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Original Article

Effects of *Malva parviflora* Leafs as the Herbal Additives on Broilers Productivity

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Abstract

Malva parviflora is a leafy vegetable belonging to the family Malvaceae. Medicinal plants have had several vital chemical compounds, with some biological functions. Supplementation of these plants to the animals diets lead to significant betterments in the animals' productivity and health status. This study was designed to investigate the effects of *Malva parviflora* as a substitute for commercial premix carrier in the poultry diets to see the response on some of the productive and economic traits in broilers. 576 one day old Ross 308 chicks were randomly divided into eight groups with three replicate (24 bird /replicate) per group. Each group was subjected to the one of the following treatments: Tr 1. (Control) contained 2.5% of diet supplemented with homemade premix (with carrier Malva parviflora weed leaves meal), Tr 2. 2.5% provimi premix, Tr 3. 2.5% Turkis hpremix, Tr 4. Dutch premix, Tr 5. 50% homemade premix + 50% provimi premix, Tr 6. 50% homemade premix + 50% Turkish, Tr 7. Homemade premix + 50% Dutch 50% Tr 8. 25% from each four types premixes. Live body weight, feed consumption, feed conversion, growth rate، Production Index، economic indicator and mortality rate averages were measured to the 5 weeks of age. Result showed that there were significant differences (P<0.05) among treatments in weight gains at all periods. Treatment 1،26،5، 4 ،showed the highest weight gain at 5 weeks of age;however, Tr.3،7 showed the lowest value. There were significant differences (P<0.05) in the rate of feed consumption among treatments during the different periods. Birds in Tr.3 consumed the highest amount of feed compared with control, Also there was significant differences in feed conversion ratio among all treatment groups at all periods where, the highest value was found in (Tr.3), and the lowest value was recorded in Tr.1.At least there was large differences in cost of locally premix which recorded the cheapest and lowest value about 1300 U.S.A$ less in every ton compared with the commercial premixes.

Keywords: Diets, Dutch, Locally Premix, Broilers Performance

1. Introduction

Medicinal plants have had several vital chemical compounds, with some biological functions. Supplementation of these plants to the animals diets lead to significant betterments in the animals' productivity and health status. The medicinal plants normally consumed as the herbal remedies, however some of them such as the mallow plant have been used in the normal and daily diets of humans being due to their highly nutritional value.

Malva parviflora is a leafy vegetable belonging to the family Malvaceae (1). It grows in most countries of the world, including Iraq, where it is found naturally in gardens, fields and roadsides. The plant is traditionally used in the treatment of all types of infections, especially as an anti-hemorrhoid and as a ameliorative substances for chest pain in children, in addition to its use as an anti-constipation substance (2, 3). *Malva parviflora* contains varying amounts of minerals, the most important of which are zinc, copper, cadmium (4),

calcium, iron (5), and phosphorous (6). It also contains vitamins, the most important of which are vitamin B3, B2, B1, E, C, A, in addition to salicylic acid (7, 8). *Malva parviflora* flowers are used in the treatment of burns. The leaves extract by boiling is considered a nerve tonic and moisturizer for the skin (9). The chemical analysis of *Malva parviflora* showed that the active substances presented in this plant are as follows: anthocyanins; flavonels; ferulic acid; hydroxycinnamic acid; steroles; sesquiterpenes (10, 11). The results of the studies showed that the leaves of plants are a good source of some phenolic compounds and antioxidant compounds (12). The plant has also been found to be effective against bacteria and fungi infections (12).

In view of the nutritional and medical benefits that this plant possesses and the scarcity of research on its use in poultry feeds, this study was designed to investigate the effects of *Malva parviflora* as a substitute for commercial premix carrier in the poultry diets to see the response on some of the productive and economic traits in broilers.

