J. Agric. Sci. Mansoura Univ., 29 (1): 27 - 37, 2004

EFFECT OF TAFLA (EGYPTIAN CLAY) AS FEED SUPPLEMENT ON THE PERFORMANCE OF BROILER CHICKS.

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ABSTRACT

A total number of 150 unsexed 7day old Hubbard chicks were distributed into five experimental treatments. Each of 30 chicks in 3 replicates (10 chicks / replicate) was used in this study. The first experimental group was fed on the control diet, whereas, groups 2, 3,4 and 5 were fed on the control diet supplemented with Tafla (local clay) at levels of 1.5,3,4.5, and 6% .A starter diet was used during the starter period (7-28 days of age) contained 22.03 % CP and 3105 kcal ME /kg diet, while the finisher diet containing 19.00 % CP and 3196 kcal ME /kg diet was used during the finisher period (29-49 days of age) all the nutrients were as recommended by NRC (1994. Diets were nutritionally evaluated through growth performance feed intake and feed conversion as well as percentage of dressing, digestibility trials and blood parameters.

Results obtained could be summarized as follows:

1.Average live body weight, body weight gain, survival rate and economical efficiency % were significantly ($p<0.01$) increased in broiler groups fed on the diets supplemented with 3%Tafla compared with other groups.

2. Values of feed conversion were significantly improved, while average feed consumption was decreased significantly with Tafla supplementation 1.5% level.

3.Digestibility coefficients of DM, OM CP, EE, CF and NFE were significantly ($p<0.01$) increased with Tafla supplementation at levels 1.5 and 3%.

4. Relative weights of carcass traits studied were significantly affected by 1.5 and 3% Tafla supplemented diets

In general, these results indicate that using (1.5 and 3%Tafla) as feed additives enhance the productive performance and economical efficiency with no adverse effects on blood constituents of broiler chicks.

Keywords: Clay, Tafla,, broiler, diets, productive performance.

INTRODUCTION

Numerous mineral materials (natural clay) are receiving greater attention in poultry production. In this respect, the research and development efforts aimed to find out the possibility of employing of natural clay such as (Tafla, zeolite, clinoptilolite, and bentonite) in enhancement of poultry performance.

Dobeic (1994) found that, supplementation of poultry diet with clinoptilolite (zeolite) at 1, 2 or 4% levels increased feed conversion efficiency. The highest feed conversion was with 2% clinoptilolite. Ziobina (1990), Elliot and Edwards (1991) and Ward *et al.* (1993) also found that natural zeolite significantly improved feed efficiency. Fisinin *et al.* (1985) and

Karelina (1985) found that zeolite increased the efficiency of feed utilization for growth and increased the financial returns in broilers. Berrios et al (1983) clarified that, feed conversion was significantly more efficient, consumption of protein and ME were low and cost of diet was reduced with zeolite dietary supplementation. Kasumov *et al.* (1986) indicated that, addition of clinoptilolite to the diet of laying hens was economically advantageous. Ziobina (1990) also found that, daily weight gain and meat quality of broiler chickens were improved with 3% zeolite added in the diet given for 49 days. Dobeic (1994) postulated that, clinoptilolite (zeolite) at levels of 1, 2 or 4% in the diet increased live weight gain and final body weight. The highest growth rate was with 2% clinoptilolite. On the other hand, Ward at *al.* (1993) found that, growth rate decreased with addition of 0.75% sodium zeolite in chicks diet. Lemser *et al.* (1992) reported that, 1.5, 3 or 5% bentonite decreased body weight by 11.6.14.5 and 12%, respectively, while zeolite supplements in broilers diet showed no effect. Kalyuzhnov at *al.* (1988) also reported that, with zeolite dietary supplement, growth rate was intensified in broiler chickens. Sodium bentonite increases chilling shrink and reduces perirenal fat in rabbits (Lambertini *et al.*, 1989). Bentonite, like other clays, is able to adsorb much water and cations, appears to improve the physical nature of pelleted feeds (Martin et *al.* 1969) and may in some ways influence absorption from the gut (Mendel, 1971). Andronikashvili *at al.* (1994) found that, clinoptilolite (zeolite) added to poultry diet delayed transit time of digesta through the digestive tract by 2 to 2.5 h and promoted absorption of nutrients. Digestibility of organic matter, fat and nitrogen-free extract and also N.utilization were increased by supplementary zeolite.

