The effect of fasting and early feeding after hatching with the nutritional supplement Gel 95 and the Safmannan prebiotic gel and the mixture between them on the productive performance of broiler chicks

Hawra Jehad Nasser Al-Huwaizi and Ammar Hussain areaare

1Department of Animal production, college of Agriculture, University of Kufa, Iraq.

Email: hawra.j.n@gmail.com

Abstract

This study was conducted in the poultry field of the Animal Production Department at the Faculty of Agriculture / University of Kufa, for a period from November 15 to December 20, 2019, and for a period of 5 weeks, 300 unsexed broiler chicks from Ross 308 hybrids were used in this study. After chick removed from the hatching machines then divided in to 5 treatments (60 chicks per treatment) and by three replications (each replicate 20 chicks) and the treatment were as follows: (T1): (Control) The chicks were fasted for 12 hours, (T2): 1 gram was provided from Gel 95, (T3): Provide chicks with 1 gram of Safmannan prebiotic Gel, (T4): Provide chicks with mixture of 1/2 gram (Gel 95 + Safmannan), (T5): the chicks was provided with a mixture of 1 gram (Gel 95 + Safmannan) per chick and after dividing the chicks to treatments, the gel was distributed on the floor of the cage in the hatchery for 12 hours and then chicks were transferred to the breeding room and after 12 hours, feed and water were provided. For chicks, the results of the statistical analysis showed a significant improvement at the level of (p <0.05) for the T4 treatment birds compared with the control group at the live body weight rate and the total weight gain at the fifth week, and there was a significant decrease in the feed consumption rate and the feed conversion rate at the second week of the chicks’s life, and there was a significant deterioration in the total feed conversion rate for the chicks of the control group compared to all experience treatments.

Keywords: fasting, early feeding, Gel 95, prebiotic, broiler.

1. Introduction

Poultry meat is a food which has been accepted worldwide throughout the ages and there is currently a world trend to reduce the use of antibiotics in animal food due to the contamination of meat products with antibiotic residues [1]. The methods and techniques used in poultry feeding have witnessed rapid and significant development for the purpose of improving production, quantitatively and qualitatively, providing a number of basic feed additives and Supplements for General health in order to improve productive and health performance [2], the hatching process in commercial hatcheries extends to about 24-48 hours due to administrative operations and then the delay in obtaining feed and water for the chicks, which leads to the dependence of the hatched chick mainly on the yolk sac, and because of the exposure of the hatched chicks to stress, hunger and drought as a result of the low water content in their tissues, which negatively affects The growth of chicks[3-5]. Therefore, specialized companies have resorted to developing modern systems to provide feed and water to the hatched chicks after they emerge from the hatching machines. This method is called early feeding. Several methods have been used for early feeding of chicks. Including sprinkling feed in the form of crumbs or crushed grain on the chicks or mixture the required nutrients with Gelatine (Gel) to form a paste that is affixed to the edge of the cages [6].
Therefore, early feeding has become today, a standard for chicks development, as early feeding contributes to the delivery of the chicks' basic nutritional needs, which may be supported by nutritional supplements [7,8]. Therefore, researchers in poultry nutrition focused on studying some nutritional and non-nutritional additives that have significant effects in supporting the physiological and productive state of the bird. Among these additives are the prebiotic [9]. A company specialized in poultry feeding also produced a substance like gelatine called Hydro Gel 95 [10], that, contains 95% water in its composition with nutrients, which is one of the most important nutritional supplements that have been used recently in the early feeding method, as this substance contains nutrients made especially for chicks in order to increase their ability to overcome the pressures that they may face in the hatchery or during the process of transporting them from Hatchery to the breeding farms [11]. Therefore, the present study aims to know the effect of fasting and early feeding after hatching with Gel 95 nutritional support and Safrmannan prebiotic gel and the mixture between them on the productive performance of broiler chicks.

