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EFFECT OF FEEDING RICE BRAN AND ANTIOXIDANTS ON A LOCAL LAYING HENS PERFORMANCE

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ABSTRACT

A total number of 210 Sina layers (28 week of age) were used to study the effect of substituting yellow corn (YC) by rice bran (RB) at different levels on laying hen performance with reference to antioxidant (AX) supplementation. The experiment included 7 treatment groups. Three experimental diets without antioxidant supplementation were formulated in which rice bran replaced control ration at levels of 7.5, 15 and 22.5 %. The other corresponding three diets had BHT antioxidant at the level of 500mg/kg. Layer groups were given diets containing 16% CP and 2700 Kcal. ME/Kg at the experimental period (20 weeks).

The following results were obtained:

1. Rice bran could substitute YC in Sina layer diets up to the rate of 22.5% without harmful effects on egg number (EN), egg weight (EW), egg mass (EM), feed conversion (FC), egg quality, fertility, hatchability and decreased Yolk cholesterol value too.
2. Antioxidant supplementation resulted in slight improvements in EN, EW, EM, FC, fertility, hatchability and yolk cholesterol.

INTRODUCTION

The term' rice bran' is used to describe the by-product remaining after the milling of brown rice to give white rice. Rice bran is about 10% of brown rice and may contain 20-25% of the total protein, 80% of the oil, more than 70% of the minerals and vitamins and up to 10% of the starch endosperm (Houston, 1972). Since little rice bran is consumed by humans, there is an enormous wastage of important nutrients in the 40-45 million tons of rice bran produced annually, mainly in the Far East and South-east Asia, and used as an animal feed. Ensaf A. El-Full, et al., (2000) showed that the rice bran could substitute YC in Golden Montazah layer diets up to the rate of 25% without harmful effects on laying hen performance (EN, EW, EM and FC) and egg quality.

Rice bran may be included in small amounts in broiler diets and in larger amounts in layer diets before adversely affecting production (Farrell and Martin, 1998). Creswell *et al.* (1977), also showed no change in feed conversion of diets with added rice bran at a level of 100-600 gm/kg in a study with layers.

Rouanet *et al.* (1993) indicated that when rats were fed crude rice bran they produced lower plasma and liver cholesterol concentrations than wheat bran this was mainly attributed to its high soluble fiber content. Hegsted and Kousik (1994) found that rice bran lowered total cholesterol in comparison with wheat bran and tended to decrease triglycerides. They also concluded

that there were active components in rice bran which could inhibit hydroxymethyl glutaryl CoenzymeA (HMG-CoA) reductase activity in vivo in both humans and rats, thus decreasing cholesterol synthesis

This experiment was conducted to determine the effect of dietary supplementation with antioxidant on performance, egg production, exterior and interior egg quality, fertility and hatchability parameters and some blood constituents in Sina laying hens fed different dietary levels of rice bran.

MATERIALS AND METHODS

This study was carried out at El-Gimmizah Poultry Station, Animal Production Researches Institute, Ministry of Agriculture. A total number of 210, 28-week-old Sina laying hens and 21 cockerels were randomly distributed into seven equal groups, each of which composed of 3 replicates of 10 females and 1 male each. Birds were housed in an individual cages with free access to feed and water, and were subjected to a total of 16 hr continuous light/ day. Seven Corn-Soy experimental diets were formulated as shown in (Table 1). Three corn-soy basal diets were formulated to be isocaloric (ME of about 2750 kcal/kg) and isonitrogenous (crude protein of about 16%), in which rice bran replaced YC at in addition, corn soy diet as control without rice bran levels (7.5, 15 or 22.5 %) with supplemental BHT antioxidant level (0 and 500 mg/kg diet). These experimental diets were given to the birds during the period from 28 to 48 weeks of age. Pullets were weighed at the beginning and at the end of the experimental period. Eggs number, egg weight and egg mass were recorded daily through the experimental period (20 weeks). Feed consumption was recorded weekly and then feed conversion (g feed / g egg) was calculated. Egg quality was evaluated at 4-week intervals. In each test, 10 eggs from each dietary treatment were collected, individually weight and broken- out in order to separate their shells, yolks and albumen. The individual weights of yolk, albumen and shell (with membranes) were recorded and calculated as percentages of egg weight. Yolk cholesterol was estimated in eggs laid in the last three days of the ten and twenty week of the experiment. The eggs laid daily were broken and yolk was separated and weighed. Yolk then were pooled and frozen at –18ºC and stored until they were analyzed in duplicate samples. Yolk cholesterol was extracted by the method of Folch *et al.* (1956) as modified by Washburn and Nix (1974) and estimated by the method of Zlatkis *et al.* (1953) using a cholesterol diagnostic kit. Off eggs, hatched chick weight, fertility percentage, hatchability as a percentage from total or fertile eggs and early embryonic mortality as a percentage (during 21 days of incubation) were recorded.