The objectives of this experiment were to study the effect of Tafla on the productive performance of broiler chicks.

MATERIALS AND METHODS

The present study was carried out at the Poultry Nutrition Research Section, Department of Poultry Production, Faculty of Agriculture, Ain Shams University, Cairo, Egypt. A total number of one hundred and fifty unsexed Hubbard broiler chicks at 7-days of age and 145 g average initial body weight assigned to five experimental groups. chicks were randomly placed in wire cages for each treatment, 30 chicks each. The Tafla (natural clay) was brought from Egypt Company for Refractories, then crushed, ground until become dust and added to the diets. Egypt Company for Refractories mentioned that, the chemical composition of Tafla were Cao (2%), Mgo (1%), Na2o (2), k20 (1.2%), Fe2o3 (4%), SiO_2 (50%) and Al2O3 (22%). Chicks were fed starter diet for (0- 7days) without supplemented Tafla, then fed on the experimental diet. A starter diet was used during the starter period (7-28 days of age) which contained 22.03 % CP and 3105 kcal ME /kg diet, while the finisher diet contained 19.00 % CP and 3196 kcal ME /kg diet was used during the finisher period (29-49 days of age) (Table 1) and supplemented with 5 levels of Tafla (0,1.5,3,4.5 and 6%). Feed and water were available ad libitum. Chicks were grown in brooders with raised wire floors and exposed to 24 hours of constant light. All chicks were kept under the same managerial

hygienic and environmental conditions.Individual body weight was recorded at 7, 28 and 49 days of age. Live body weight, Body weight gain (BWG), feed intake (FI (and feed conversion (FC) were also recorded during these periods. At 49 days of age, 4 birds from each treatment were used to determine the digestibility coefficients of nutrients. The proximate analysis of the experimental diet and excreta were carried out according to A.O.A.C (1990) .At the end of the experiment, eight chicks (4 male and 4 female birds) from each experimental treatment group were slaughtered and carcasses. Liver, heart, gizzard ،and abdominal fat were weighed as a percentage of live body weight. Blood samples were taken for determination of, albumin, total protein, total lipids, cholesterol, glutamic oxaloacetic transaminase (GOT) and pyruvic transaminase activity (GPT) by kits from Bio Mereux. Finally, the economical efficiency (%) was calculated from the input-output analysis based upon the differences in body gain. .The Economical efficiency (EE) was calculated according to the equation EE=[(A-B)/B] x100 where A is the selling cost of the obtained gain and B is the feeding cost of this gain. performance index was estimated according to North (1981): performance index=(live body weight/feed conversion) x100. The obtained data were statistically analyzed using the general linear model procedure described in SAS User's Guide (SAS Institute, 1995). Differences among means were tested using Duncan's multiple range test (Duncan, 1955).

Table(1). Composition of basal diets and Chemical analysis:

Ingredients	Starter	Finisher
Yellow corn	49.25	57.88
Soybean meal (44%)	40.85	32.52
Soy Oil	6.10	6.00
Limestone	I .40	1.30
Di~calcuimPhosphate	1.60	1.60
NaCl	0.30	0.30
DL- Methionine	020	0.10
Vit& Min Premix*	0.30	0.30
Total	100	100
PriceLE/ton	1137	1081
Detemined analysis:		
Crude protein %	22.03	19.00
Crude Fiber %	4.07	3.65
Ether Extract %	8.00	8.16
Calculated analysis:		
ME KCal/Kg diet	3105	3196
Calcium %	1.01	0.91
Availabile phosphorous %	0.45	0.37
Lysine%	1.32	1.09
Methionine %	0.56	0.43
Meth. + Cys. %	0.92	0.74

