A, 40000 IU Vit. D3, 500 mg Vit. E, 40 mg Vit. K3, 30 mg Vit. B1, 200 mg Vit. B2, 40 mg Vit. B6, 0.5 mg Vit. B12, 7 Mg Choline chloride, 2 mg Biotin, 20 mg Folic acid, 60 mg Nicotinic acid, 1000 mg Zn, 160 mg Cu, 800 mg Fe, 3 mg Se, 8 mg I, 1200 mg Mn and 3 mg anti-oxidant.

### Productive performance traits

A weekly body weights (BW), body weight gain (BWG), average weekly feed intake (AWFI) and feed conversion ratio (FCR) of birds were recorded.

As well as Production index was measured according to the formula referred to by Naji (2006) :

$$\text{Production Index} = \frac{\text{Average body weight (g)} \times \text{viability}}{\text{Rearing period} \times \text{feed conversion} \times 10}$$

$$\text{Viability} = 100 - \text{Mortality}$$

### Statistical analysis

The statistical analysis of experimental data was performed using randomized statistical design using SAS

[2012] statistical software package. The means of data were compared using Duncan's multiple range test (Duncan, 1955).

## Results

### Body weight

Table 2 shows effect of use of different ways to introduce the Iraqi probiotics in the average of weekly body weight of broilers. There were no significant differences between the six treatments in the first week of chicks age, in the second week, T3 (Oral dosage), T5 (adding the Iraqi probiotics to feed) and T6 (adding the Iraqi probiotics to drinking water) showed significant superiority (Pd"0.05) compared to T1 (control treatment) and T4 (injecting chicks with Iraqi probiotic in vent opening), while T5 and T6 were higher significantly (Pd"0.05) than T1, T2 and T4 at the third week of age, at the fourth and fifth weeks of ageT6 was higher significantly (P≤0.05) compared with the rest of the treatments, T5 showed significant superiority (P≤0.05) compared with T1, T2, T3 and T4 parameters. T2, T3 and T4 were higher significantly (P≤0.05) compare with the control treatments.

The body weight of the chicken broiler significantly improved (P≤0.05) in the treatments used by the Iraqi probiotics and in different ways compared with control treatment, the comparison between the methods of providing the Iraqi probiotics that the addition with drinking water has given the best rate of weight comparison when providing t with food. The treatment of addition to the feed exceeded the treatment of the dosage and spray the broiler while the treatment of injecting in vent opening give lowest body weight when compared to ways to provide the Iraqi probiotics.

### Body weight gain

Table 3 shows the effect of different ways to provide the Iraqi probiotics in the average of weekly body weight

**Table 2 :** Body weight of the broiler in different provide ways of Iraqi probiotics (Mean and SE).

| Age (weeks) | | | | | Treatment |
|---|---|---|---|---|---|
| 5 | 4 | 3 | 2 | 1 | |
| 1691.39 ± 15.15f | 1138.36 ± 10.12e | 693.15 ± 5.82e | 312.44 ± 2.66d | 111.23 ± 0.97 | **T1** |
| 1794.79 ± 16.16d | 1191,6312.29c | 715.266.17c | 323.322.39bc | 113.17 ± 1.02 | **T2** |
| 1823.40 ± 16.33c | 1206.38 ± 13.11bc | 721.54 ± 6.23bc | 325.52 ± 1.80ab | 114.36 ± 1.10 | **T3** |
| 1715.77±15.46e | 1167.12±11.20d | 706.96 ± 5.93d | 320.32 ± 2.16c | 113.68±1.08 | **T4** |
| 1843.77 ± 15.27b | 1215.41 ± 12.95b | 725.35 ± 6.06ab | 326.32 ± 2.23ab | 112.41 ± 0.88 | **T5** |
| 1887.36 ± 15.23a | 1233.79 ± 12.77a | 731.59 ± 5.97a | 328.85 ± 2.14a | 114.32 ± 1.11 | **T6** |
| * | * | * | * | N.S | Sig. |

Average values with (a-d) in row, were differ significantly at (p<0.05).
(T1) control treatment, (T2) spraying Chicks with Iraqi probiotic at one day old, (T3) Oral dosage of chicks with Iraqi probiotic at one day old. (T4) injecting chicks with Iraqi probiotic in vent opening at one day old. (T5) providing Iraqi probiotic with feed from one day old to marketing age (35 days). (T6) providing Iraqi probiotic with drinking water from one day old to marketing age (35 days).

