

EVALUATION THE EFFECT OF DIETARY SUPPLEMENTATION WITH HIGH LEVELS OF LOCALLY PREPARED PROBIOTIC (Iraqi Probiotic) ON PRODUCTIVE PERFORMANCE OF BROILER CHICKENS

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ABSTRACT

A total of 420 Ross broiler chicks, one day old, were divided in to four treatment group were fed on standard broiler starter and finisher diets. And used as control. Chicks in T₂, T₃ and T₄ were fed on diets supplanted with 4, 6 and 8 g/kg of locally prepared probiotic respectively. characteristics included in this experiment were: mean body weight, gain feed conversion , mortality, feed intake, dressing percentage with or without giblets, relative weight of carcass cuts, relative weight of heart, gizzard, liver, and productive index.

Results revealed that the addition of probiotic to broiler diet resulted in a significant ($p>0.01$) increase in final body weight gain and feed conversion ratio. Also T₂ recorded the best result as regards most of traits studied in this experiment. Dietary treatments were significantly improved production index and decreased mortality. No significant differences were observed in relative carcass cuts except for breast percentage which increased significantly.

INTRODUCTION

Probiotic was a mixture of benefit microbes (bacteria geast and mold) which mixed with fed of animals in order to make a benefit and healthy microbial balance in the intestine this balance lead to improved animal productivity especially in stressed animal which face a heat stress, fed on toxic or improper diets (17, 19). Inclusion the probiotic in poultry diet seemed to improve broiler performance (2, 14) and increased egg production in layer (16) and enhanced fertility and hatchability in broiler breeders (18). A locally prepared probiotic (Iraqi probiotic) were actually tested and compared with foreign imported probiotic products in Iraq and proved its superior activity in improve broiler, Layer and breeder performance. In large scale pilot study on Layer farms, Abbas (1) used diet supplemented with Iraqi probiotic at the rate of 2 or 4 Kg. per ton of the diet. The data showed that diet supplementation with the two levels of probiotics were significantly improved egg production, egg weight, feed efficiency and decreased mortality. Al-Khalidi (3) compares the effect of locally prepared Iraqi probiotic and commercially imported probiotic (Biomim) on broiler performance. Iraqi probiotic seemed to be more efficient to increase body weight at marketing, feed conversion, and decreased mortality. Another comparison of the Iraqi probiotic with foreign trade probiotic (Biotronic) were carried out in large Layer farms by Al-Norie (4) His data showed that Iraqi probiotic had the priority in improving the layer performance. The two kinds of probiotics were the layer performance.

The two kinds of probiotics were significantly increased hen-day and hen house egg production, egg mass, egg weight and accumulative egg production. Iraqi probiotic consist of three kinds of bacteria (*Lactobacilli Bacillus subtitles*)

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and *Lactobacillus acidophilus*) and one kind of yeast (*Saccharomycis cervisia*). This mixture of benefit microbes in Iraqi probiotic may be make its priority when compared with other products science Ram (10) concluded that the polygeneric probiotics, which have multi kids of microbes were better than monogeneric probiotics which consist of one species of benefit microbe. The tested inclusion rat for Iraqi probiotic are ranged between 2-5g per kg of the diet.

In this study we aimed to test a higher inclusion rate. For this purpose different levels of Iraqi probiotic were used as diet supplementation to determine their effects on broiler performance.

MATERIAL AND METHODS

This experiment was conducted at the poultry farm of animal resources Dept. College of Agric. During the period from 28/2/2004 to 23/4/2004 to evaluate the effect of dietary supplementation with different levels of Iraqi probiotic on productive performance of broiler chickens. A total of 420 Ross broiler chicks one day old were divided into four treatment groups. Each treatment group was further sub-divided into three replicates of 35 chicks per replicate. Chicks in T₁ group were fed a tradition diet (Table 1) with no probiotic supplementation and used as control. Chicks in T₂, T₃ and T₄ were fed on diets supplemented with 4, 6 and 8 g/kg of Iraqi probiotic respectively. Characteristics included in this experiment were: mean body, weight gain, feed conversion, mortality, feed intake, dressing percentages with or without giblets, relative weight of carcass cuts, relative weight of heart, gizzard, liver. At the of the experimental period production index were calculated (8).