2. Materials and Methods

2.1. Preparation of *Malva parviflora* Weeds Leafs Powder

This step was carried out according to the method previously described by Malik, Aremu (13). Whole plants of weeds were collected from the college gardens in Najaf State. The green plants were harvested freshly; roots and stems were separated. Then the leaves were transferred to the Animal Production Laboratory for more processing. The *Malva parviflora* leaves were washed and carefully inspection to remove all unwanted substances and sun-dried for about three days. They were then kept in apolythene bags for further processing. Collections of the *Malva parviflora* plant were carried out at one period of the year at the peak of the cold season, during February 2021. They were then dried in forced-oven at 40°C for about 24 h to a moisture content of about 10 %. The dried plants were then grinded using an attrition mill and sieved through a 1 mm sieve to obtain *Malva parviflora* L. weeds leaves powder which was then stored in large plastic containers with tight-fitting lids until needed.

2.2. Chemical Analysis Measurement of Essential Ingredients of Diets

Chemical composition of the *Malva parviflora* L weed leaves meal (MPM) was determined using the standard procedures previously described by Horwitz (14). All ingredients of diets determinations have been done in triplicates, including approximate chemical composition table 1 for all macro ingredient, mineral composition for *Malva parviflora* L. leaves meal (Table 2). The bioactive compounds are tabulated in table 3 and the amino acids are listed in table 4. The composition of homemade and commercial premixes is listed in table 5. The starter formulation is presented in table 6. The finisher diets for all treatments are same and the formulation (Table 7).

Table 1. Approximate chemical composition for ingredient in diets

Ingredients	DM %	ASH %	CF %	EE %	CP %	NFE %	ME Kcal/Kg
Malva parviflora L. leafs meal	92.6	8.83	7.252	2.92	30.0	21.0	1999.8
Locally wheat grain	89.0	1.0	3.2	2.1	13.6	69.1	3150.0
Turkish yellow corn	90.0	2.1	2.3	3.0	8.5	74.1	3353.0
Soybean meal	92.0	10.3	6.1	2.3	48.0	25.3	2232.0

Table 2. Mineral composition of *Malva parviflora* weed leafs meal

Mineral	Composition(ppm)
Phosphorus :P	**4.9**
Calcium :Ca	**63.5**
Zinc (Zn)	**0.41**
Se	**4.1**
Cobalt(Co)	**10.6**
Magnesium(Mg)	**21.3**
Manganese(Mn)	**0.23**

Table 3. Bioactive compounds in *Malva parviflora* weed leafes meal

Bioactive compounds	Value
Total alkaloid content %	**3.8**
Total phenolic content (mg Gallic /100gm)	**256.0**
Total anthocyanin content(mg/100gm	**0.41**
Total flavonoids content (mgRutin/100gm)	**96.4**
Total glycoside content %	**4.9**

Table 4. Amino acids content in *Malva parviflora* weed leaves meal

AA	Tyrosine	Arginine	Aspartic	Glutamic	Glycine	Lucien
D.M%	**2.69**	**1.26**	**1.58**	**2.00**	**3.05**	**3.07**
A.A	**Lysine**	**Methionine**	**Phenyl alanine**	**Serine**	**Valine**	**Asparagin e**

Table 5. Composition of homemade and commercial premixes

component	Locally premix	Provimi premix	Turkish premix	Dutch premix
ME Kcal/Kg	1200	4800	4000	1540
Crude protein%	16	17	47	11.2
Crude fat %		1.5		
Moisture %	7.4	10	12	10
		Vitamins		
*Vit. A(i.u)	480 000	480000	12.000.000	400 000
Vit.D3(i.u)	140000	220000	5.000.000	120000
Vit.E(i.u)	1333	3000	80.000	2000
Vit.K3(i.u)	100	138	3.200	120
Vit.B1(mg)	83	138	3.200	160
Vit.B2(mg)	200	280	8.600	300
Vit.B6 (mg)	400.0	160	4.300	200
Vit.B12(mg)	0.7	1	17	1
Vit.B3(mg)	1333	1800	60.000	2000
Vit.B5(mg)	400	600	17.000	600
Folic acid B9 (mg)	50	48	2.200	40
Biotin B7 (mg)	3.3	6	220	4
Cholin B4(mg)	0	20000	300.000	0
		Minerals		
A val.P%	1.06	13.7%	14.6	1.04
Total P%		6.7%		
Total Ca		15.0%	15.6	
Na	-	4.8%	5.9	6.4
Cl		5.8%		
Mn(mg)	2666.7	3200	120.000	3200
Fe(mg)	1566.7	2400	40.000	2.400
component	**Locally premix**	**Provimi premix**	**Turkish premix**	**Dutch premix**
Zn(mg)	2666.7	3880	110.000	2400
Cu(mg)	333.3	480	15.000	600
Co(mg)	8.3		—	0
I(mg)	50	48	1.250	2800
Se(mg)	6.7	10	300	12
BHT	3333	250	Sepiolite 1.075.00	0
Methionine%	15	7.8%	12.50	8.5
Lysine%	10	9.3%	7.000	5.4
Meth+Cys%	2.57	7.8%	12.5	9
Therionine%	0	0.4%	1.8	0.5
Phytase(u/kg)	1500	39200	100.000	-
Glucanase(u/kg)	-	200000	-	-
Amylase(u/kg)	3000	120000	-	-
xylanase (u/kg)	32000	80000	-	-
Protease(u/kg)	4000			
Multi enzyme*	-	-	100.000	-
Organic acids %	-	0.8	-	-