2. Materials and methods of work

2.1. Experience design

This study was conducted in the poultry field, affiliated to the Animal Production Department at the Faculty of Agriculture / University of Kufa, for a period from November 15, 2019 to December 20, 2019, for a period of 5 weeks, in which the effect of early feeding after hatching with the Gel 95 nutritional supplement and Safrmannan prebiotic gel and mixture of them was studied in the productive performance of broiler chicks, and the experiment included 300 unsexed broiler chicks from Ross 308 hybrids, one day old, with an average initial weight of 42 g, prepared from a commercial hatchery (Al-Anwar hatchery) in Al-Muradiya / Babylon Governorate, and after the chicks removed from the hatching machines, the chicks were divided into treatment, with a rate of 60 chicks per treatment and with three replicates (each replicate 20 chicks), the cage for transporting the chicks was divided into three parts by cardboard paper, and placing the bottom of the cage regular paper and the cage represents a treatment while each part of the cage represents replicates and after the arrival of the chicks, the cages were bringing about to the breeding farm and they stayed for 12 hours in the transport boxes and the time was calculated from the moment the chicks were placed in the cages in the hatchery and after that the chicks were distributed randomly and each replicate was placed in a cage and the cages were separate with wire mesh barriers BRC the Space of each cage is 3 square meters, providing the chicks with all the requirements of breeding that provide them with a suitable environment, such as the litter of the floor, lighting, ventilation, heating, feeders and fountains(watering places). The chicks also received the necessary health and vaccination care from the first day of their housing until the end of the experiment. Food and water were prepared freely (Ad-libitum) throughout the period of the experiment and the chicks were fed On two diets, starting during the first 21 days of life (Table 1) and finisher from the age of 22 until the marketing age (35 days) and the treatment were as follows: Treatment (T1): (Control) The chicks were fasted for 12 hours, Treatment (T2): 1 gram was provided From Gel 95 per chick, Treatment (T3): Provide chicks with 1 gram of Safrmannan prebiotic Gel per chick, Treatment (T4): Provide chicks to a mixture of 1/2 gram of Gel 95 + 1/2 gram of Safrmannan prebiotic Gel per chick, Treatment (T5): the chicks was provided with a mixture of 1 gram of Gel 95 + 1 gram of Safrmannan prebiotic Gel for each chick, the data were analyzed statistically using the [12] SAS statistical program (2012) and a comparison of the mean values was made using the Duncan (1955) polynomial test to compare the significant differences between the means of the studied traits.

| Table 1. Chemical analysis of initiator and growth suspensions (pellet feed tablets) used in the experiment. |
|-------------------------------------------------------|------------------|------------------|
| **Chemical analysis** | **Starter Diet** | **Finisher Diet** |
| Crude protein%     | 22.89            | 19.12            |
| Representative energy (kcal / kg feed)                | 2958             | 3117             |
| Fat%             | 2.62             | 3.96             |
| Fiber%           | 3.97             | 3.83             |
| Calcium%         | 1.00             | 0.82             |
| Available phosphorous% | 0.52       | 0.39             |
| Methionine%      | 0.52             | 0.46             |
| Lysine%          | 2.35             | 1.91             |
| Vitamin A (IU / kg feed)                             | 12000            | 10000            |
| Vitamin D3 (IU / kg / feed)                           | 5000             | 4000             |
| Vitamin B2 (mg / kg feed)                             | 8.60             | 3.00             |
| Vitamin B12 (μg / kg feed)                            | 17.00            | 10.00            |
3. Results and Discussion

3.1. Live Body Weight

The results of the statistical analysis indicated in Table 2. There were no significant differences during the first, second, third and fourth week of chicks life between all the experimental treatments and the control group, while significant differences were noted in the average live body weight in the fifth week. The treatment T4 significantly outperformed (p <0.05) on the control group, which recorded an average weight of 2183.3 and 2083.3 g / bird, respectively, while the treatments for T2, T3, T4 and T5 did not differ among themselves, and the treatments T2, T3 and T5 did not differ with the control group.

3.2. The rate of weight gain Weekly and total

The results of the statistical analysis in Table 3. indicate that there are no significant differences in the rate of weekly weight gain during the first, second, third, fourth and fifth weeks of chicks life. Regarding the rate of total weight gain, the results indicated that there are significant differences at the level of (p <0.05) between T4 birds, which significantly outperformed the control group, scored 2140.6 g / bird, while the control group scored 2040.0 g / bird, and the previous did not differ significantly with T2, T3, and T4 treatments, and the T2, T3, and T5 treatments did not differ among them. The improvement in the average live body weight and total gain weight of the treatment T4 birds may be due to the role of early feeding with Hydrogel 95 and the Safmannan prebiotic gel, as it provides some nutrients while providing moisture to the chicks during the first hours of the hatching process, which may lead to the acceleration of the absorption of the Yolk sac because it contains some nutrients when feeding chicks from an external source [13-16], Safamnnan prebiotic gel also improves intestinal function and increases the absorption in them by increasing the length of the villi in the internal endothelium of the intestine [17], and thus works on the development and maturation of the gastrointestinal tract and the improvement of the digestion and absorption of nutrients, which is reflected in the increased utilization of chicks from nutrients, which is positively related to the improvement in the speed of growth [18].