Table 1: composition of experimental diets

Ingredients (%)	Starter diet (1-28 days)	Finisher diet (29-56 days)
Yellow corn	30	30
wheat	29	36
Soybean	29	20
Protein concentrate	10	10
Soybean oil	3	3
Limestone	0.7	0.7
salt	0.3	0.3
Total	100	100
Calculated chemical Analysis		
Crude protein (%)	22.82	19.89
ME (Kcal/kg.)	3044.1	3124.2
Lysine%	1.22	1.01
Methionine%	0.45	0.41
Calcium%	0.87	0.85
Total phosphorus%	0.48	0.47
Available phosphorus%	0.15	0.14
Methionine + Cystine%	0.83	0.75

* Protein concentrate used was Al-haiat which imported from Jordan. This concentrate provided per kg: 44% CRUDE PROTEIN 2800 ME Kcal/kg. Crude fat 120% Ash 25% Calcium 5% available phosphorus 74% methionine 75% Lysine 2.8% methionine +2.55%.

Data were subjected to an ANOVA analysis using the general linear models (GLM) procedures of SAS (13) significant treatment means differences were tested by using the multiple range test of Duncan (13).

RESULTS AND DISCUSSION

The effect of diet supplementation with probiotic at the levels of 0, 4, 6 and 8 g /kg on the weekly body weight is presented in Table (2). No significant differences were observed in body weight between treatments groups during the first six week of broiler age. The effects of probiotic in enhancing the body weight were appeared during the last two week of the experimental period which is lasted for 8 weeks. Diet supplementation with the three levels of ptobiotic improved the final body weight of broiler in comparison with control group (T₁). birds in T₂ recorded the highest mean body weight ($p < 0.01$) during 7 and 8 weeks of age as compared with other groups. Furthermore T₂ group surpass T₃ and T₄ groups with relation to final body weight at 8 weeks old.

Table 2: Effect of diet supplementation with probioric (Iraqi Probiotic) at the levels of 0, 4, 6 and 8 g/kg On weekly weight gain for Ross broiler chicks reared to 8 weeks of age

Age (weeks)	Treatments				significance
	T ₁	T ₂	T ₃	T ₄	
1	81.5	75.8	75.0	73.0	NS
2	197.2	201.3	199.0	200.5	NS
3	380.3	362.8	363.0	362.2	NS
4	421.7	406.8	414.1	413.1	NS
5	254.8	265.7	279.6	263.9	NS
6	338.6	384.8	380.1	351.0	NS
7	581.8	529.2	530.8	473.5	*
8	344.3	370.5	413.0	388.1	NS
Total	2525.7	2656.2	2595.9	2600.5	*

**: $p < 0.05$, a, b, mean values with different superscripts within arrow differ significantly. NS: no significant.

Results revealed

There were no significant differences between treatment groups during the first six weeks of age regarding weight gain (Table 3). At the end of the experimental period the difference were become more pronounced. Although, the weight gain for the probiotic groups were acceded the control group but these difference were not statistically different accept for T₂ recorded the highest body weight gain during the total period of experiment. This result concluded that the best level for Iraqi probiotic supplementation for broiler diets was 4 g/kg.