*Multi enzyme:(Endo-1,4-beta-xylanase, 6-phytase, Alpha – amylase, Protease, 200 – 500 gm/Ton feed. Technozyme Multi, Germany

Table 6. Starter Diets for all treatments

Ingredients	Treatments							
	T1	T2	T3	T4	T5	T6	T7	T8
Corn	43.10	44.7	47.1	41.40	49.2	50.2	42.20	44.17
Soybean meal	36.50	36.50	34.2	37.50	35.50	34.50	37.00	36.17
Wheat	3.001	13.00	13.00	3.001	13.00	13.00	3.001	13.00
Locally premix*	2.5	—	—	—	—	—	—	—
Provimi premix	—	2.5	—	—	—	—	—	—
Turkish premix	—	—	2.5	—	—	—	—	—
Dutch premix	—	—	—	2.5	—	—	—	—
50% Locally+50% provimi	—	—	—	—	2.5	—	—	—
50%Locally+50%Turkish	—	—	—	—	—	2.5	—	—
50%Locally+50%Dutch	—	—	—	—	—	—	2.5	—
25% from each premix	—	—	—	—	—	—	—	2.5
Corn oil%	3.60	2.0	1.9	4.30	1.1	1.1	4.00	2.95
Salt%	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
DACL %**	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Limstone	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
ME,Kcal/Kg	3021.2	3021.2	3021.0	3020.0	3023.0	3024.0	3023.0	3020.8
CP%	23.30	23.35	23.33	23.27	23.36	23.35	23.31	23.31
Total Ca%	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Aval.P%	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
CF%	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86
Lysine %	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43
Meth.+Cys.%	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
C/P Ratio	128.7	128.7	128.7	128.7	128.7	128.7	128.7	128.7

* Locally premix its carrier Malva parviflora weed leaves meal, Jordan premix- Provimi,Turkish premix- BirsenKimya,Dutch premix-Koudijs

**DiCalcium Phosphate (Turkish) Contain: 22% Inorganic Calcium, 18% Inorganic Phosphorus

Table 7. Finisher diets for all treatments

Ingredients	Treatments							
	T1	T2	T3	T4	T5	T6	T7	T8
Corn	50.60	52.20	53.20	49.40	51.4	51.4	50.0	51.2
Soybean meal	28.4	28.4	26.4	28.7	28.4	27.4	28.7	27.9
Wheat	12.0	12.0	13.0	13.0	12.0	13.0	12.3	12.7
Locally premix*	2.5	—	—	—	—	—	—	—
Provimi premix	—	2.5	—	—	—	—	—	—
Turkish premix	—	—	2.5		—	—	—	—
Dutch premix	—	—	—	2.5	—	—	—	—
50%Locally+50%provimi	—	—	—	—	2.5	—	—	—
50%Locally+50%Turkish	—	—	—	—	—	2.5	—	—
50%Locally+50%Dutch	—	—	—	—	—	—	2.5	—
25% from each premix	—	—	—	—	—	—	—	2.5
Corn oil%	5.2	3.6	3.6	5.1	4.4	4.4	5.2	4.4
Salt%	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
DACL %**	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Limstone	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Total	100	100	100	100	100	100	100	100
ME,Kcal/Kg	3204.0	3203.0	3203.0	3202.0	3204.0	3204.0	3204.0	3203.0
CP%	20.00	20.10	20.1	20.00	20.03	20.05	20.02	20.01
Total Ca%	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aval.P%	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
CF%	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56
Lysine %	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43
Meth.+Cys.%	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
C/P Ratio	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0

