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Effect of Feeding Different Levels of Arabic Gum (AG) on Physiological and Productive Performance of a Local Breed of Chicken

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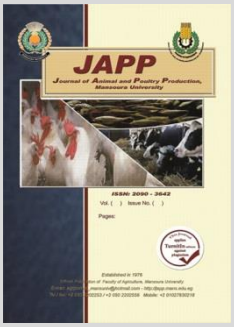

ABSTRACT

The study goal was to find out how hens fed Arabic gum (AG) powder affected performance and blood chemistry of breed chicken. The experiment included one hundred and eighty AL-SALAM local chicken breed14 days old. The criteria for response were average weight increase, feed intake, feed conversion ratio, dressing %, non-carcass component (heart, gizzard, and liver), and chemical analysis of blood serum parameters were applied as a standard for responding. Results showed that the group fed 5% (AG) as an addition increased daily gain, live weight (1710 gm), decreased feed intake (3320 gm), feed conversion ratio, carcass traits at the end experimental, those results were increased highly significant (P≤ 0.05) compared to the control group that received a control diet without (AG). There were no notable variations in the blood analysis results (P≤ 0.05) at the conclusion of the trial period, the economic efficiency of each group was determined. Significant Arabic Gum addition to the control diet (P≤ 0.05) improved the general performance of chicks. It could be concluded that the feed supplemented with 5% (AG) lead to lowest value of feed consumption and obtained the highest performance and total profit.

***Keywords*:** chicken, local breed, Arabic Gum.

INTRODUCTION

Many factors may have contributed to the increase in chicken production and consumption in Egypt, such as people's preference for white meat, over cheaper cuts of meat Because feed costs are between 70% and 75% of total production costs, lowering feed costs and improving feed utilization efficiency are the only ways to produce poultry profitably (Qureshi, 1991)

Arabic Gum is made from the dried exudates that are collected from the stems and branches of Acacia Senegal or Acacia Seyal. These plants are raised as a commercial crop in Sudan's agro-forestry systems (Duke, 1981). The majority of its components are high molecular weight polysaccharides and their calcium, magnesium, and potassium salts, which upon hydrolysis provide the sugars arabinose, galactose, rhamnose, and glucuronic acid. (Glicksman,1969).

Arabic Gum is described by the FAO's Joint Expert Committee for Food Additives (JECFA) as "a dried exudation obtained from the stems of Acacia Senegal (L.) (FAO,1999). Traditional medicine apparently uses AG to cover irritated surfaces and to treat intestinal mucosal irritation internally (Gamal El-din *et al.*, 2003). Some publications claim that AG has properties such as nephroprotection, antioxidant defense, and more (Rehman *et al.*, 2001; Gamal El-din *et al.*, 2003; Ali *et al.*, 2008). The soluble fermentable fractions of Arabic Gum, which make up more than 85% of the product's weight, are dietary soluble fibers (Nasir *et al.*, 2004). Dietary fibers have been shown to encourage beneficial physiological changes, such as better mineral absorption, regular bowel movements, and/or lower blood sugar and cholesterol (Phillips, 1998).

High density protein levels (HDL) did not change much, although triglycerides and serum cholesterol did, according to Abd-Razig *et al.* (2010) and Elkhier *et al.* (2010). Arabic Gum levels in Egypt decrease the detrimental effects of high ambient temperature on egg production characteristics, according to Ismail *et al.* (2016), they found that supplementing the feed with 1.5 percent AG had the best results in reducing the detrimental effects of heat stress on egg production, egg quality, and certain plasma metabolites in laying hens reared in Egypt during the summer season.

The purpose of this study is to ascertain the effects of sparingly incorporating Arabic Gum (AG) into feed on the blood chemistry, weight of internal organs, performance, and dressing % of the indigenous breed ALSLAM

METHOD AND MATERIALS

The current study was conducted by the Animal Production Research Institute in Sakha Station, Kafr El-Sheikh, Egypt. The biochemical analysis was done in the laboratories of APRI during the period from April to July 2021.