**Table 3 :** Body weight gain of the broiler in different provide ways of Iraqi probiotics (Mean and SE).

| Age (weeks) | | | | | Treatment |
|---|---|---|---|---|---|
| 5 | 4 | 3 | 2 | 1 | |
| 5.41±552.83 f | 4.18±445.41f | 3.18±380.71 c | 2.29± 201.21 c | 1.29 ± 71.23 | **T1** |
| 6.94± 603.16d | 5.28±476.37d | 4.87±391.74bc | 3.72± 210.35ab | 0.73± 73.17 | **T2** |
| 6.49±617.02c | 4.25± 484.84 c | 4.24±395.78ab | 2.06± 211.40ab | 1.25± 74.36 | **T3** |
| 5.74±578.29e | 5.13± 460.16e | 4.37±386.64c | 2.15±206.64bc | 1.22±73.68 | **T4** |
| 6.30±628.36b | 4.87±490.06b | 4.33±398.52a | 2.20±214.42a | 0.70 ± 72.41 | **T5** |
| 6.57±653.57 a | 4.56± 502.20a | 3.61±402.74a | 2.50±214.53a | 1.29± 74.32 | **T6** |
| * | * | * | * | N.S | Sig. |

Average values with (a-d) in row, were differ significantly at (p<0.05).
(T1) control treatment, (T2) spraying Chicks with Iraqi probiotic at one day old, (T3) Oral dosage of chicks with Iraqi probiotic at one day old. (T4) injecting chicks with Iraqi probiotic in vent opening at one day old. (T5) providing Iraqi probiotic with feed from one day old to marketing age (35 days). (T6) providing Iraqi probiotic with drinking water from one day old to marketing age (35 days).

gain. There were no significant differences in all treatments at the first week of age, significant increase (P≤0.05) in T5 and T6 compared with T1 and T4 at the second and third weeks of the broiler age. At the fourth and fifth weeks of the broiler age, the T6 showed a significant difference (P≤0.05) compared with the other treatments, while the T5 treatment was significantly higher (P≤0.05) compared to T1, T2, T3 and T4 at the same age. T4 showed significant superiority (P≤0.05) and the same age compared to control treatment.

**Feed consumption**

Table 4 indicates the effect of the use of different methods to give the Iraqi probiotics at the average weekly feed consumption. There were no significant differences in all treatments at the first week of age, at second week T5 was a significantly increased (P≤0.05) compare with control treatment, at week 3, treatment was significantly higher (P≤0.05) compared to T4, at the fourth and fifth weeks, T6 showed a significant superiority (P≤0.05) in feed consumption compared to all treatments. All treatments showed a significant superiority (P≤0.05) at the fifth week of feed consumption compared to control treatment.

**Feed conversion**

Table 5 show the effect of using different ways to provide the Iraqi probiotics on feed conversion. There were no significant differences in the first week of the age of the eggs between all the experimental treatments, at the second and third weeks of age, T5 and T6 showed significant superiority (P≤0.05) compared to T1 and T4, at week 4 and 5, treatment was significantly higher (P≤0.05) than T1, T2, T3 and T4, at the same age, T2, T3 and T4 showed significant superiority (P≤0.05) compared to control treatment. In the overall feed