The reason is due to the provision of important sugars, which are an important source in preparing the bird with the energy needed to carry out its various operations, which is related to adding the prebiotic to the diet or as a result of using the prebiotic gel, through which the number of harmful bacteria in the intestine is reduced and the number of beneficial bacteria increases. An improvement in the increase in the number of beneficial bacteria and a decrease in the number of harmful bacteria for birds of all biological precursor treatments compared with the control treatment T1, as well as its role in stopping the growth of disease-causing microbial colonies that in turn lead to the growth and increase of the bird's weight, or by reducing inflammatory reactions in Pathological infection status and it plays an important positive role in enhancing the productive performance of the bird [19], also prebiotic performs positive roles in improving metabolism by enhancing the activity and increasing the effectiveness of digestive enzymes present in the small intestine and increasing its production, which in turn leads to an increase in the digestibility of food, and it may also be due to the fact that the Gel 95 and the safamnnan prebiotic gel contains nutritional supplements, which leads to an improvement in body weight, which is reflected in a way. Positive in the rate of weight gain by enhancing the secretion of digestive enzymes as well as improving the health status of birds, which is a good indicator of weight gain by reducing the pH in the digestive system and thus reducing the competition between harmful and beneficial bacteria and thus the ease of blood flow in the mucous layer of the intestinal wall, which plays an important role in regulating metabolic processes [20].
Table 2. The effect of early feeding with the 95 Gel nutritional supplement and Safmannan's rebiotic gel and mixture between them on the average live body weight of broiler chicks (g / bird) (mean ± standard error).

| Age/week | Treatment | first week | Second week | Third week | Forth week | Fifth week |
|----------|-----------|------------|-------------|------------|------------|------------|
|          | T1 (control) | 162.907 ±0.822 | 458.24 ±1.376 | 967.10 ±7.143 | 1445.20 ±21.570 | 2083.33 ±38.441ab |
|          | T2 | 170.697 ±5.333 | 467.22 ±2.184 | 988.88 ±10.304 | 1467.18 ±23.992 | 2130.00 ±45.368ab |
|          | T3 | 169.733 ±5.000 | 461.57 ±5.263 | 1002.19 ±10.855 | 1503.55 ±12.933 | 2172.33 ±6.489ab |
|          | T4 | 172.363 ±1.351 | 470.43 ±16.367 | 991.79 ±27.555 | 1457.28 ±38.891 | 2183.33 ±13.017a |
|          | T5 | 172.363 ±3.189 | 469.12 ±7.205 | 994.84 ±6.356 | 1458.77 ±22.858 | 2136.67 ±21.666ab |

level of sign. | N.S | N.S | N.S | N.S | N.S | *

*The different letters between the parameters indicate the presence of significant differences between the averages at a probability level * (P <0.05). NS: Non Significant means no significant differences between the mean of the transactions. * The parameters are: T1: comparison group (12-hour fasting). T2: Early feeding with gel 95 (1 g / chick). T3: early feeding with Safmannan prebiotic Gel (1 g / chick). T4: early feeding with gel 95+safmannan pre-biotic gel (1/2 gram gel 95 + 1/2 gram safmannan pre-biotic gel). T5: Early Feeding with Gel 95+ Safmannan prebiotic Gel(1 g Gel 95 + 1g Safmannan prebiotic Gel)

Table 3. The effect of early feeding with food supplement GEL 95 and Safmannan prebiotic gel and the mixture between them on the rate of weekly and total weight gain (g / bird) of broiler chicks (mean ± standard error).

| Age/week | Treatment | first week | Second week | Third week | Forth week | Fifth week | Total weight gain |
|----------|-----------|------------|-------------|------------|------------|------------|-------------------|
|          | T1 (control) | 119.573 ±0.798 | 295.33 ±1.684 | 508.86 ±5.774 | 478.10 ±28.074 | 638.14 ±17.384 | 2040.00 ±38.587b |
|          | T2 | 128.363 ±5.478 | 296.53 ±3.699 | 521.66 ±9.840 | 478.30 ±16.570 | 662.82 ±42.913 | 2087.67 ±45.498ab |
|          | T3 | 127.067 ±4.778 | 291.84 ±3.947 | 540.61 ±11.994 | 501.37 ±23.108 | 668.78 ±9.015 | 2129.67 ±6.565ab |
|          | T4 | 129.697 ±1.483 | 298.07 ±15.509 | 521.36 ±11.667 | 465.4 ±12.345 | 726.06 ±50.706 | 2140.67 ±13.042a |
|          | T5 | 129.697 ±3.482 | 296.76 ±8.641 | 525.72 ±10.297 | 463.93 ±26.845 | 677.90 ±38.130 | 2094.00 ±21.962ab |