The goal of the experiment was to determine how Arabic Gum powder supplementation to the diet of AL-SALAM chickens affected performance and serum chemistry. Three levels of Arabic gum (AG) were tested and compared to the control group in the experiment Group 1 served as the control, and groups 2, 3, and 4 received 1%, 3%, and 5% Arabic Gum, respectively, in addition to the control group.

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Experimental design:

Treatments:

180 two-week-old, unsexed local breed chicks were randomly assigned to four different experimental diets. Experimental Birds and Management:

In a completely randomized design, 45 birds were employed for each treatment, and each treatment was further divided into three duplicates. The chicks had unrestricted access to food and water while being nurtured in deep litter.

The experimental period began with chicks that were 3 weeks old until they were 19 weeks old.

Experimental Diet: Chicks were given starter meals for the first two weeks of their lives before being switched to finisher experimental diets.

Table 1. Chemical composition of control diet and Arabic Gum (AG)

Chemical analysis	Control diet	Arabic Gum	Ration supplemented with AG 1%	AG 3%	AG 5%
Dry matter (%)	88	87	87.99	87.97	87.95
Crude protein	16	3.71	15.88	15.63	15.39
Crude fiber	3.35	7.98	3.40	3.49	3.58
Ether extract	2.87	0.43	2.85	2.80	2.75
Digestible energy (kcal/ kg)	2700	1387	2677	2661	2634

Measurements:

Initial and final live body weight (IBW & FBW), feed intake (FI), feed conversion ratio (FCR) and body weight increase (BWG) were computed. At the conclusion of the trial period, carcass characteristics were evaluated for 9 chicks from each treatment. Economic effectiveness was then calculated.

Blood constituents and CBC: Blood samples were taken from three birds per replica (9 birds per treatment), allowed to clot in clean, dry test tubes, and then the serum was separated, gathered, and analyzed. The chemical evaluation of blood serum parameters served as the evaluation standard. Total serum protein was measured by the Biuret method as described by King and Wooton (1965).

Cholesterol concentration was measured using the techniques Naito described (1984). According to Bucolo et adscription's GPO-POD (1973), techniques were used to measure serum triglycerides

Economic efficiency was calculated at the conclusion of the experimental duration for each group.

Statistical analysis: All data were subjected to statistical analysis in accordance with (SAS, 2002).

RESULTS AND DISCUSSION

I-Growth performance:

1- Daily body weight:

Table (2) showed that adding AG to rations increased daily body weight gain means (gm) during the experimental time. The birds fed the most were found to acquire weight the fastest, 5% Arabic Gum (1710 g). Those results are in agreement with Tabidi and Ekram (2015) who found when compared to other treatment groups or the control group, the chicks fed a died supplemented with AG had considerably ($P < 0.05$) more body mass. But were not in agreement with Siham *et. al.*, (2015), they reported that there were no significant differences between birds fed AG levels in body weight gain (BWG). High fiber diets typically have very low-calorie densities, which could reduce poultry BWG. For the first 12 days after birth, however, including a source of fiber in the diet seemed to lower the broiler's FI, but the effect vanished after that.

So, the experimental study started with 3 weeks up to 19 weeks old chicks. The soluble fiber concentration in AG may be the cause of the inconsistencies between these investigations.

According to (Palji and Tivey's 1997) research, chicks fed the AG diet gained more body weight and were heavier overall than those fed the other diets ($P< 0.001$). There were no significant differences in small intestine weight or intake between the chicks on the various diets. In the villus height, surface area, and depth of the ileal crypt in chicks fed various diets. González-Alvarado *et al*. (2007) reported that between the ages of 14 and 21 days, chicks fed hulls gained more body weight than those on control diets. In our work, we hypothesis that Arabic Gum, which is made from dried exudates of Acacia Senegal, includes soluble dietary fibers with more than 85% of its weight as soluble fermentable components, increasing the nutrient absorption when added to poultry rations Nasir *et a*l. (2004). As a result, the addition of AG enhanced BWG.