* Each 3 Kg of vitamin and mineral mixture contain : vit. A, 12000,000 IU;vit. D3, 2000,000 IU ;Vit. E, 10,000 mgVit. K3 2000 mg; Vit Bl 1000 mg; vit B2 5000 mg; Vit B6, 1500 mg; Vit. B12 10 Mg; Pantothenic acid, 10,000 mg; Nicotenic acid, 30,000 mg; Folic acid, 1000 mg; Bioten, 50 mg; Choline , 50,000 mg; Copper, I0,000~mg : iodine, 1000 mg; Iron, 30,000, Mg; Manganese,60,000 Mg; Zinc, 55,000 mg; Selenium, 100 mg and Cobalt, 100 mg.

RESULTS AND DISCUSSION

Effect of feeding different levels of Tafla on broiler performance:
Live body weight (LBW).

The effect of Tafla on growth performance of experimental birds was presented in (Table2). During 28 and 49 days, analysis of variance showed highly significant differences (P<0.01) between birds fed on the diet containing 1.5 and 3% Tafla and all other treatments. Analysis of variance showed highly significant differences (P<0.01) in the final LBW. Results indicated that birds fed 1.5and 3% Tafla recorded the highest final LBW followed by those fed the 4.5% Tafla level and control group. Average BWG during the experimental period were significantly higher (P<0.01) for birds fed 3% Tafla than any of the other groups, followed by those fed 1.5,4.5 and 6% Tafla levels. It seems that, 3% Tafla was the most efficient for broiler among the experimental levels. The reduction in the growth for birds given the diets containing high levels of Tafla (4.5 or 6%) ،may be due to the effect of high levels Tafla which like other clays, is able to adsorb much water and cations, appears to reduce the growth and may in some ways influence absorption from the gut.

Table(2).Growth performance of broiler chicks as affected by dietary Tafla.

Items	Treatments				
	Control	1.5%Tafla	3% Tafla	4.5% Tafla	6%Tafla
Live body weight (g)					
7days	145.17^{a}±0.54	1 43.05^{a}±0.55	145.45^{a}±0.43	144.14^{a}±0.49	145.14^{a} ±0.49
28days	1010.07^{b}±28.32	1054.76^{a}±17.78	1056.15^{a}±17.35	1000.10 ^{b}±24.01	940.10^{c}±19.71
49days	18 66.87^{b}±20.47	1948.59^{a}±21.43	2033.84^{a}±16.63	1882.77^{b}±18.72	1754^{c}.+16.72
Body weight gain(g):					
7-28days	864.90^{b}±17.25	911.71^{a}±9.90	910.70^{a}±13.33	855.96^{c}±13.90	794.96^{c}±13.90
29-49days	856.80^{b}±17.39	893.83^{a}±18.70	977.69^{a}±17.83	882.67^{b}±19.76	814.60^{c}±19.76
7-49days	1721. 7c±20.47	1805.54^{b}±21.45	1888.39^{a}±16.69	1738.63^{c}±16.75	1609.56^{d}±18.74
Feed intake (g / bird):-					
7-28 days	1158.33^{b}±23.15	1117.82^{b}±43.50	1156.59^{b}±53.56	1241.14^{a}±33.71	1157.67^{b}±33.7
29-49days	2225.67^{a}±93.78	2023.74^{b}±92.33	2177.00^{a}±92.39	2095.14^{ab}±97.86	1970.00^{c}±95.86
7-49days	3384.00^{a}±76.80	3141.56^{b}±93.40	3333.59^{a}±93.74	3336.28^{a}±98.85	3327.60^{a}±98.85
Feed conversion ratio:					
7-28 days	1.34^{b}±0.03	1.23^{c}±0.03	1.27^{c}±0.06	1.45^{a}±0.03	1.46^{a}±0.02
29-49days	2.57^{a}±0.07	2.20^{c}±0.10	2.23^{c}±0.10	2.37^{b}±0.13	2.40^{b}±0.14
7-49days	1.97^{a}±0.03	1.74^{c}±0.06	1.76^{c}±0.07	1.92^{b}±0.08	2.07^{a}±0.07
Performance Index:					
7-49days	87.36	103.74	107.30	90.47	77.75
Mortality No.-					
7-49days	3	2	2	2	3

