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COMPARATIVE OF LOCALLY PREMIX (CARRIER *MEDICAGO HISPIDA* LEAFS MEAL) WITH IMPORTED PREMIXES IN DIETS ON THE BROILER PERFORMANCE

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Abstract

The study was carried out at the Animal Production Department, Faculty of Agriculture, University of Kufa to investigate the effect of feeding locally premixes comparable with imported premixes the broiler diets. Starter diets (23.0% C.P and 3000.0 kcal ME/kg) feed were gave to the birds from week 1 to week 3 of age, and finisher diets which contained 20.0% C.P. and 3150.0 kcal ME/kg were gave from week 4to week 6 of age. Three hundred sixty one day old Ross 308 chicks were randomly divided into six groups with three replicate (20 bird /replicate)per group, Each group was subjected to the one of the following treatments (T1) control contained 2.5% locally premix (T2) 2.5% Netherland premix imported (T3) 2.5% Turkish premixes imported (T4) 1/2 locally premixes+1/2 Netherland premixes**,** (T5) 1/2 locally premixes+1/2 Turkish premixes) **,**(6) 1/2 Netherland+1/2 Turkish premixes. Randomized completely Block Design (RCBD) was used. Live body weight, feed consumption, feed conversion, growth rate, Production Index economic indicator and mortality rate were measured to the 6 weeks of age. Result showed that there were significant differences (P<0.05) among treatments in weight gains at all periods. Treatment 1**,**4**,** 6**,**2 showed the highest weight gain at 6 weeks of age; however, Treatment 3**,**5 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 Treatment 3,5 consumed the highest amount of feed compared with control, Also there was significant differences in feed efficiency among all treatment groups at all periods where ,The highest value was found in (Treatment 3), and the lowest value was recorded in Treatment 1.

Keywords : Locally premix, carrier *Medicago hispida* leafs meal, broiler performance

Introduction

The feed industry has become sophisticated in countries known as the poultry industry, as it has become self-reliant in the manufacture of local premixes for broiler chickens that are compatible with the rapid growth of new commercial poultry hybrids (Kassar, 2019). The recommendations of the experts of factories and companies in the production of pre-prepared mixtures global, the German company BASF (2005), the American company Adisseo and Pioneer 2004, the Turkish company Kartalkimya (2002) and the Swiss Zagro (2002), confirm that all the prepared mixtures need to be prepared To two types of the first materials, which are the goal represented by the active substances (vitamins, minerals, amino acids, bio-enhancers, bio-minerals alone, vitamins mixes alone, or mixtures of amino acids linked to some rare minerals) and the second is the carriers. For these active substances, most of the technical recommendations have confirmed that these pregnant women are like foodstuffs. Their use in this aspect includes two goals: the first is physical, to increase the volume of the mixture, and the second is chemical, as it is a foodstuff that can benefit from the nutrients it contains, such as crushed yellow corn, and soybean meal. (Al-Kassar, 2006). Therefore, the idea of producing a local premix bearing vegetable material (bush leaves) was not competitive with human consumption and was cheap (Al-Kassar, 2010). In Iraq, there are large agricultural areas cultivated with wheat crops in northern, central and southern Iraq. The annual statistical group (the Central Bureau of Statistics - the Iraqi Ministry of Planning for the year 2020) showed that the total cultivated area of wheat is 3.5 dunums, while the production yield per acre was an average of 1280 kg / dunum, bringing the total total production to 4.5 million tons of wheat, forming the bush 40-50% of the total area planted with wheat, and in order to get rid of it, huge sums of money will be spent to buy pesticides to combat it before the harvest date. Based on the foregoing, the present study was designed with the aim of making use of the leaves of this bush which is not valid and not competitive for human consumption and its approval as a carriers in the production of pre-prepared mixtures (Premixes) locally produced in the country after being supplemented with food and non-food additives such as the addition of lysine, acid methionine and vitamins The necessary minerals, anti-molds, anti-coccidiosis and anti-oxidants in quantities corresponding to Turkish and Dutch imported premixes in their contents, with a view to knowing the efficacy of this locally prepared mixture previously (Locally premixe) and comparing its nutrition with the importer and its effect on performance now. Coronary and carcass recipes for broilers.