Table 2. Effect of feeding Arabic Gum (AG) on Live weight and daily body weight growth means (gm) during the experimental period from (3 - 19 weeks old chicks):

Treatment AG %	DBW3-7 Mean ± SE	DBW8-11 Mean ± SE	DBW12-15 Mean ± SE	DBW16-19 Mean ± SE	DBW3-19 Mean ± SE	LW Mean ± SE
Control	10.34±0.20^{c}	10.10±0.12^{c}	12.85±0.45^{b}	10.91±0.92^{c}	11.05±0.43^{d}	1250.00 ±57.73 ^{c}
1 %	11.54±0.38^{b}	9.70±0.38^{c}	14.63±0.55^{ab}	15.85±0.53^{b}	12.93±0.22^{c}	1433.33±72.64 ^{b}
3 %	12.00±0.12^{b}	13.47±0.19^{a}	12.84±1.47^{b}	19.56±1.03^{a}	14.47±0.43^{b}	1583.33±60.09 ^{ba}
5 %	13.42±0.38 ^{a}	13.10±0.17^{a}	15.60±0.09^{a}	20.76±0.66^{a}	15.72±0.27^{a}	1710.00±37.85 ^{a}

Means shown by distinct superscripts within the same column are significantly different at positions a, b, and c. ($P \leq 0.05$).
DBW: Daily body weight, LW: Live weight

2-Daily feed intake (DFI):

In this study, as shown in table 3 we found that adding AG to chicks' rations decreased feed intake. Usually, diets high in fiber have a relatively low-calorie density, which could reduce feed intake. We are suggesting that the type of dietary fiber, makes changes to how poultry react to FI. These findings concur with those of Tabidi and Ekram (2010) and González-Alvarado *et al*., (2015), who reported that the birds fed rations supplemented with AG showed a reduced Comparing FI to a control group.

Elkhier *et al*., (2009b) findings that birds fed high levels of Arabic Gum showed higher meal consumption are at odds with these findings. He suggested that increasing the amount of gum would improve the taste of the diet. According to the results of our study, we suggesting that these results are due to an increase in digesta viscosity and a prolonged digestion period's GIT retention duration, which finally affects voluntary feed intake. Probably, the kind and amount of dietary fiber impacts how poultry reacts to FI. Wim Calame *et al.*, (2008) came to the conclusion that AG may be regarded as a prebiotic fiber with functionality at least as excellent as inulin since it yields larger numbers of helpful bacteria without stimulating undesirable bacteria. They discovered that Arabic Gum increased log10 populations of Bacteroides.

We suggest that AG considered a promising prebiotic fiber for poultry production that enhances the palatability of the diet while at the same time decrease feed intake and enhancing feed conversion ratio. These findings increase the AG value of poultry nutrition as a feed efficiency enhancer. Additional research is required to ascertain the nutritional needs for AG in local breeds as well as the method of action of AG.

Table 3. Effect of dietary Arabic Gum on daily feed intake (gm) /bird during the experimental period from (3 - 19 weeks old chicks):

Treatment GA%	DFI 3-7 Mean ± SE	DFI 8-11 Mean ± SE	DFI 12-15 Mean ± SE	DFI116-19 Mean ± SE	DFI 3-19 Mean ± SE
Control	20.99±0.41^{a}	44.50± 0.64ab	66.95±0.34 a	82.98±0.07^{a}	53.86±0.27^{a}
1 %	20.91±0.22^{a}	44.01±0.17ab	65.06±0.81 ^{bc}	81.33±0.155^{bc}	52.83±0.22^{b}
3 %	20.85±0.23^{a}	43.18±0.10^{b}	65.00±0.54 ^{bc}	81.15±0.68^{bc}	52.54±0.38^{b}
5 %	20.34±0.11^{a}	43.59±0.65b	64.40±0.17 ^{c}	80.78±0.35^{c}	52.28±0.07^{b}

Means shown inside the same column with various superscripts are significantly different at (P ≤ 0.05) in the cases of letters a, b, and c. Daily feed intake, or DFI.