Means within the same row with different superscripts are significant1y different, (P<0.01). NS=Not Significant

Results obtained are in agreement with those reported by Ziobina (1990) who found that, daily weight gain of broiler chickens were improved with 3% zeolite added in the diet given for 49 days. Dobeic (1994) postulated that, clinoptilolite (zeolite) at levels 1,2 or 4% in the diet increased live weight gain and final body weight. The highest growth rate was with 2% clinoptilolite.

On the other hand, Ward at *al* (1993) found that growth rate decreased with addition of 0.75% sodium zeolite in chicks diet. Lemser *et al.* (1992) reported that, 1.5, 3 or 5% bentonite decreased body weight by 11.6, 14.5 and 12%, respectively, while zeolite supplements in broilers diet showed no effect.

Feed intake (FI).

During the starter period (7-28 days), total feed intake (FI) Table (2) recorded the highest value for the birds given 4.5% Tafla followed by those fed control diet, 6, 3 and 1.5 % Tafla levels. The differences in FI due to Tafla level effect were highly significant (P<0.01). For the overall period (7-49 days), analysis of variance showed highly significant differences (P<0.01) in FI among birds given different Tafla levels 1.5, 3, 4.5 and 6 % respectively. These results indicate that, the inclusion of Tafla to broiler diets as a feed additive decreased FI at level of 1.5% Tafla than control group and increased with more higher level (3, 4.5 and 6%).

Feed conversion ratio (FCR):

During the first experimental period (7-28days), It is clear that the improvement in the FCR was associated with increasing the dietary Tafla level up to 3%. These results were, statistically, highly significant (P<0.0 1). Similarly, the best FCR was corresponding to the 1.5 and 3% Tafla levels in the finisher period. Birds fed1.5 or 3% Tafla converted their ration into BWG more efficiently than the other groups during the overall experimental period. Birds fed on diets containing high level of Tafla (4.5% or 6%) and control group recorded the poorest feed conversion ratios. These results were statistically, significant (P<0.05). Diets used in the present experiment were formulated to contain equal. Levels of nutrients, therefore the improvement in growth and feed efficiency for broilers given the diets containing low levels (1.5 or 3%) of Tafla would suggest an improvement in digestive efficiency as a result of Tafla addition. Tafla may be increased each of ion exchange capacity (Grim, 1968) digestible nutrients (EL-Hakim et al 1994).

These results are in agreement with those reported by Dobeic (1994) who found that, supplementation of the diet with clinoptilolite (zeolite) at 1, 2 or 4% levels improved feed conversion efficiency. The best feed conversion was with 2% clinoptilolite. Ziobina (1990), Elliot and Edwards (1991) and Ward *et al.* (1993) also found that, natural zeolite significantly improved feed efficiency. The diets used in this study did not contain a growth promoter. This was done intentionally because of the potential beneficial effect of Tafla on gastrointestinal trace macro –organisms .It was hypothesized that a more positive effect would be seen without growth promoters .A positive effect was seen and the performance of the flock was excellent at 3.0%of Tafla, However .it is not possible to determine if Tafla was acting as a growth promotant or could replace a growth promotant in the diet.

Form the previous results, it could be concluded that dietary Tafla 1.5 up to 3%of the diet was shown to improve the growth, feed efficiency and performance index of chickens while numerically reduced mortality.