Material and Methods

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

Preparation of *Medicago hispida* weeds leavs powder

This was carried out using the procedure of (Malik *et al*., 2013). Whole plants of weeds were collected from the college gardens in Najaf State. The green plants were harvested freshly from the soil, roots and stems were cut manually ، leaves were transferred to the Animal Production Laboratory. They were washed and carefully inspection to remove all unwanted matters and sun-dried for about three days. They were then kept in apolythene sacks for further processing. Collections of the weed plant were carried out at one period of the year at the peak of the cold season, during February 2019. 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 *Medicago hispida* L. weeds leaves powder which was then stored in large plastic containers with tight-fitting lids until needed.

Chemical analysis Measurement of essential ingredients of diets

Chemical composition of the weed leaves meal (WLM) was determined using the standard procedures of (A.O.A.C.1990). All ingredients diets determinations have been done in triplicates, table (1).Including approximate chemical composition for all macro ingredient, Table (2) Mineral composition, The anti-nutritional factors in WHM, (Table 2), Amino acids (Table 3), Heavy metals Cd, Pb also made Approximate chemical analysis for all ingredients in diets (Corn, Wheat, Soybean meal), (Table 4).

Table 1 : Approximate chemical composition for ingredient in diets

Ingredients	DM %	ASH %	CF %	EE %	CP %	NFE %	ME Kcal/Kg
Medicago hispida L. leaves meal	90.0	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**

ME for *Medicago hispida* leaves meal calculated according to (Lodhi,1976)*
ME= 370.29+(24.47 ×CP%)+(65.77×EE%)+(44.07×NFE%)-(8.15×CF%)
To (Alkassar,2006). ME calculated according **

Table 2 : Mineral composition of *Medicago hispida* weed leaves meal.

Mineral	Composition(ppm)
Phosphorus :P	26.8
Calcium :Ca	110.2
Zinc (Zn)	351.6
Copper (Cu)	142.3
Cobalt(Co)	65.4
Magnesium(Mg)	121.3
Manganese(Mn)	89.8
Calcium(Ca)	110.2

Table 3 : Bioactive compounds in *Medicago hispida* mea.

Bioactive compounds	Composition %
Alkaloids	17.58
Tannin	22.69
Saponin	4.69
Flavonoids	26.53
Glycosides	32.56
Phenols	45.23

Table 4 : Amino acids content in *Medicago hispida* L. leaves meal

A.A	Tyrosine	Arginine	Aspartic acid	Glutamic acid	Histidine	Isoleucine	Leucine
%D.M	1.088	1.094	1.076	1.098	1.104	1.038	1.097
A.A	Lysine	Methionine	Phenyl alanine	Serine	Tyrosine	Valine	Tryptophane
D.M%	1.076	1.78	1.046	1.038	1.088	1.069	1.094

Table 5 : Composition of locally premixes, Netherland and Turkish

component	BIRMIX M-25 2.5%	DUF AMIX 964 2.5%	Locally premix
ME	3000	1540	2000
CP%	20	11.2	30
Vitamins			
* A(i.u)	400 000	400 000	480 000
D3(i.u)	160000	120000	140000
E(i.u)	1600	2000	1333
K3(i.u)	80	120	100
B1(mg)	80	160	83
B2(mg)	240	300	200
B6 (mg)	1200	200	400.0
B12(mg)	0.4	1	0.7
B3(mg)	1400	2000	1333

B5(mg)	5200	600	400
Folic acid(mg)	40	40	50
Biotin(mg)	2	4	3.3
Choline	20000	0	0
Minerals			
Aval. %		1.04	1.06
Na%		6.4	-
Mn(mg)	120.000	3200	2666.7
Fe(mg)	40.90	2.400	1566.7
Zn(mg)	110.000	2400	2666.7
Cu(mg)		600	333.3
Co(mg)		0	8.3
I(mg)		2800	50
Se(mg)	300	12	6.7
BHT		0	3333
Methionine%	8.78	8.5	15
Lysine%	2.875	5.4	10
Meth.+Cys%		9	2.57
Threonine%	0	0.5	0