3-Feed conversion ratio (FCR):

Birds receiving AG recorded a better feed conversion ratio than the control birds. The results recorded were 4.87, 4.08, 3.63 and 3.32 for the chicks fed 0, 1, 3 and 5 % rations supplemented with A, respectively. The better values recorded for FCR were 5 then 3 % AG groups, followed by group fed 1 % AG than control group. Tabidi and Ekram (2015) and Walugembe et al. (2014) observed that there was no significant difference in broiler chickens given high-fiber diets, feed efficiency has improved.

Through a receptor analogue mechanism (strongly binding to and decoying pathogens away from the sugar-coated intestinal lining) or through agglutination of AG by various bacterial strains (e.g., increased villi height, uniformity, and integrity) (Spring et al., 2000)**. We** suggest that the type of dietary fiber, modifies the response of poultry concerning FCR.

Table 4. Effect of dietary AG on feed conversion rate (FCR) and initial weight at 3rd week to 19th week final weight (FW) during the experimental intervals per bird (from 3 - 19 weeks old chicks):

Treatment AG%	FCR 3-7 Mean ± SE	FCR 8-11 Mean ± SE	FCR 12-15 Mean ± SE	FCR 16_-19 Mean ± SE	Total FCR 3-19 Mean ± SE	IW Mean±SE	FW16 Mean ± SE
Control	2.03±0.07^{a}	4.40±0.05^{a}	5.22±0.21^{a}	7.71±0.66^{a}	4.87±0.09^{a}	567.00±36.19^{a}	19143.33 ±350.74^{d}
1 %	1.81±0.07^{b}	4.54±0.18^{a}	4.46±0.22^{a}	5.14±0.16^{cb}	4.08±0.08^{b}	534.40±4.11a	22268.33±383.62^{c}
3 %	1.73±0.02^{b}	3.20±0.04^{c}	5.22±0.70^{a}	4.16±0.21^{cd}	3.63±0.12^{c}	522.57±8.37^{a}	24835.00±746.81^{b}
5 %	1.51±0.04^{c}	3.32±0.08^{c}	4.12±0.02^{a}	3.90±0.14^{d}	3.32±0.05^{d}	515.70±2.25^{a}	26931.67±455.70^{a}

Means shown inside the same column with various superscripts are significantly different at (P ≤0.05) in the cases of letters a, b, and c.
FCR: Feed conversion ratio. IW: initial weight, FW: final weight

II-Carcass characteristics:

The data represented in table (5) showed that live body weight increased significantly (P ≤ 0.05) due to adding AG to the chick's diet, whereas the best weight was recorded for chicks fed diet supplemented with 5 % AG. Dressed carcass percentage for chicks fed rations supplemented with different levels of AG rose more than the control group substantially (P ≤ 0.05). Tabidi and Ekram (2015), discovered that when compared to the control group, chicks given a meal supplemented with AG showed a substantial increase (P ≤ 0.05) in the proportion of carcass dressing.

In our study, we found that the proportion of giblets (heart, liver and gizzard) recorded substantial (P ≤ 0.05) decline values in the group fed a meal supplemented with 5% AG. The addition of AG to the feed of broiler chicks raised the heart weight considerably (P ≤ 0.05), lowered the gizzard weight, and increased the gizzard weight, according to Tabidi and Ekram's (2015) research.

Table 5. Effect of dietary Arabic Gum at the conclusion of the trial period on carcass characteristics per bird (19 weeks old chicks):