**Table 4:** Feed consumption of the broiler in different provide ways of Iraqi probiotics (Mean and SE).

| Total | Age (weeks) | | | | | Treatment |
|---|---|---|---|---|---|---|
| | 5 | 4 | 3 | 2 | 1 | |
| 26.12±3019.61d | 11.53±1083.55c | 8.34± 824.01b | 7.15±658.63ab | 3.22±338.03b | 1.22± 115.39 | **T1** |
| 23.21±3041.62c | 12.26±1097.75b | 8.42±828.85b | 6.21±654.21ab | 3.42±344.47ab | 1.38± 116.34 | **T2** |
| 27.84±3056.71 b | 10.84±1104.47b | 9.88±833.92ab | 6.76±656.99ab | 3.79±344.58ab | 1.66± 116.75 | **T3** |
| 26.55±2983.46e | 10.12±1064.05d | 8.34± 805.28c | 7.56± 653.42b | 4.17±343.02ab | 1.83±117.69 | **T4** |
| 25.37±3047.88 bc | 11.34±1099.63b | 10.40±828.20b | 8.06±657.56ab | 4.37± 347.36a | 1.36± 115.13 | **T5** |
| 26.58± 3093.40a | 11.75±1130.68a | 8.69±838.67a | 6.20±660.49a | 3.82±345.39ab | 1.56± 118.17 | **T6** |
| * | * | * | * | * | N.S | Sig. |

Average values with (a-d) in row, were differ significantly at (p<0.05).
(T1) control treatment, (T2) spraying Chicks with Iraqi probiotic at one day old, (T3) Oral dosage of chicks with Iraqi probiotic at one day old. (T4) injecting chicks with Iraqi probiotic in vent opening at one day old. (T5) providing Iraqi probiotic with feed from one day old to marketing age (35 days). (T6) providing Iraqi probiotic with drinking water from one day old to marketing age (35 days).

**Table 5 :** Feed conversion of the broiler in different provide ways of Iraqi probiotics (Mean and SE).

| Total | Age (weeks) | | | | | Treatment |
|---|---|---|---|---|---|---|
| | 5 | 4 | 3 | 2 | 1 | |
| 0.01± 1.77c | 0.01±1.96c | 0.02±1.85c | 0.02± 1.73b | 0.02±1.68b | 0.03± 1.62 | **T1** |
| 0.01± 1.69b | 0.01±1.82b | 0.01± 1.74b | 0.01± 1.67ab | 0.01±1.64ab | 0.02± 1.59 | **T2** |
| 0.01±1.67b | 0.01±1.79b | 0.01± 1.72 b | 0.01±1.66ab | 0.01±1.63ab | 0.02± 1.57 | **T3** |
| 0.01±1.71bc | 0.01±1.84b | 0.01±1.75b | 0.01± 1.69b | 0.01± 1.66b | 0.02± 1.60 | **T4** |
| 0.01±1.66ab | 0.01±1.75ab | 0.01±1.69ab | 0.01±1.65a | 0.02± 1.62a | 0.01±1.59 | **T5** |
| 0.01±1.65a | 0.01± 1.73 a | 0.01±1.67a | 0.01±1.64a | 0.01±1.61a | 0.02± 1.59 | **T6** |
| * | * | * | * | * | N.S | **Sig.** |

Average values with (a-d) in row, were differ significantly at (p<0.05).
(T1) control treatment, (T2) spraying Chicks with Iraqi probiotic at one day old, (T3) Oral dosage of chicks with Iraqi probiotic at one day old. (T4) injecting chicks with Iraqi probiotic in vent opening at one day old. (T5) providing Iraqi probiotic with feed from one day old to marketing age (35 days). (T6) providing Iraqi probiotic with drinking water from one day old to marketing age (35 days).

conversion, all Iraqi probiotics treatments showed significant superiority (P≤0.05) compared to control treatment.

**Mortality and production index**

Table 6 shows the effect of the use of different ways of the Iraqi probiotics in mortality and the production index. A significant increase (P≤0.05) in mortality was observed of T1 compared with T4, which was significantly higher (P≤0.05) compared with T2 and T3, a significant increase (P≤0.05) compared with T5 and T6. The same table shows significant superiority (P≤0.05) in the production index of T5 and T6 compared with T3 and the treatments T2, T3 and T4 showed significant superiority (P≤0.05) compared with control treatment.

**Table 6 :** Mortality and production index of the broiler in different provide ways of Iraqi probiotics (Mean and SE).

| Production Index | Mortality (%) | Treatments |
|---|---|---|
| 254.84 ± 20.18e | 6.66 ± 0.22a | **T1** |
| 293.33 ± 19.77c | 3.33 ± 0.19c | **T2** |
| 301.64 ± 22.05b | 3.33 ± 0.20c | **T3** |
| 301.64 ± 20.58d | 5.00 ± 0.21b | **T4** |
| 312.04 ± 22.11a | 1.67 ± 0.17d | **T5** |
| 319.42 ± 21.14a | 1.67 ± 0.22d | **T6** |
| * | * | **Sig.** |

Average values with (a-d) in row, were differ significantly at (p<0.05).