Table 3: Effect of diet supplementation with probioric (Iraqi Probiotic) at the levels of 0, 4, 6 and 8 g/kg On mean weekly body weight (for Ross broiler chicks reared to 8 weeks of age

Age (Weeks)	Treatments				Significance
	T ₁	T ₂	T ₃	T ₄	
1	117.1	118.5	118.9	124.6	NS
2	317.7	317.5	320.3	321.9	NS
3	679.9	681.5	683.1	702.2	NS
4	1093.0	1096.2	1088.6	1123.9	NS
5	1707.9	1375.8	1354.4	1378.8	NS
6	2181.5	1755.9	1739.2	1717.5	NS
7	2569.6	2286.7	2268.5	2259.3	**
8	2569.6	2699.7	2639.7	2643.6	**

**: $p < 0.01$, a, b, mean values with different superscripts within arrow differ significantly. NS: no significant.

There is no positive response when the probiotic level were increased. The result noticed by Al-Khalidi (3) who concluded that the best inclusion rate of

Iraqi probiotic in boiler diet was 2.5g/kg rather than 5g/kg the real answer and explanation for this phenomena is waited for another search.

Results also indicate that there were no significant differences between treatment groups in respect of feed intake (Table 4) but diet supplementation with probiotics had significantly ($p<0.05$) improved feed conversion ratio (Table 5). Also T₂ recorded the best result in relation to this trait. Further studies have been suggested that the improvement of feed conversion belonged to the ability of the benefit microbes which consist the probiotic to secret digestible enzymes like beta glucanase and phytase which help the digestibility and increased the availability for a specific nutrients like phosphorus vitamins trace minerals and encouraging the protein and carbohydrate digestion (11) the effect of diet supplementation with different levels of probiotics on dressing percentages relative weight carcass cuts mortality and production index are summarized in Table (6). dietary treatment had not a significant effect on dressing percentages with or without giblets gizzard weight heart weight and relative carcass cuts (parts weight accept for breast cut. Relative breast weight for T₂ birds were significantly ($p<0.01$) higher than control group (T₁) and that for T₃ and T₄.

Table 4: Effect of diet supplementation with probioric (Iraqi Probiotic) at the levels of 0, 4, 6 and 8 g/kg on weekly feed consumption (gm) of Ross broiler chicks reared to 8 weeks of age

Age (weeks)	Treatments				Significance
	T ₁	T ₂	T ₃	T ₄	
1	97.2	44.7	96.0	95.8	NS
2	231.1	334.8	339.3	329.3	NS
3	409.5	507.3	529.9	507.3	NS
4	651.1	648.1	647.8	653.3	NS
5	725.4	712.3	726.8	710.5	NS
6	899.8	867.4	902.9	849.5	NS
7	998.0	1004.8	1000.0	1003.5	NS
8	988.6	980.7	987.7	996.2	NS
Total	5196.4	5157.0	5218.7	5151.0	NS

NS: Not significant

Table 5: Effect of diet supplementation with probioric (Iraqi Probiotic) at the levels of 0, 4, 6 and 8 g/kg on weekly feed conversion ratio (g feed/g gain) of Ross broiler chicks reared to 8 weeks of age

Age (weeks)	Treatments				Significance
	T ₁	T ₂	T ₃	T ₄	
1	1.31	1.28	1.25	1.19	NS
2	1.64	1.70	1.66	1.68	NS
3	1.4	1.36	1.44	1.34	NS
4	1.57	1.56	1.60	1.55	NS
5	2.74	2.56	2.76	2.78	NS
6	2.58	2.28	2.36	2.57	NS
7	2.08	1.90	1.89	1.72	*
8	2.55	2.37	2.68	2.89	*
total	2.06	1.94	2.01	1.98	*

**: $p<0.05$, a, b, mean values with different superscripts within arrow differ significantly. Ns: no significant.

Results of this experiment also denoted that dietary supplementation with probiotic were significantly ($p<0.01$) increased relative liver weight and decreased mortality for broiler chickens.

The mortality percent were decline from 11.8% for control group to 5.7% for T₂ and to 5.1 and 6.2% for T₃ and T₄ respectively.