Treatment AG %	Live Weight (gm) Mean ± SE	CARCASS% Mean ± SE	HEART% Mean ± SE	LIVER% Mean ± SE	GIZZARD% Mean ± SE	GIBLETS% Mean ± SE	SPLEEN% Mean ± SE
Control	1250.00 ±57.73^{c}	63.84±1.67^{b}	0.50±0.03^{ab}	2.15± 0.09^{a}	2.52±0.12^{a}	5.17±0.23^{a}	0.27±0.01^{a}
1 %	1433.33±72.64^{b}	72.73±2.52^{a}	0.41±0.01^{ab}	1.97±0.08^{ab}	2.57±0.04^{a}	4.96 ± 0.11^{ab}	0.28±0.03^{a}
3 %	1583.33±60.09^{ab}	74.92±2.74^{a}	0.50±0.02^{ab}	1.63±0.03^{b}	2.52±0.10^{a}	4.66 ± 0.07^{ab}	0.17±0.01^{a}
5 %	1710.00±37.85^{a}	77.32±1.27^{a}	0.39±0.03^{b}	1.68±0.14^{b}	2.33±0.13^{a}	4.40 ±0.24^{b}	0.28±0.05^{a}

Means shown inside the same column with various superscripts are significantly different at (P ≤ 0.05) in the following cases: a, b, and c.

However, we suggest that improving performance, increasing live body weight and dressing weight of groups fed rations supplemented with AG because of containing soluble fiber that increased digesta viscosity. While Wils-Plotz ELet. al., (2013) reported that feeding fiber to poultry due to the negative impact that fiber has on performance and nutrient utilization, displayed antinutritive effects in the young chicks with decreased growth efficiency, hemicellulose and cellulose do not digest properly.

We suggest that adding Arabic Gum to poultry rations increases the nutrient absorption because it is made from dried exudates of Acacia Senegal and includes soluble dietary fibers that account for more than 85% of its weight. This result is consistent with (Nasir et al., 2004) who claimed that dietary fiber was discovered to induce favorable physiological effects and that it also improved mineral availability.

III-Blood constituents:

The effects of AG in local breed chick's diet on blood constituents appear in table 6. There were no notable variations, in cholesterol, high density lipoproteins, low density lipoproteins, Protein, Globulin and Glutamic-oxaloacetic transaminase (GOT) and glutamate pyruvate transaminase (GPT) means between the chicks fed AG levels and control groups. The CHO/HDL ratio increased in chicks fed AG levels compared to control groups.

There were differences in Albumin %, between the control group and other groups but not significant except chicks fed diet included 5 % AG. Inclusion diets with AG increased Albumin % in all groups except 3% group.

Results obtained showed increase Triglycerides % in chicks fed diet included 1, 3 and 5 % AG. The values recorded for GOT decreased in chicks fed diet included 1 and 3 % AG than control group.

Tabidi and Ekram (2015) found that chicks fed on supplemented AG decreased total cholesterol by a significant amount ($P \leq 0.05$) while simultaneously raising the level of total protein. Palji and Tivey (1997) found that laying hens fed the AG diet showed no significant difference in triglycerides, total lipids and phospholipids significantly decreased along with serum levels of cholesterol. Ismail *et al* (2016) investigated the effects of Arabic Gum levels, they discovered substantial drops in blood cholesterol and triglycerides, but no significant alterations in high density protein level, to mitigate the negative impacts of high ambient temperature on egg production features (HDL) during high ambient temperature in Egypt. The results revealed that the concentration of plasma total protein, albumen, globulin, calcium and phosphorus were groups fed meals containing Arabic Gum experienced significantly ($P \leq 0.05$) increased levels of lipids particularly group (1.5 percent AG) compared with the control group during hot ambient temperature Palji and Tivey (1997). The researchers came to the conclusion that feeding Arabic Gum to laying hens did not significantly alter their blood cholesterol levels while significantly lowering their triglyceride and phospholipid levels.

Table 6. Effect of dietary Arabic Gum (AG) on blood constituents per bird at the end of experimental period (19 weeks old chicks):