level of sig. | N.S | N.S | N.S | N.S | N.S | *
consumed 1.7. 
improves the value of the food conversion rate, because the feed conversion rate is the ratio of weight gain rate to the feed intake of the gastrointestinal tract, and improve the live body weight rate, which reflects positively on the rate of weight gain and thus the mixture between them, which leads to an increase in bacteria and beneficial microorganisms in the intestine and therefore increase the chicks’s life and the total feed conversion rate.

The results of the statistical analysis indicated in Table 4. There are significant differences at the level of ($P < 0.05$) in the rate of feed consumption in the second week by recording the highest value, and that amounted to 330.7, and thus significantly outperformed on treatment T4, which recorded 352.4, while no significant differences were noted between the control group and the treatments T2, T3 and T5, and the treatments T2, T3, T4 and T5 did not differ among themselves, and the results indicated that the control group scored the highest value, which amounted to 698.2 and therefore significantly outperformed on treatment T4 in third week, and the treatment while no significant differences were noted between the control group and the treatments T2, T3 and T5, and the treatment T2, T3, T4 and T5 did not differ between them.

The results of the statistical analysis in Table 5 indicate that there are significant differences in the value of the food conversion rate in the second, third and fifth week of chicks’ life and the value of the total food conversion rate, while there were no significant differences during the first and fourth week of chicks’ life, among all the experimental treatments and the control group. In the second week, the results indicated that treatment T4 at the level ($P < 0.05$) was outperformed on the control group by scoring the lowest value for the feed conversion rate, which amounted to 1.185 g of feed / g weight gain, while the control group recorded the highest value, which amounted to 1.289 g Feed / g weight gain and thus the value of the food conversion rate deteriorated, and no significant differences were noticed between the control group and the treatments T2, T3 and T5, and the treatment T4 did not differ with the treatments T2, T3, and T5 but in third week deteriorated occurred noted in food conversion rate for Control group, which amounted to 1,327, compared with T2, T3, T4 and T5 coefficients, which amounted to 1,213,1.262, 1,243,1.208, respectively. 

In the fifth week, the control group recorded the highest value, which amounted to 1.877, and thus significantly deteriorated compared to treatment T4, which recorded the lowest value, which amounted to 1.624, which in turn did not differ with treatment T5. Also, the coefficients T2, T3 and T5 did not differ between them, as it is noticed that there were no significant differences between the parameters T2 and T3 and the control group, as for the value of the total food conversion factor, the results indicate that a significantly outperformed occurred at the level of ($P < 0.05$) for the treatment T4, which recorded the lowest value and amounted to 1.60 on the treatment T3, T2 and control group. While the control group did not differ significantly from treatment T5, as the two treatments T3 and T2 significantly outperformed the control group, while they did not differ between them and did not differ from treatment T5, as the control group recorded the highest value in the value of the food conversion rate, which amounted to 1.745, and thus it deteriorated significantly compared with treatment T4. The feed consumption rate of the treated birds in which the early feeding method was used may be due to the role of early feeding with Gel 95 and Safmannan prebiotic gel and the mixture between them in improving their performance and the development of the growth of the gastrointestinal tract, which is reflected positively on the utilization of nutrients and the increase in absorption and thus the decrease in the amount of feed intake [20]. The reason for an improvement in the value of the feed conversion rate during the second, third and fifth week of the chicks’s life and the total feed conversion rate may be due to Early feeding with Gel 95 and Safmannan prebiotic gel and mixture between them, which leads to an increase in bacteria and beneficial microorganisms in the intestine and therefore increase of the gastrointestinal tract and improve the live body weight rate, which reflects positively on the rate of weight gain and thus improves the value of the food conversion rate, because the feed conversion rate is the ratio of weight gain rate to the feed consumed [17].