* (i.u): International Unit

Table 6 : Composition of starter diets for all treatments

Ingredients	**Treatments**					
	T1	**T2**	**T3**	**T4**	**T5**	**T6**
Corn	45.70	48.53	50.00	47.45	48.70	49.23
Wheat	10.00	10.00	10.00	10.00	10.00	10.00
Soybean meal	35.50	35.90	35.20	35.90	35.15	35.60
Locally premix	2.5	—	—	1.25	1.25	—
DUF AMIX Netherland premix	—	2.5	—	1.25	—	1.25
BIRMIX M Turkish premix	—	—	2.5	—	1.25	1.25
DCLP%*	1.6	0.3	0.3	0.8	0.8	0.3
Limestone**	0.9	0.3	0.3	0.4	0.4	0.3
Salt	0.3	—	—	0.15	0.15	—
Corn oil	**3.50**	**2.47**	**1.70**	**2.80**	**2.30**	**2.07**
Total	100.00	100.00	100.00	100.00	100.00	100.00
Chemical analysis						
ME, Kcal/Kg	3002.5	3002.0	3002.9	3001.2	3000.0	3001.0
CP%	23.00	23.00	23.01	23.00	23.00	23.00
Total Ca%	0.94	0.94	0.94	0.94	0.94	0.94
Aval. P%	0.47	0.47	0.47	0.47	0.47	0.47
CF%	3.67	4.02	4.37	4.72	**5.05**	4.02
Lysine %	1. 3	1. 3	1. 3	1. 3	1. 3	1. 3
Methionine%***	0.75	0.75	0.75	0.75	0.75	0.75
Meth.+Cys.%	1.07	1.07	1.07	1.07	1.07	1.07
C/P Ratio	130.5	130.5	130.5	130.5	130.5	130.5

*Di Calcium Phosphate (Turkish) Contain:22% Inorganic Calcium,18%Inorganic Phosphorus.
**Lysine-HCl: Hydrochloride Lysine, Purity percentage 98.5%.
***DL-Methionine (Turkish) Purity percentage 99.0%.
— : Mean non additive

Table 7 : Finisher Diets for all treatments

Ingredients	**Treatments**					
	T1	**T2**	**T3**	**T4**	**T5**	**T6**
Corn	51.9	54.65	56.90	54.00	51.80	51.00
Wheat	10.00	10.00	10.00	10.00	10.00	10.00
Soybean meal	28.1	28.6	27.25	28.20	28.4	29.0
Locally premix	2.5	—	—	1.25	1.25	—
DUF AMIX Netherland premix	—	2.5	—	1.25	—	1.25
BIRMIX M	—	—	2.5	—	1.25	1.25

Turkish premix						
DCLP%*	1.6	0.3	0.3	0.8	1.6	1.6
Limestone**	0.9	0.3	0.3	0.4	0.9	0.9
Salt	0.3	—	—	0.15	0.3	0.3
Corn oil	4.7	3.65	2.75	3.95	4.50	4.70
Total	100.00	100.00	100.00	100.00	100.00	100.00
ME, Kcal/Kg	3150.9	3150.0	3151.2	3151.3	3151.1	3151.0
CP%	20.00	20.00	20.01	20.00	20.01	20.00
Total Ca%	0.89	0.89	0.89	0.89	0.89	0.89
Aval. P%	0.40	0.40	0.40	0.40	0.40	0.40
CF%	4.02	4.02	4.37	4.72	5.05	5.05
Lysine %	1. 3	1. 3	1. 3	1. 3	1. 3	1. 3
Methionine%***	0.75	0.75	0.75	0.75	0.75	0.75
Meth.+Cys.%	1.07	1.07	1.07	1.07	1.07	1.07
C/P Ratio	157.5	157.5	157.5	157.5	157.5	157.5

*DiCalcium Phosphate (Turkish) Contain:22% Inorganic Calcium,18%Inorganic Phosphorus.
**Lysine-HCl: Hydrochloride Lysine, Purity percentage 98.5%.
***DL-Methionine (Turkish) Purity percentage 99.0%.

Experimental procedure

Each experimental group was fed *ad-libitum* with its own diet for 42 d. Feed intake, gain weight and feed conversion ratio were determined in each period weekly. The study was conducted according to the International Guidelines for research involving animals (Directive 2010/63/EU),specially slaughtering birds according to the Islamic procedures

Birds and Plan of Nutrition

A total of 300 one-day-old mixed-sex Ross 308 broiler birds were obtained from commercially hatched eggs (Green World company-Najaf). 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 (20 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 five dietary treatments of 20 birds per replicate and three replicates per treatment in a randomized completely block design. Each treatment was subjected to one of five levels of WHM (0%, 2.5%, 5%, 7.5% and 10%)instead of wheat dietary inclusion. levels The percentage composition of the experimental diets for the starting and finishing is shown in (Table I). These diets were formulated to be iso energetic and iso nitrogenous according to NRC (1994), nutrient requirements for broiler, in particular the recommendations for Ross 308 strain. The birds were reared and grown to market age 6 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 free access 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 and mortality were recorded daily and BW was recorded at 0, 7, 14, 21, 28, 35, and 42 d of age, by pen (average BW of all birds), to determine the FCR and ADG.