Treatment GA%	CHO Mean ± SE	HDL Mean ± SE	CHO/HDL ratio Mean ± SE	LDL Mean ± SE	Triglycerides Mean ± SE	Protein Mean ± SE	Albumin Mean ± SE	Globulin Mean ± SE	GOT Mean ± SE	GPT Mean ± SE
Control	211.82±5.09^{a}	51.36±2.60^{a}	3.95±0.01^{b}	126.66±5.98^{a}	165.56±10.73^{a}	5.43±0.65^{a}	3.58±0.15^{b}	2.02±0.82^{a}	42.33±3.71^{ab}	2.33±0.38^{a}
1 %	218.90±16.23a	57.00±1.84^{a}	3.86±0.37^{b}	124.29±17.40^{a}	188.00±2.37^{a}	5.60±0.28^{a}	4.29±0.39^{ab}	1.31±0.51^{a}	40.33±2.33^{b}	2.70±0.11^{a}
3 %	243.03±9.02^{a}	47.96±3.49^{a}	4.79±0.17^{a}	150.23±8.80^{a}	186.90±3.92^{a}	5.36±0.88^{a}	3.60±0.24^{b}	1.76±0.71^{a}	45.00±5.56^{ab}	2.70±0.32^{a}
5 %	229.24 ±15.67^{a}	48.40±3.32^{a}	4.77±0.42^{ab}	140.68±13.31^{a}	179.00±1.83^{a}	5.44±0.39^{a}	4.64±0.28^{a}	0.79±0.6^{a}	35.66±4.80^{b}	2.26±0.20^{a}

Means shown inside the same column with various superscripts are significantly different at ($P \leq 0.05$) in the cases of letters a, b, and c.
CHO: cholesterol, or Low-density lipoproteins (LDL) and high-density lipoproteins (HDL), GPT: Glutamate Pyruvate Transaminase and GOT: Glutamic-oxaloacetic transaminase.

White blood cells (WBCS), packed cell volume (PCV), hemoglobin (Hb), and red blood cells (RBCS) concluded in Table 7 showed that there no significant effect for supplementing AG in rations of local chicks.

Table 7. At the conclusion of the trial, the CBC levels were affected by dietary Arabic Gum (AG) per bird (19 weeks old chicks):

Treatment GA%	RBCs Mean±SE	PCV_ Mean±SE	WBCs Mean±SE	HB Mean±SE
Control	1.88±0.16^{a}	19.46±8.48^{a}	26.66±3.33^{a}	8.16± 0.14^{a}
1 %	2.12±0.19^{a}	32.33±1.18^{a}	30.00±5.77^{a}	9.73±0.63^{a}
3 %	1.60±0.03^{a}	27.86±0.87^{a}	26.66±6.66^{a}	8.23±0.93^{a}
5 %	1.83±0.39^{a}	28.56±1.8^{a}	23.33±3.33^{a}	8.43±0.17^{a}

Means shown inside the same column with various superscripts are significantly different at ($P \leq 0.05$) in the cases of letters a, b, and c. Red blood cells, packed cell volume, white blood cells, and hemoglobin are all abbreviations for blood.

Arabic Gum was researched as a supplement to diet and its impact on lipid profiles by (Abd-Razig et al. in 2010). Performance of laying hens fed on graduated levels of Arabic gum (serum, egg yolk and meat) (1, 3 and 5%) respectively.

The results showed that serum cholesterol and triglycerides had significantly decreased, while high density protein had not changed. There was no discernible variation in the lipid profile of the meat between the treated and untreated groups. Elkhier *et al*., (2009a), observed lower yolk cholesterol in eggs when the AG ratio was increased in the basal a layer diet by 5 to 15 percent. This progressive reduction in serum cholesterol was substantial

In this work, we propose that Arabic Gum, which is made from dried exudates of Acacia Senegal, includes soluble dietary fibers that make up more than 85% of its weight as soluble fermentable portions thus increasing the absorption of nutrients in poultry diets (Nasir *et al*., 2004). Both high and low molecular weight (lipoprotein) proteins are present (heterogeneous gum polysaccharides).

Dietary fibers have been shown to provide positive physiological benefits, such as improved mineral availability, laxative effects, and a lowering of blood glucose and cholesterol levels. Arabic gum is a polysaccharide that is water soluble, fermentable by native bacteria, resistant to gastrointestinal enzymes in both humans and animals, and hence qualifies as a dietary fiber (Phillips, 1998). The majority of its components are high molecular weight polysaccharides and the calcium, magnesium, and potassium salts of those polysaccharides, which when hydrolyzed produce arabinose, galactose, rhamnose, and glucuronic acid (Glicksman, 1969).