Nutrients Digestibility Coefficients:

The effect of Tafla on the digestion coefficient of nutrients are

presented in Table (3).It is worthy to note that digestibility of CP, EE and NFE were improved and surpassed that of the control by 1.5 or 3% Tafla. Next are the data obtained by control group while the lowest values nutrient digestibility were obtained by chicks having 4.5 or 6% Tafla .The overall digestibility results of the three nutrient were reflected as a results with organic matter digestibility The highest value being 79.7and 79.9 was for 1.5 or 3% Tafla supplemented groups. While the lowest value was recorded for the chick received diets supplemented with 4.5 or 6% Tafla .The remarkable increase in nutrient digestibility by low levels (1.5 to 3%) of Tafla may be due to its prevention effect of the mold growth so can reduce the bioavailability of mycotoxines (Resanovic et al, 1999) Khosravi and Modirsanei (1999) and accordingly led to higher utilization efficiency of nutrients in the feed. Andronikashvili *et al.* (1994) found that, (zeolite) increased the digestibility of organic matter, fat and nitrogen-free extract and also N utilization.

Table(3). Digestion coefficients as affected by dietary Tafla supplementation.

	Treatments				
Items	**Control**	**1.5%Tafla**	**3% Tafla**	**4.5% Tafla**	**6%Tafla**
Digestibility Coefficients (%):-					
DM	$78.40^{b}\pm0.06$	$80.70^{a}\pm1.22$	$81.30^{a}\pm1.20$	$78.70^{bc}\pm0.70$	$77.30^{c}\pm0.24$
OM	$77.80^{b}\pm0.81$	$79.70^{a}\pm1.16$	$79.9^{a}\pm1.03$	$77.10^{bc}\pm0.92$	$74.90^{c}\pm0.01$
EE	$79.50^{b}\pm0.61$	$84.00^{a}\pm3.28$	$84.20^{a}\pm0.95$	$77.60^{c}\pm0.45$	$73.10^{c}.+1.28$
CF	$29.90^{a}\pm5.28$	$25.10^{a}\pm1.06$	$27.80^{a}\pm1.00$	$27.60^{a}\pm5.75$	$25.10^{a}\pm1.00$
CP	$92.50^{b}\pm0.04$	$94.20^{a}\pm0.02$	$95.4^{a}\pm1.10$	$92.90^{b}\pm0.20$	$92.30^{b}\pm0.02$
NFE	$94.90^{b}\pm0.27$	$95.00^{a}\pm0.06$	$95.40^{a}\pm0.05$	$94.00^{b}\pm1.17$	$94.60^{b}\pm0.04$

Means on the same row differently superscripted are significantly different. * (P<0.05) NS=Not Significant

Carcass Traits :-

The data in Table (4) show that, dressing percentages as well as total edible parts were affected by dietary treatments., Dressing percentages and total edible parts significantly (P<0.01) higher in broiler chicks fed on 1.5,3 and 4.5% Tafla diet when compared with those fed on the 6%tafla and control group.

Table(4). Carcass traits of broiler chicks as affected by dietary Tafla supplementation.