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 starter period 21^{th} d of age, finisher period 22^{th}-42^{nd}d of age and total period 42 d of age (Alkassar, 2012). Feed conversion ratio-FCR) was calculated by dividing feed consumption / body weight gain (Alkassar, 2010). On the final day of the experiment, (42 d-of-age), two bird from each replicate (six from each treatment) were randomly selected slaughtered and dissected manually, 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, drumstick, 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 digesta), liver, (without gallbladder), heart, Next, the percentage of these organs to pre slaughter body weight was determined.

Statistical analysis

Statistical analysis were conducted using SAS (Version 6, SAS Institute, Cary, NC, USA) (SAS, 2001). 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's Multiple Range Test (Duncan, 1955).

Results and Discussion

Table 8 showed the weight gain, feed consumption, feed conversion ratio of the control and the dietary treated groups. The average weight was not significantly different between the control (without WHM) and the dietary treatment (T3) with 5% WHM+5%wheat, which recorded weight gain 740.6,741.4 g/bird respectively at starting periods(0-21d),but significant ($p \leq 0.05$) compromise with all treatment which weight gain were 683.8, 669.0, 710.05 g/bird at T5, T4, T2 respectively. However, there was no significance differences between the last three treatments. During finishing period (4-6)weeks age,T2 recorded significant ($p \leq 0.05$) higher weight gain compared to the other treatments, 1868.5 g/bird versus the lowers average 1593.0g/bird in T5.and during the all period of study (0-6wk), Also the second treatment the higher weight gain

(2569.6g/bird) at probability (p≤0.05) than the other treatments, It seemed to ours generally decreasing in weight gain with increasing water hyacinth meal more than 5% instead of wheat, this may be due to the high level of tannin content in WHM (12.5%) in our study, and which causes decreasing in the digestibility of nutrients in diets, by making chelating compound with important minerals required for metabolism inside the body and conformed double stress in sequence of operation on metabolism lead to retarded growth rate and decreasing weight gain (Rajab *et al.*, 2015).This may be due to high level of fiber in WHM (18%), which is agreement with (Malik *et al.*, 2016) who found that the decreasing of growing chicken fed on water hyacinth meal because of high content of fiber which lead to inhibition of growing chicks by slowing metabolism operation. The same table showed the average of feed consumption, so we noticed that there was decreasing in feed consumption with increasing the level of WHM instead of wheat, and the highest value at 42 d age in the T5 (10%WHM + 0% wheat) 4886.9 g/bird, while the lowest value in the T1 (Control group, 10%wheat) 4202.1g/bird, this result may be related to determined metabolisable energy (2000kcal/kg for WHM) highly which more than the actual energy, or may be due to high percent of NSPs in water hyacinth meal, (Malik *et al.*, 2016) indicated to high content of cellulose, and lignin in water hyacinth 24.86, 26.08, 12.86% from the total fiber content in water hyacinth. Also reflected the same trends on feed conversion ratio, the table shows the best value in FCR in T2,which recorded 1.7 feed/gain ration and best significantly (p≤0.05) than control group and the rest treatments. This result may be due to occur more balance in the second treatments to produce ration with more digestibility and available for more absorption at intestinal birds.

Table 8 showed carcass traits, where there significant differences (p≤0.05) between all treatments. The highest percentage recorded in the T2,T3 74.19, 73.99% respectively, while the lowest values found in the T4, T5 (73.49, 73.10% respectively).This result was in agreement with (Lalović and Pandurević,2014) who found that high positive correlation between weight before slaughtering and dressing percentage and the value r=0.7 .

Conclusion and Recommendations

Body weight gain was significantly (p≤0.05) higher for birds fed 5% WHM with 5% wheat diets than for those fed diets without WHM. FCR. There were no significant (p≤0.05) differences in mortality between all treatments. 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 a good quantities throughout the year and can be regarded as a valuable raw material vital to the Iraqi feed milling industry for the formulation of balanced and quality feed for growing pullets at reduced cost.