IX-Economical Efficiency:

Prices and costs assumed are shown in Table 8. The total cost was determined by the feed cost. The only return considered was the income from selling fattening birds. Price of one kg diet was 7.00 L.E. and kg of marketing live weight was 37.5 L.E.

Feed cost was calculated as shown in table 8. It was 7.00, 7.63, 8.89 and 10.15 for diets included 0, 1, 3 and 5% AG levels rations, respectively. The costs included diet with and without levels of AG cost.

Arabic Gum cost was 70 LE/Kg. Diets costs were (7.0, 7.63, 8.89 and 10.15 LE) for (0,1,3 and 5 % AG supplemented rations respectively.

The relative economic efficiency values of (0,1,3 and 5 % AG) supplemented rations were calculated In our present study, birds fed rations supplemented with AG levels were highly efficient economically compared to birds fed a control diet free of AG, either sold as live birds or sold as dressed birds.

Although rations supplemented with AG levels were very expensive, the final results economized the AG price. Poultry prices were 37.5 LE/kg live weight and 50 LE/kg dressed weight. In this study, we assess the cost of diets that are supplemented or not with amounts of AG and the price of live and dressed birds. We found that groups fed rations supplemented with 1% AG revealed the best profit and relative EE/Kg live bird percentage, either sold as a live bird or dressed bird, followed by 3% and control groups.

The control group had lower live weight, lower dressed body weight, and lower profit gain compared to those fed rations supplemented with 1 and 3 % AG.

Although including 5% AG in rations increased feeding costs, it was offset by an economic profit gain when birds were sold as dressed birds. Finally, we suggest adding Arabic Gum with levels (1-3%) to rations of local poultry breeds from 14 days to reach market weight and reveal the best economic profit gain. This result showed that AG can be included in local breed diets at a level of 1% to promote economic efficiency at a reasonable cost.

Economic Efficiency calculated as follow:

Cost of feed = (Total feed intake × Kg feed cost)

Utilities costs (L.E.) / = management costs.

Total cost = (Total feed intake × Kg feed cost) + cost of managements

Cost of feed representing 75% of total cost, it calculated when total feed cost multiply (100 / 75)

Total cost / bird (LE) = Total feed cost x (1/ 0.75)

The Net Profit = Body Weight Price - Total Cost Price

Net revenue divide total cost equals Economic efficiency (Net revenue / Total cost)

Relative Economical efficiency (%) = (Net revenue/ Total cost) x 100

Feed cost /dressed Kg (LE):

Feed cost /dressed Kg (LE) = Feed cost / live Kg (LE) * (1/ dressed weight Kg)

Feed cost calculated as follow:

control group: 7 LE / Kg

group fed 1 % GA: cost of 99% control ration + cost of 1% AG = 6.93 + 0.7 = 7.63 LE

group fed 3 % GA: cost of 97% control ration + cost of 3% AG = 6.79 + 2.1 = 8.89 LE

group fed 5 % GA: cost of 95% control ration + cost of 5% AG = 6.65 + 3.5 = 10.15 LE

Table 8. Economical efficiency for poultry fed rations supplemented with Arabic Gum at the end of experimental period from 3-19 weeks old chicks.