	Treatments				
Traits	**Control**	**1.5%Tafla**	**3% Tafla**	**4.5% Tafla**	**6%Tafla**
Dressing %	$70.11^{b}\pm0.80$	$73.54^{a}\pm2.06$	$73.51^{a}\pm0.36$	$73.67^{a}\pm0.82$	$71.22^{b}\pm104$
Liver %	$2.70^{a}\pm0.16$	$2.75^{a}\pm0.61$	$2.71^{a}\pm0.11$	$2.68^{a}\pm0.08$	$2.65^{a}\pm0.05$
Heart %	$0.50^{a}\pm0.03$	$0.53^{a}\pm0.01$	$0.50^{a}\pm0.03$	$0.48^{a}\pm0.01$	$0.49^{a}\pm0.02$
Gizzard %	$1.63^{a}\pm0.12$	$1.60^{a}\pm0.06$	$1.60^{a}\pm0.06$	$1.59^{a}\pm0.07$	$1.62^{a}\pm0.12$
Total giblets %	$4.03^{a}\pm0.19$	$4.37^{a}\pm0.11$	$4.22^{a}\pm0.18$	$4.27^{a}\pm0.08$	$4.25^{a}\pm0.16$
Total edible parts %	$74.14^{b}\pm0.82$	$77.91^{a}\pm1.81$	$77.73^{a}\pm0.51$	$77.94^{a}\pm1.05$	$75.80^{a}\pm1.16$
Total inedible parts %	$25.86^{a}\pm0.39$	$22.09^{b}\pm0.69$	$22.27^{b}\pm0.34$	$22.60^{b}\pm0.82$	$24.20^{a}\pm1.16$
Abdominal fat %	$0.92^{a}\pm0.26$	0.84 ± 0.28	$0.82^{a}\pm0.22$	$0.81^{a}\pm0.20$	$0.80^{a}\pm0.10$
Gizzard fat %	$0.37^{a}\pm0.09$	$0.36^{a}\pm0.06$	$0.35^{a}\pm0.08$	$0.32^{a}\pm0.07$	$0.30^{a}\pm0.03$
Heart Fat %	$0.09^{a}\pm0.01$	$0.08^{a}\pm0.06$	$0.08^{a}\pm0.01$	$0.06^{a}\pm0.02$	$0.06^{a}\pm0.01$
Non carcass fat %	$1.38^{a}\pm0.30$	$1.28^{a}\pm0.38$	$1.25^{a}\pm0.26$	$1.19^{a}\pm0.26$	$1.16^{a}\pm0.17$

Means on the same row differently superscripted are significantly different.
*** (P<0.05) NS=Not Significant**

Internal organs were not affected by dietary treatments. Although there were no significant differences among dietary treatments for abdominal fat and non-carcass fat, there were the numeric variations in treatments and reduced values by increasing Tafla levels. The improvements in carcass traits are in agreement with those obtained by Yamani *et aL,* (1994) reported that, the improved the percentages of carcass traits over the control group by using Tafla in broiler diets. The percentage of liver and abdominal fat did not show any significant differences among the experimental group by the addition of Tafla .Lon et al (1993) reported that, Natural Cuban zeolites in broilers diets increased carcass yield from 62.9 to 64.8%, with lower abdominal fat content (2.13 and 1.69%).

In general, dressing % and total edible parts % significantly increased in experimental groups fed diets supplemented with Tafla up to 4.5%.

Blood Parameters: -

Effect of dietary treatments on blcod parameters is shown in Table(5). Total protein, albumin, A/G ratio and globulin levels in all treatment groups (up to 4.5% Tafla) were significantly higher than those of control group. However, broiler chicks fed diet supplemented with 6% Tafla had the lowest (P< 0.05) level of these parameters than those fed anther levels. These results are in agreement with those obtained by Yang et al (1999) who reported that, Zeclite significantly increased contents of serum total protein.

Table(5). Blood constituents of broiler chicks as affected by dietary Tafla supplementation.