Table 7 : Means of some productive traits of broiler at(0-3),(4-6)and(0-6) weeks of age

Means± SE					
Treat.					
Traits	**T1:Control 10%Wheat Without WHM**	**T2 2.5%WHM + 7.5%Wheat**	**T3 5.0%WHM + 5.0%Wheat**	**T4 7.5%WHM + 2.5%Wheat**	**T5 10%WHM + 0.0%Wheat**
Initial BW g/bird (1 d)	41.70	40.75	42.60	41.85	42.15
Weight gain (0-3wk)	a 740.6±30.05	b 710.05 ±13.0	a 741.4 ±17.1	b 669.0± 8.8	b 683.8± 10.7
Weight gain (4-6wk)	c 643.9±30.05	a 1868.5±35.1	b 1757.0±28.8	b 1703.0 ±21.1	c 1593.0±24.2
Weight gain (0-6wk)	b 2384.5±18.9	a 2569.6±20.2	a 2498.4±23.1	b 2371.8±19.3	c 2277.2±15.6
Feed Cons.g/bird (0-3wk)	c 1125.6±21.1	d 1032.0±22.5	b 1188.5±24.1	c 1136.1±19.6	A 1239.2±18.4
Feed Cons.g/bird (4-6wk)	d 3076.5±19.3	c 3360.1±24.4	c 3348.9±23.7	b 3529.5±20.0	a 3647.7±25.1
Feed Cons.g/bird (0-6wk)	e 4202.1±23.7	d 4392.1±26.1	c 4537.4±19.7	b 4665.6±27.1	a 4886.9±30.2
Feed Conv.ratio (0-3wk)	d 1.51±0.02	d 1.47±0.03	c 1.60±0.01	b 1.69±0.01	a 1.81±0.02
Feed Conv.ratio (4-6wk)	c 1.87±0.06	d 1.79±0.04	c 1.90±0.03	b 2.07±0.04	a 2.28±0.02
Feed Conv.ratio (0-6wk)	c 1.76±0.01	d 1.70±0.02	c 1.81±0.02	b 1.96±0.01	a 2.14±0.03
Mortality %	0%	0%	0%	0%	0%
Significant	*	*	*	*	*

* Means in the same rows with different superscripts were significantly (p<0.05) different

Table 8 : Dressing percentage without edibles and edibles weight for all treatments

Means ± SE					
Treatments					
Traits	**T1**	**T2**	**T3**	**T4**	**T5**
Final bodyweight(g)/ bird pre slaughtering	b** 2391.0 ± 25.4	a 2465.0±31.4	a 2497.0±30.6	a 2450.0±27.5	c 2281.0±22.3
Hot carcass weight (g without edibles)	c 1838.4±13.8	a 1908.3±20.6	a 1929.8±18.5	b 1881.7±14.7	d 1743.5±12.9
Dressing percentage without edibles	b 73.59±4.12	a 74.19±3.7	a 73.99±3.8	cd 73.49±2.9	c 73.10±4.4
Heart weight(g)	b 10.0±1.3	a 14.0±2.5	ab 12.0±0.9	b 11.0±1.1	ab 13.0±2.0
Heart as % of live body weight	c 0.42±0.01	a 0.57±0.01	b 0.48±0.02	b 0.49±0.02	a 0.57±0.01
Liver weight (g)	b 55.0±3.6	a 66.0±3.8	b 59.0±2.5	b 58.0±2.3	ab 61.0±3.3
Liver weight as% of live body weight	b 2.30±0.10	a 2.68±0.18	ab 2.36±0.14	ab 2.37±0.17	a 2.67±0.18
Gizzard weight (g)	d 40.0±0.03	a 54.0±0.05	b 51.0±0.01	c 47.0±0.01	d 42.0±0.02
Gizzard as% of live body weight	b 1.67±0.2	a 2.20±0.3	ab 2.04±0.3	ab 1.92±0.2	ab 1.84±0.1
Significant	*	*	*	*	*

*means significant differences (P≤0.05) among treatments

**means the same letters in every row indicated no significant differences,and the different letters mean there were significant differences.

Table 9 : Carcass cuts percentage of birds slaughtered at 6 weeks of age.

Means ± SE					
Percentage of carcass cuts%					
Traits	**T1**	**T2**	**T3**	**T4**	**T5**
Breast%	30.1±3.5	30.7±4.1	31.0±4.7	29.6±3.7	30.8±4.3
Thighs%	31.7±3.1	31.6±2.5	30.5±1.9	30.8±2.7	29.5±1.4
Back%	21.2±2.0	20.0±1.8	20.3±3.1	22.5±2.9	22.8±2.2
Neck%	5.7±0.7	6.0±0.3	6.1±0.3	5.6±0.5	5.7±0.4
Wings%	11.2±1.7	11.6±0.9	11.8±2.0	11.2±1.5	11.1±0.8
Significant	NS	NS	NS	NS	NS

NS: Means Non Significant differences among treatments

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