*Local premixes (its carrier *Malva parviflora* weed leaves meal)

2.3. Study Design

A total of 576 one-day-old mixed-sex Ross 308 broiler birds were obtained from commercially hatched eggs (Al-Anwar Hatchery-Babylon). They were raised from day old at the Poultry farm of the Animal Production Department. Birds with one day-old-age were randomly allocated to 15 floor pens (2 × 1. 5 m) with wood shavings (24 birds per pen). The floor pens were located in an open-sided house, and each pen was equipped with an automatic bell drinker and1tube feeder. The pen was considered as experimental unit for performance measurements. The birds were randomly allocated to eight dietary treatments of 24 birds per replicate and three replicates per treatment in a randomized completely block design. Eight treatments as following:

Tr 1. (Control) contained 2.5% of diet supplemented with homemade premix (with carrier Malva parviflora weed leaves meal), Tr 2. 2.5% provimi premix, Tr 3. 2.5% Turkis hpremix, Tr 4. Dutch premix, Tr 5. 50% homemade premix + 50% provimi premix, Tr 6. 50% homemade premix + 50% Turkish, Tr 7. homemade premix + 50% Dutch 50% Tr 8. 25% from each four types premixes. Levels The percentage composition of the experimental diets for the starting and finishing is shown in (Table 1). These diets were formulated to be iso-energetic and iso-nitrogenous according to NRC (15), nutrient requirements for broiler, in particular the recommendations for Ross 308 strain. The birds were reared and grown to market age 5 weeks. The birds were also given standard medication and prophylactic treatments as recommended by the Iraqi Veterinary Medical Association for this region. Birds were provided add libitum to feed and water, with constant illumination of 23 h of light and 1 h of dark per day during the entire growing period. Feed consumption, body weight gain, Feed conversion ratio were recorded weekly of age.

2.4. Performance Traits

Feed consumption (FC: g/bird/period) and body weight gain (BWG, g/bird /period) were recorded at the beginning of the experiment (day1) until the end of the experiment as 21^{th} and 35^{th} day of age. Feed conversion ratio (FCR) was calculated by dividing feed consumption/body weight gain. On the final day of the experiment, (35^{th} day-of-age), two bird from each replicate (six from each treatment) were randomly slaughtered and dissected, plucked and eviscerated. Chickens heads and Legs were removed, and then internal organs (liver, gizzard and heart) were removed, weighted and calculated as percentage of carcass weight. The dressed carcass was divided into breast, thigh, back, wings, neck, cuts which were weighed and calculated as percentage of dressed carcass weight. The length of the esophagus and crop, small intestine, both caeca and large intestine was tape-measured. In addition, the following internal organs were separated and weighed to the nearest 0.001 g on a Medicate M160scales:gizzard (without digests), liver, (without gallbladder), heart, Next, the percentage of these organs to pre slaughter body weight was determined.

2.5. Statistical Analysis

Statistical analysis were conducted using SAS(Version 6, SAS Institute, Cary, NC, USA) (16). Data collected were subjected to analysis of variance (ANOVA) by means of the General Linear Models (GLM) procedure , based on the Randomized Completely Block. Means were compared using the Duncan (17)'s Multiple Range Test.

3. Results and Discussion

Table 8 showed the weight gain, feed consumption, feed conversion ratio of the control and the dietary treated groups. In the characteristic of weight gain, it can be seen from Table 8, that during the starter period (first 21 days of the chickens life), treatments 8,1,4 were significantly ($P \leq 0.05$) superior to the rest of the treatments, and at the same time, treatment 4 did not differ significantly with the rest of the treatments, while significant differences appeared during the total period (0-5) weeks, as treatments 4,8,1,5,2 outperformed the rest of the treatments.