Treatment (AG%)	Control	1 %	3 %	5 %
EE / Kg live birds:				
Final Live Body weight (gm)	1250	1433	1583	1710
Feed Consumption/ bird (Kg)	6.032	5.917	5.885	5.855
Feed Price /Kg (LE)	7.00	7.63	8.89	10.15
Sell price / Kg (LE)	37.5	37.5	37.5	37.5
Feed cost /Kg body weight (LE)	33.779	31.505	33.049	34.753
Profit gain / Kg live bird (LE)	3.72	5.99	4.45	2.75
Relative EE/ Kg live bird %	11.01	19.01	13.47	7.91
EE / live birds:				
Sell price / bird (LE)	46.875	53.738	59.363	64.125
Feed cost /bird (LE)	42.224	45.147	52.317	59.458
Profit gain / live bird (LE)	4.651	8.591	7.046	4.695
Relative EE/ live bird %	11.02	19.03	13.47	7.90
EE / Kg carcass yield:				
Carcass (%)	63.84	72.73	74.92	77.32
Dressed Body weight / bird (gm)	798	1043	1186	1322
Sell price / dressed bird (LE)	39.9	52.15	59.30	66.10
Sell price / dressed Kg (LE)	50	50	50	50
Feed cost /dressed Kg (LE)	42.33	30.21	27.80	26.29
Profit /dressed Kg (LE)	7.67	19.79	22.2	23.71
Relative EE/ dressed Kg (%)	18.12	65.51	79.86	90.19

CONCLUSION

Based on the outcomes, it can be said that Arabic Gum (AG) supplementation apparently improved the performance and best economic profit gain for live local poultry breed ALSALAM up to 3 % without any adverse effects on live weight price. Also, The best relative economic efficiency for dressed meat was for 5 then 3 then 1% AG supplemented rations, respectively. Furthermore, studies are also required to look at how adding Arabic Gum to diets affects the performance of other indigenous breeds.

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تأثير تغذية دجاج التسمين المحلى على مستويات مختلفة من الصمغ العربي على الأداء الإنتاجي و الفسيولوجي

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الملخص

أجريت هذه التجربة لمعرفة أثر اضافه بودرة الصمغ العربي الي عليقة كتاكيت اللحم سلالة السلام و تأثيرة على الأداء العام، ومصل الدم في أربعة معاملات (1 و 2 و 3 و 4) و هي : المجموعة (1) القياسية خالية من الصمغ العربي ، مجموعة (2) مضاف لها الصمغ العربي بنسبة 1 % ، مجموعة (3) مضاف لها الصمغ العربي بنسبة 3 % ، مجموعة (4) مضاف لها الصمغ العربي بنسبة 5% . استخدم في هذه التجربة 180 كتكوت لاحم عمر 14 يوم سلالة السلام حيث وزعت عشوائيا على أربعة معاملات كل معاملة بها ثلاث مكررات، كل مكررة بها 15 كتكوت وذلك لجمع البيانات عن العليقة المستهلكة، معامل التحو يل الغذائي والوزن المكتسب، ونسبة التصافي وأيضا أوزان الأجزاء الداخلية (الكبد، القلب، القانصة) أوضحت النتائج أن هناك فرق معنوي على مختلف المعاملات في مقاييس الأداء ونسبة التصافى وأظهرت النتائج أن هناك فرق معنوي ($P> 0.05$) بين المجموعة المضاف لها الصمغ العربي و المجموعة القياسية. حيث أن الصمغ العربي أظهر تحسن في الأداء العام للدجاج اللاحم .الكتاكيت التى غذت على العليقة المضاف لها الصمغ العربي بنسبة 5% إستهلكت أقل كمية من العليقة و سجلت أفضل متوسط وزن مكتسب و أفضل معامل تحويل و أفضل نسبة تصافي مقارنة بالمجموعات المختبرة الأخرى، بينما حققت المجموعة التي غذيت على عليقة مضاف لها 1% أعلي ربح كلي يليها المجموعة المضاف لها صمغ عربي بنسبة 3%في حالة البيع كطيور حية مقارنة بالمجموعات المختبرة الأخرى، بينما في حالة بيع الطيور مذبوحة فقد سجلت المجموعات المضاف لها الصمغ العربي بنسبة 5 ثم 3 ثم 1% كفاءة إقتصادية أعلى من مجموعة المقارنة على التوالى. نوصي بعمل دراسات أخرى على استخدام الصمغ العربي في علائق سلالات الدواجن المحلية الأخرى للوصول بها إلى معدلات تحويل و متوسط وزن مكتسب قياسي و زيادة الكفاءة الإقتصادية .