(T1) control treatment, (T2) spraying Chicks with Iraqi probiotic at one day old, (T3) Oral dosage of chicks with Iraqi probiotic at one day old. (T4) injecting chicks with Iraqi probiotic in vent opening at one day old. (T5) providing Iraqi probiotic with feed from one day old to marketing age (35 days). (T6) providing Iraqi probiotic with drinking water from one day old to marketing age (35 days).

## Discussion

**Body weight**

In the past, there was no comparison between the methods of providing of Iraqi probiotics to know the main reason for interpreting the results. The main reason for the superiority of the treatment of the addition of the Iraqi probiotics with drinking water and feed as a result of continuous exposure from the beginning of the to the end of experiment, which improves the ability of intestinal flora in the digestive tract of broilers, thus improve the bird health with digestibility improved lead to increased body weight (Falaki *et al*., 2011).

The cause may be due to the direct role of the microorganisms of the probiotics, which eliminates the pathogenic bacteria, which causes the microbial balance in the digestive tract, thus increasing the secretion of the digestive enzymes which cause the increase of digestion and utilization of the food significantly, as well as increased utilization of nutrients after conversion to simpler food units (Rahman *et al*., 2013).

Increase the absorption by increasing the length of the villi and the depth of crept, which increase the surface area inside the intestines of birds as well as improvement in the health of birds and all these factors have an important role to make the bird gives the best production performance (Olnood *et al*., 2015).

**Body weight gain**

A significantly improvement in average body weight gain in drinking water treatment and feed may be due to the doubling of the useful microbiology cumulatively, which increase digestibility of food in the gastrointestinal tract. The compounds make food easy to digest and absorb to increase the digestion capacity and increase the height of the villi and the ratio between the height of the villi and depth of crept (Molnar *et al*., 2012).

Exceeding all Iraqi probiotics treatments compared to the treatment of control in the weekly weight gain may be due to continuous exposure to probiotics will improve the health of the birds, which increases their ability to eat food, which reflected positively on body weight, thus increase the body weight gain as well as a positive correlation coefficient between digestion rate, body weight and feed intake (Abdollahi *et al*., 2012).

**Feed consumption**

Total feed consumption has increased significantly in the treatment of the provision of Iraqi bioenergy in drinking water compared to all transactions, and that all treatments providing the Iraqi biochemist have significantly exceeded the treatment of control. This is due to the increase in the consumption of fodder for the benefit of the Iraqi probiotics because of microorganisms is more quantity available inside the bird, which increases drinking water birds, which increases their ability to eat food (Lin *et al*., 2011).

**Feed conversion**

The significant improvement in the efficiency of food conversion when using the Iraqi probiotics in different ways for broilers has led to improved digestion capacity of digested food from feed provided by an increase in the depths of the crept and the length of the villi, as well as increasing the diet digestion by beneficial microorganisms, thus increasing the utilization of nutrients better, absorption and digestion efficiency was higher, the activity of the digestive system increased in the

efficiency of food conversion and rapid body growth (Awad *et al*., 2011).

**Mortality and production index**

The decrease mortality in the probiotics treatments may be due to the enhanced immunity of the chick and its resistance to diseases, especially digestive diseases close the receptors of the digestive system, the beneficial bacteria prevent harmful bacteria and exclusion outside the digestive system (Sultan, 2011).

These beneficial bacteria stimulate the lymphatic system in the gastrointestinal tract, which antibodies form, beneficial bacteria extracted called bacteriocines, which play an important role in inhibiting the function of pathogenic bacteria, thus have good on the health and vitality of birds and then reduce mortality all this improvement in the qualities of production performance is reflected positively on the values of the production Index (Ghavidel *et al*., 2011).

## Conclusion

In conclusion, all different way of Iraqi probiotics provide significant improvement most of broiler performance in this study. The best results were obtained in traits through addition of Iraqi probiotic to drinking water, then in diet followed by spray and oral dosage chicks. Iraqi probiotics can be used in drinking water Throughout the broiler rearing period.

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