We note from these results that the local premix (T1 control treatment) competes strongly with the commercial Dutch premix, as individual or with combination ,that is mean Getting the most benefit for the bird from the ingredients of diet because of high availability of nutrients and increasing of digestibility and High sedimentation rate of essential nutrients inside the bird's body, and thus high growth rates appeared with high rates of weight gain for birds compared to their counterparts that ate diets containing Turkish premix or Jordanian provimi premix.

As for the total period (0-5) a week, it seems that the local, Dutch and Jordanian premix have shown a clear moral superiority over the Turkish premix, and the reason for this may be due to the inaccuracy of the specifications of the Turkish premix related to meeting the birds' needs of vitamins, minerals and other additives to achieve the maximum possible metabolic rates.

As for the amount of feed consumed, it is noted from the same table that during the three periods, the initial, the final and the total, the largest consumption in the amount of feed occurred in the birds that ate rations that contained the Turkish premix with the lowest rates of weight gain, perhaps due to the decrease in the amount of energy in this premix or that it is installed on The leaf of the Turkish premix product is much higher than the real figure, which was reflected in the increased intake of feed for birds to meet their energy needs .As for the feed conversion ratio, the statistical analysis from the same table showed that the least significant rates were for the share of treatments T1, T7, T5 and T2 compared with the rest of the treatments during the starter and finisher periods, while during the total period the control treatment T1 (local premix) was recorded and T7 (local and Dutch premix in half) lower the significant values, followed by T6 (local and Turkish premix in half), then followed by the two treatments T5 (local premix and Provimi in half) and T8 (a combination of the four premixes in equal proportions), followed by T2 (Provimi premix) and either worse. The values were recorded in the birds that fed rations contained Turkish premix T3 were the highest compared with all treatments in this study. There were no significant ($P \leq 0.05$) differences in mortality between all treatments .Generally show our study explain that local premixes (its carrier *Malva parviflora* weed leaves meal) individual or half with Dutch premix gave the best results ,and Turkish premixes gave the bad results, this may be due to contain local premix bioactive compound like a flavonoids (Rutin 96.4 mgL100gm leaves meal) which play essential role as antioxidant materials and satisfy birds requirements from vitamins , minerals, amino acids which done increasing in availability of nutrients diets and caused appositive reflex on internal metabolites process which depended on vitamins and minerals and this lead to increasing of anabolism rate to gate high weight gain and speed growth (18). Also the same trends in feed consumption and feed conversion ration, Generally we noticed that all birds intake Turkish premix appeared weak feathering and slow growth with high quantity of feed intake ,may be due to bad quality of this premix through happened some of chemical changes in vitamins and minerals because of choline in premix which made hydroscopic and moisture absorbed and this lead to oxidation of minerals and fat rancidity so degradation of vitamins especially fat soluble vitamins (A,D,E) and decreasing in satisfy of bird requirements so the birds eating more feeds to satisfied their needs (19). Also feed conversion ratio at total periods (0 – 5)week ,the Turkish premix gave the bad values compared with the best values in local and Dutch premixes and this may be due to decreasing in availability of energy and crude proteins efficiency. Local premixes nearly equal in potential capacity with Dutch premix and this may be due to protein quality in local premix carrier *Malva parviflora* weed leaves meal which contained essential amino acids like lysine(3.79%),methionine (2.45%),this results agreements with (20).

Table 9 showed carcass traits and dressing percentage, there was no significant differences ($P \leq 0.05$) between all treatments. This result was in