	Treatments				
Traits	**Control**	**1.5% Tafla**	**3% Tafla**	**4.5% Tafla**	**6% Tafla**
Total protein (g/dL)	3.60 ^{b} ±0.09	4.58 ^{a} ±0.19	4.95 ^{a} ±0.26	4.98 ^{a} ±0.18	3.55 ^{b} ±0.10
Albumin (g/dL)	1.41 ^{b} ±0.06	1.60 ^{a} ±0.08	1.58 ^{a} ±0.07	1.53 ^{a} ±0.07	1.39 ^{b} ±0.06
Globulin (g/dL)	2.19 ^{b} ±0.07	2.98 ^{a} ±0.07	3.37 ^{a} ±0.20	3.45 ^{a} ±0.18	2.16b±0.08
A/G ratio	0.64 ^{a} ±0.04	0.59 ^{b} ±0.03	0.47 ^{b} ±0.03	0.44 ^{b} ±0.03	0.64 ^{a} ±0.05
GOT(U/L)	20.40 ^{a} ±1.06	18.02 ^{a} ±1.98	20.65 ^{a} ±3.27	19.27 ^{a} ±2.47	19.25 ^{a} ±3.45
GPT *(U/L)*	14.22 ^{a} ±2.30	14.86 ^{a} ±2.05	15.40 ^{a} ±2.20	15.55 ^{a} ±2.83	14.96 ^{a} ±2.07
Total lipids (mg/dL)	220.80 ^{b} ±12.90	175.14 ^{b} ±14.77	170.33 ^{b} ±13.70	165.12 ^{b} ±12.30	160.00 ^{c} ±2.50
Cholesterol (mg/dL)	I 25.00 ^{a} ±9.30	95.33 ^{b} ±9.26	92.13 ^{b} ±8.36	91.12 ^{b} ±6.30	90.25 ^{b} ±5.46

Means within same row with different superscripts are significantly different.(P<0.05).

With respect to GPT and GOT, chicks fed diets 1.5, 3 and 4.5 recorded significantly higher (P<0.05) levels of GPT and GOT than the control group or those fed diet contained 6% Tafla. This slightly changes in the blood transaminases level may depend on the rate of protein metabolism, which may be a function of birds age rather than any other factor. It is well known that, by the simple process of transamination, an amino radical is transferred to alfa- keto acid, while the keto oxygen is transferred to the donor of the amino radical which is promoted by transaminases. Analysis of variance showed non significant differences among treatment applied in GOT and GPT which may be an indicator for an optimum hepatic function (Guyton,1981). Cholesterol and total lipids were significantly reduced by Tafla supplementation. The control group had significantly (P<0.05) higher levels of Cholesterol and total lipids as compared to all other experimental groups.

In general, data shown in Table (5) indicated that, Tafla supplementation is more efficient as hypo- cholesterolemic and hypo-lipemic agent when compared with control group. may be due to that addition of Tafla reduced body fat, which may be reflected as a decreased level in the blood. Moreover, this observed decrease in blood total lipids and cholesterol levels with Tafla applied as feed additives may be attributed to the decrease that may occur in the rate of total lipids and cholesterol absorption through the intestinal villi that may be reflected as a decrease in their level in the blood EL-Gendi, 1996) .From data obtained on the previous blood parameters it could be concluded that addition of Tafla to broiler' chicks diet had no adverse effects on blood components, as well as it had no deleterious effects on liver (as measured by GPT and GOT levels.

Economic efficiency (EE):

The higher economic efficiency (EE) observed in the groups fed 1.5 and 3% (Tafla) may be attributed mainly to the heavier weight gain of these groups Table(6). Diets containing 4.5%, 6% and 0% (control group) Tafla gave lower (EE) compared with 1.5 and 3% (Tafla). These results are in agreement with those reported by Fisinin *et al.* (1985) and Karelina (1985) who found that, zeolite increased the financial returns in broilers. Berrios et al (1.983) clarified that, consumption of protein and ME were low and cost of diet was reduced with zeolite dietary supplementation. Kasumov at *al.* (1986) indicated that addition of clinoptilolite to the diet of laying hens was economically advantageous. Generally the addition of (Tafla) improved (EE) up to 3% level. It seems that the addition of Tafla up to 3% as a cheap feed additive to commercial growing broiler diets improved economical efficiency. In conclusion, the obtained results indicate that clay feeding at a rate of 3% could serve as an effective, for increasing performance in the same time without any detrimental effects on birds health.

Table (6). Economic efficiency of the experimental dietary Tafla treatments.