Table 6: Effect of diet supplementation with probioric at the levels of 0, 4, 6 and 8 g/kg dressing percentages with or without giblets carcass characteristic mortality and production index

characteristic	Treatments				Significance
	T ₁	T ₂	T ₃	T ₄	
Dressing% with giblets	75.3	76.6	75.9	75.6	ns
Dressing% without giblets	70.9	72.3	71.0	71.3	ns
Breast weight (%)	24.94b	26.13a	24.56b	22.68c	**
Wing weight (%)	7.74	8.09	7.50	7.95	ns
Back weight (%)	16.11	15.89	15.41	15.15	ns
Drumstick weight (%)	9.97	10.57	10.18	10.27	ns
Neck weight (%)	3.56	3.69	3.40	3.60	ns
Thigh weight (%)	11.54	12.52	11.08	11.20	ns
Gizzard weight (%)	2.30	1.91	2.00	1.99	ns
Heart weight (%)	0.48	0.47	0.48	0.46	ns
Liver weight (%)	1.66c	1.91b	2.14a	1.86bc	**
Mortality (%)	11.8a	5.7b	5.1b	6.2b	**
Production index	196.5c	234.3a	222.6b	223.6b	**

** : $p < 0.01$, a, b, mean values with different superscripts within arrow differ significantly. Ns: no significant.

The production index which is reflected all productive parameters were significantly ($p < 0.01$) improved by dietary treatment. This index was increased from 196.5 for control (T₁) group to 234.3 for T₂ group which recorded the highest value when compared with other two dietary treatment group (T₃ and T₄).

Published researches describe four major modes of action of probiotic to enhance the productive performance of broiler chicks. These four modes of action maybe summarized as follows:

- 1- Increased digestibility and availability for the most nutrients.
- 2- Compositely excluded and killed of pathogenic bacteria and prevent the to cause a clinical and sub-clinical diseases.
- 3- The volatile fatty acids which produced from the benefit microbes were used as nutrient for enterocyts cells their for the villi height were become longer and the rate of passage for the nutrient time for digestion and absorption. A beautiful intestinal histological study were done by Santos (12).
- 4- In conclusion this experiment showed that the diet supplementation with 4, 6 and 8 g/kg. Had significantly improved productive performance for broiler chickens. The best level of diet supplementation is 4 g/kg probiotic in the future may be used as growth promoters antimicrobial agents and immunity enhancement.

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تقويم اضافة مستويات مرتفعة من المعزز الحيوي المحلي (Iraqi Localy probiotic) في الاداء الانتاجي

لفروج اللحم

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الملخص

استخدم في التجربة 420 فرخ لحم بعمر يوم واحد سلالة (Ross) قسمت الافراخ الى اربع معاملات تغذوية. غذيت افراخ المعاملة الاولى على عليقة بادئ ونمو وقياسية. واستخدمت كمعاملة للمقارنة Control افراخ معاملات T₂، T₃ و T₄ غذيت على علائق تحتوي على اضافات من بروبايوتك المعزز الحيوي المحلي معدل 4، 6 و 8 غم/كغم من العلف على التوالي. الصفات التي درست في هذه التجربة هي كل من معدل وزن الجسم، معدل زيادة الوزن، كفاءة تحويل الغذاء، نسبة الهلاكات، استهلاك العلف ونسبة التصافي مع او بدون الاحشاء الداخلية المأكولة. كذلك درست نسبة القطيعات للذبيحة والوزن النسبي للاحشاء المأكولة التي شملت القلب والقانصة والكبد وبنهاية التجربة تم حساب الدليل الانتاجي.

اشارت النتائج الى ان تجهيز العلائق بالمعزز الحيوي كان له تاثير عالي المعنوية ($p > 0.01$) في رفع معدلات وزن الجسم وزيادة الوزن واستهلاك العلف وكفاءة التحويل الغذائي. وسجلت المعاملة الثانية افضل المعدلات في هذه الصفات. كذلك لوحظ بان الاضافات العلفية حسنت من قيم الدليل الانتاجي وخفضت نسبة الهلاكات، لم تؤثر المعاملات في نسبة القطيعات من الذبيحة ما عدا الوزن النسبي لقطعة الصدر الذي زاد بنسبة معنوية.

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