agreement with the results of a stucy conducted by Pandurević, Lalović (18) who found that high positive correlation between weight before slaughtering and dressing percentage and the value r=0.7, or may be all rations were iso nitrogenous and calorie and calorie protein ratio (C/P ratio) which lead to similar dressing percentage without edibles. The same table appeared no significant differences in percentage of heart and gizzard while appeared significant differences ($P\leq0.05$) in Liver weight as% of live body weight, the highest value recorded in T4,T3,T1,T7,T2,T6,T8 and the least don't differ significantly with T5,the weight percentages were 2.71,2.63,2.62,2.58,2.41,2.29,2.25 and 2.07 % respectively. Also table 10 appeared there is no significant differences in carcass cuts like breast, neck, wings, while there were significant differences ($P\leq0.05$) in thighs percentage, the highest value 29.87% (T1:local premix) and the lowest value 26.26% (T3:Turkish premix),also appeared high significant differences ($P\leq0.01$) in back percentage, the highest value 21.15% (T5:50% local premix+50% provimi premix),the lowest value 19.6% recorded in T1.The economic benefits trends to locally premix because the lowest cost for produced one ton about 400 $/ton vs 1600 $/ton for all comercila premixes. This result is considered a promising and encouraging step for the production of local premixes its carrier leafs of weeds that are not competitive for human consumption and are inexpensive, but a lot of money are spent on them by purchasing pesticides for the purpose of killed them.

Table 8. Means of some productive traits of broiler at(0-3),(4-5)and(0-5) weeks of age

	Means± SE								
Traits	**T1: Control**	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**	**Significant level**
Initial BW g/bird (1 d)	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	NS
Weight gain (0-3wk)	749.77±14.89^{ab}	698.69±22.62^{b}	697.95±7.36^{b}	737.98±24.44^{ab}	683.8±10.7^{b}	683.75±29.45^{b}	722.14±22.32^{b}	792.03±19.47^{a}	*
Weight gain (4-5wk)	1147.71±28.27	1191.87±51.11	1132.92±58.59	1223.67±45.72	1204.02±11.15	1157.08±16.54	1101.25±28.93	1115.11±25.80	NS
Weight gain (0-5wk)	1897.48±28.51^{ab}	1890.57±70.53^{ab}	1830.87±52.68^{b}	1961.66±41.69^{a}	1897.06±22.26^{ab}	1840.84±23.60^{ab}	1823.39±11.01^{b}	1907.15±6.33^{ab}	*
Feed Consumption .g/bird (0-3wk)	1024.83±24.70^{ab}	971.30±35.25^{b}	1023.80±16.84^{ab}	998.78±34.14^{b}	953.94±10.97^{b}	975.15±38.29^{b}	998.86±29.21^{b}	1108.91±28.81^{a}	*
Feed Consumption. g/bird (4-5wk)	1916.83±50.81^{ab}	2030.68±93.12^{Ab}	2110.22±101.23^{a}	1981.23±63.24^{ab}	2062.84±22.24^{a}	2086.66±33.09^{a}	1842.88±51.31^{b}	1947.99±52.79^{ab}	*
Feed Consumption. g/bird (0-5wk)	2941.66±53.29^{ab}	3001.99±126.32^{ab}	3134.02±87.07^{a}	2980.01±74.86^{ab}	3016.78±29.82^{ab}	3061.82±43.17^{ab}	2841.74±23.70^{b}	3056.91±24.42^{ab}	*
F C R(0-3wk)	1.37±0.008^{d}	1.39±0.017^{cd}	1.47±0.008^{a}	1.35±0.007^{e}	1.38±0.006^{cde}	1.43±0.006^{b}	1.38±0.003^{cd}	1.400±.0050^{bc}	**
F C R (4-5wk)	1.67±0.005^{e}	1.70±0.008^{de}	1.86±0.006^{a}	1.62±0.023^{f}	1.71±0.012^{dc}	1.80±0.008^{b}	1.67±0.008^{e}	1.75±0.01^{c}	**
F C R (0-5wk)	1.55±0.005^{e}	1.59±0.01^{dc}	1.7±0.003^{a}	1.52±0.012^{f}	1.59±0.01^{c}	1.66±0.005^{b}	1.56±0.01^{de}	1.60±0.007^{c}	**
Mortality%	0%	0%	0%	0%	0%	0%	0%	0%	NS

*means different letters in every row indicated significant differences ($P\leq0.05$) among treatments
**means different letters in every row indicated significant differences ($P\leq0.01$) among treatments
NS: means the same letters in every row indicated no significant differences

Table 9. Dressing percentage without edibles and edibles weight for all treatments