	Treatments				
Items	**Control**	**1.5%Tafla**	**3% Tafla**	**4.5% Tafla**	**6% Tafla**
Total gain(g)	1721.09	1805.54	1888.39	1738.63	1609.63
Price/kg feed(P.T)	111	112	114	115	117
Total cost/ Feed intake(L.E)	3.76	3.30	3.48	3.83	3.89
Total revenue/bird (L.E)	9.47	9.93	10.38	9.56	8.85
Net revenue/bird (L.E)	5.71	6.63	6.9	5.73	4.96
Economical efficiency (EE%)	152	201	198	150	128
Relative economic efficiency (%)	100	132.20	130.30	98.70	84.20

1-The selling price of each Kg. Live body weight (5.5 LE).
2-Assuming that the relative economic efficiency of the control equals 100.

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J. Agric. Sci. Mansoura Univ., 29 (1), January, 2004

تأثير استخدام الطفلة المصرية كإضافات غذائية علي الأداء الإنتاجي لدجاج اللحم

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تهدف هذه التجربة إلي دراسة تأثير استخدام مستويات مختلفة من الطفلة المحلية على أداء دجاج التسمين واستخدم في هذه التجربة ١٥٠كتكوت هابرد وقسمت إلى خمسة مجا ميع تجريبية في كل مجموعة ٣٠ كتكوت(٣مكررات-١٠كتكوت في كل مكرر) وتم تغذية الطيور على عليقه كنترول في الأسبوع الأول وبدأت التغذية على المعاملات في عمر ٧أيام وكانت المعاملات صفر و١,٥و ٣ و ٤,٥و٦% طفلة مضافة إلي العليقة الأساسية والتي كانت تحتوى على ٢٢%بروتين و ٣١٠٥كيلو كالورى خلال فترة البادي من (٧-٢٨يوم)وكانت عليقه الناهي تحتوى على ١٩%بروتين و ٣١٩٦ كيلو كالورى من عمر(٢٩-٤٩يوم)وتم تقدير المستهلك من العلف والزيادة في الوزن والكفاءة الغذائية كما تم أجراء تجربة ذبح لوزن أجزاء الذبيحة ووزن دهن الجسم والأجزاء المأكولة و أخذت عينات للدم لتقدير البروتين الكلى والليبيدات الكلية والكولستيرول ووالبيومين وGOT GPT كما تم أجراء تجربة هضم في نهاية التجربة لتقدير معاملات هضم البروتين والدهن والمادة الجافة والألياف وتم حساب التكلفة الاقتصادية وكانت نتائج التجربة كالتالي :-

١- يزيد وزن الجسم وتتحسن الكفاءة الاقتصادية معنويا بإضافة الطفلة بمستوى ٣% بالمقارنة مع باقي المجموعات التجريبية.
٢- تتحسن الكفاءة الغذائية بإضافة الطفلة بمستوى ٣% بالمقارنة بالمجموعات الأخرى.
٣- كانت هناك زيادة معنوية في معاملات الهضم للبروتين والألياف والدهن والمادة الجافة والعضوية والمستخلص الخالي من الأزوت بإضافة الطفلة بمستوى ١,٥ و ٣%.
٤- ينقص مستوي الكولستيرول والليبدات الكلية الدم وكان ذلك مر تبطاً بانخفاض نسبة الدهن في الذبيحة بوجه عام.
٤-يزيد وزن الذبيحة ومجموع الأجزاء المأكولة منها معنويا بإضافة الطفلة بمستوى ١,٥و ٣% وبوجه عام توضح نتائج التجربة انه يمكن استخدام الطفلة كإضافات غذائية في علائق التسمين بمستوى ١,٥و٣%مما يزيد الأداء الإنتاجي والكفاءة الاقتصادية وتقليل النسبة المئوية للدهن في الذبيحة ولبيدات الدم دون حدوث تأثيرات سيئة على مكونات الدم.