Due to the small number of birds bred in this study and because of the care and special attention that the chicks received during the period of breeding, no losses were recorded for all treatment throughout the period of the experiment.
**Table 4.** The effect of early feeding with nutritional supplement Gel 95 and Safmannan Vital Former Gel and mixture between them on the feed rate consumed by broiler chicks (mean ± standard error).

| Age/week Treatment | first week | Second week | Third week | Forth week | Fifth week | Total feed consumed |
|--------------------|------------|-------------|------------|------------|------------|---------------------|
| T1 (control)       | 154.997 ±1.671 | 380.700 ±4.419 | 698.25 ±6.772 | 1128.82 ±36.300 | 1197.18 ±19.552 | 3559.95 ±41.722 |
| T2                 | 149.820 ±3.561 | 365.963 ±7.378 | 658.17 ±13.079 | 1129.37 ±20.232 | 1194.54 ±51.986 | 3497.86 ±75.644 |
| T3                 | 149.997 ±3.385 | 366.223 ±3.250 | 654.61 ±17.451 | 1165.90 ±1.894 | 1226.42 ±33.053 | 3563.16 ±46.641 |
| T4                 | 152.800 ±2.724 | 352.453 ±10.798 | 630.31 ±20.184 | 1112.46 ±17.925 | 1178.68 ±75.870 | 3426.71 ±55.537 |
| T5                 | 150.697 ±3.166 | 365.520 ±3.289 | 654.08 ±20.160 | 1081.06 ±30.011 | 1158.01 ±26.362 | 3409.36 ±24.920 |

*The different letters between the parameters indicate the presence of significant differences between the averages at a probability level * (P <0.05). NS: Non Significant means no significant differences between the mean of the transactions. * The parameters are: T1: comparison group (12-hour fasting). T2: Early feeding with gel 95 (1 g / chick). T3: Early feeding with Safmannan prebiotic Gel (1 g / chick). T4: Early feeding with gel 95+ safmannan prebiotic gel (1/2 gram gel 95 + 1/2 gram prebiotic gel). T5: Early Feeding with Gel 95+ Safmannan prebiotic Gel (1 g gel 95+ 1 g safmannan prebiotic gel).

**Table 5.** The effect of early feeding with food supplement GEL95 and Safmannan Vital Gel and the mixture between them on the value of the weekly and total feed conversion rate of broiler chicks (mean ± standard error).

| Age/week Treatment | first week | Second week | Third week | Forth week | Fifth week | Total feed consumed |
|--------------------|------------|-------------|------------|------------|------------|---------------------|
| T1 (control)       | 1.296 ±0.011 | 1.289 ±0.021 | 1.372 ±0.003 | 2.368 ±0.071 | 1.877 ±0.030 | 1.745 ±0.012 |
| T2                 | 1.172 ±0.062 | 1.234 ±0.022 | 1.262 ±0.035 | 2.364 ±0.058 | 1.807 ±0.037 | 1.675 ±0.004 |
| T3                 | 1.184 ±0.075 | 1.255 ±0.027 | 1.213 ±0.060 | 2.335 ±0.110 | 1.833 ±0.030 | 1.673 ±0.020 |
| T4                 | 1.178 ±0.029 | 1.185 ±0.041 | 1.208 ±0.017 | 2.392 ±0.050 | 1.624 ±0.010 | 1.600 ±0.016 |
| T5                 | 1.164 ±0.050 | 1.233 ±0.024 | 1.243 ±0.014 | 2.338 ±0.073 | 1.714 ±0.055 | 1.628 ±0.015 |

*The level of significance (P <0.05) is indicated as follows: NS: Non Significant means no significant differences between the mean of the transactions. * The parameters are: T1: comparison group (12-hour fasting). T2: Early feeding with gel 95 (1 g / chick). T3: Early feeding with Safmannan prebiotic Gel (1 g / chick). T4: Early feeding with gel 95+ safmannan prebiotic gel (1/2 gram gel 95 + 1/2 gram prebiotic gel). T5: Early Feeding with Gel 95+ Safmannan prebiotic Gel (1 g gel 95+ 1 g safmannan prebiotic gel).
*The different letters between the parameters indicate the presence of significant differences between the averages at the probability level * (P < 0.05). NS: Non Significant means no significant differences between the mean of the factors. * The parameters are: T1: comparison group (12-hour staking). T2: Early feeding with gel 95 (1 g / chick). T3: early feeding with Safmannan prebiotic Gel (1 g / chick). T4: early feeding with gel 95 + safmannan prebiotic gel (1 / 2 gram gel 95 + 1/2 gram prebiotic gel). T5: Early Feeding with Gel 95+ Safmannan prebiotic gel(1 gGel 95+1 g safmannan prebiotic gel)

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