Means±SE									
Treatments									
Traits	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**	**Significant level**
Final bodyweight(g)/bird pre slaughtering	1936.33±3.28	1929.67±72.39	1870.00±31.51	2000.33±77.18	1936.00±21.54	1880.33±33.49	1862.00±49.57	1946.00±3.21	NS
Hot carcass weight(g without edibles)	1320.67±68.70	1377.33±105.40	1331.67±31.68	1324.00±111.49	1436.67±15.59	1377.00±55.62	1337.33±25.75	1295.33±68.70	NS
Dressing percentage without edibles	68.21±3.66	71.17±3.08	71.19±0.49	65.95±3.23	74.20±0.38	73.17±1.64	71.89±1.92	66.57±3.60	NS
Heart as% of live body weight	0.63±0.03	0.55±0.03	0.52±0.01	0.64±0.05	0.52±0.01	0.58±0.03	0.68±0.12	0.52±0.01	NS
Liver weight as% of live body weight	2.62±0.04^{a}	2.41±0.16^{ab}	2.63±0.17^{a}	2.71±0.05^{a}	2.07±0.17^{b}	2.29±0.20^{ab}	2.58±0.14^{a}	2.25±0.13^{ab}	*
Gizzard as% of live body weight	1.90±0.15	1.66±0.08	1.75±0.14	1.81±0.02	1.75±0.11	1.75±0.11	1.83±0.06	1.82±0.05	NS

*means different letters in every row indicated significant differences ($P \leq 0.05$) among treatments
NS: means the same letters in every row indicated no significant differences

Table 10. Carcass cuts percentage of birds slaughtered at 5 weeks of age

Means±SE									
Percentage of carcass cuts%									
Traits	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**	**Significant level**
Breast%	33.38±0.23	34.73±0.64	35.14±1.22	35.07±0.77	33.42±1.59	35.30±0.71	35.66±0.26	35.88±0.17	NS
Thighs%	29.87±0.13^{a}	27.63±0.78^{ab}	26.26±1.04^{b}	25.69±0.42^{b}	27.09±1.19^{ab}	27.14±0.57^{ab}	27.30±1.01^{ab}	26.94±1.03^{b}	*
Back%	19.60±0.37^{b}	20.36±0.08^{ab}	20.03±0.42b	20.24±0.03^{b}	21.15±0.49^{a}	20.19±0.08^{b}	20.16±0.15^{b}	19.81±0.20^{b}	**
Neck%	5.22±0.01	5.38±0.21	5.43±0.14	5.17±0.07	5.52±0.16	5.43±0.32	5.08±0.07	5.20±0.17	NS
Wings%	10.59±0.05	10.47±0.11	11.23±0.42	11.73±0.59	10.85±0.14	10.72±0.26	10.90±0.46	10.83±0.49	NS

*means different letters in every row indicated significant differences ($P \leq 0.05$) among treatments
**means different letters in every row indicated significant differences ($P \leq 0.01$) among treatments
NS: means the same letters in every row indicated no significant differences

The results of our study seemed to us that homemade premix (its carrier *Malva parviflora* weed leaves meal) showed high potentially compared with commercial premixes Turkish or jordanian premixes and nearly equal to the Dutch commercial premix which knowing globally, addition of the local premix recorded the same carcass qualities as well as recorded the lowest cost compared with commercial premixes at percent 25% from commercial cost. A noxious weed that requires millions of dollars for its eradication and control can now be as an important and valuable feed resource for poultry. It is available in good quantities throughout the year and can be regarded as a valuable raw material vital to the Iraqi feed milling industry for syntheses local premix and formulation of balanced and quality feed for growing pullets at reduced cost.

Authors' Contribution

Study concept and design: K. K. A. A.
Acquisition of data: A. M. A.
Analysis and interpretation of data: A. M. A.
Drafting of the manuscript: K. K. A. A.
Critical revision of the manuscript for important intellectual content: K. K. A. A.
Statistical analysis: A. M. A.
Administrative, technical, and material support: A. M. A.

Ethics

The study was conducted according to the International Guidelines for research involving animals (Directive2010/63 /EU), specially slaughtering birds according to the Islamic procedures.

Conflict of Interest

The authors declare that they have no conflict of interest.

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