Data were analyses using one way procedure of statistical analysis system (*Spss 8, 1997*). Significant differences among individual means were analyzed by Duncan"s multiple range test *(Duncan, 1955)*.

Table (1):Composition and calculated analysis of the experimental diets.

Ingredients	Control	7.5% Rice Bran	15% Rice Bran	22.5% Rice Bran
Yellow corn	65.00	57.20	49.37	42.15
Rice Bran	00.00	7.50	15.00	22.50
Soybean meal, 44 %	25.00	24.25	23.60	22.80
Cotton seed oil	00.00	1.00	2.00	2.50
Limestone	7.50	7.50	7.50	7.50
Dicalcium phosphate	1.60	1.65	1.60	1.60
Salt	0.35	0.35	0.38	0.38
Vit. & Min. mix.*	0.30	0.30	0.30	0.30
Choline chloride	0.10	0.10	0.10	0.10
Methionine	0.15	0.15	0.15	0.17
Total	100	100	100	100
Calculated values**:				
Crude protein, %	16.61	16.59	16.60	16.61
ME, Kcal/kg	2735	2769	2800	2806
Calcium, %	3.35	3.22	3.22	3.22
Available phosphorus, %	0.43	0.44	0.44	0.45
Lysine, %	0.89	0.89	0.89	0.89
Methionine,%	0.44	0.44	0.44	0.45
Methionine + cystine %	0.71	0.71	0.71	0.73
Determined values***:				
Dry matter, %	89.48	88.68	89.41	89.24
Crude protein,%	15.97	15.78	15.52	15.46
Crude fiber,%	3.42	3.97	4.73	5.37
Ether Extract,%	3.11	3.28	3.57	3.74
Ash,%	9.35	10.21	10.71	11.25

*Each 3kg contains: 10,000,000 IU Vit. A; 2,000,000 IU Vit D_3; 10,000 mg Vit. E; 1,000 mg Vit. K; 1,000 mg Vit. B_1; 5,000 mg Vit. B_2; 1,500 mg Vit. B_6; 10 mg Vit. B_{12}; 50 mg; Niacin, 20 mg ; Pantothenic acid, 1g Biotin; I,000 mg Folic acid; 250,000 mg choline; 80 g manganese; 40 g iron; 50 g zinc; 4 g copper; 2 g iodine; 1 g Selenium and 2 g cobalt.
**Calculated according to NRC (1994). ***Determined according to the methods of A.O.A.C (1980).

RESULTS AND DISCUSSION

Change in body weight:

Data in (Table 2) indicated that feeding diets containing graded levels of rice bran substitution of YC at levels (7.5, 15 and 22.5%) did not significantly affection changing body weight of Sina pullets. Also there was no significant effect of dietary antioxidant (0 and 500 mg AX) levels on change in body weight of laying hens during 28 to 48 weeks of age.

Regardless of the only effect of dietary RB levels or AX levels the layers fed on dietary treatments attained similar change in body weight, In this respect, Summers and Leeson (1993) stated that any gain in body weight after commencement of egg production should be minimal as the hen is essentially at its mature body weight.

Daily feed intake:

Results in (Table 2) indicated that both dietary antioxidant levels (0 and 500 mg AX) and dietary rice bran levels (7.5, 15 and 22.5 % RB) during 28-48 weeks had significant effect on daily feed intake. Layers fed high RB

level (15 and 22.5% RB) recorded lower daily feed intake compared with the other treatments. Regarding to dietary AX levels. Layers fed on the 500 mg AX diets consumed significantly ($P<0.05$) lower feed compared with 0 mg AX diets.

It is worthy noted that layers fed the highest dietary level (22.5% RB/kg) of rice bran with 500 mg AX followed by those fed on 22.5% RB without antioxidant which consumed significantly ($P\leq0.05$) lower daily feed intake compared to control group. Layers fed the control diet recorded the highest daily feed intake, these results confirm those of Sounders (1986), Warren and Farrell (1990c) and Farrell (1994). Whom reported that rice bran contains factors which reduce FI.

Feed conversion (g. feed/g. egg mass):

Results in (Table 2) indicated that, layers fed the dietary of rice bran at levels 15% RB had the best feed conversion followed by those fed the dietary of rice bran at level 7.5 %, 22.5% and without a significant differences among them. But it is observed the layers fed the control diet and that contain rice bran at level 22% RB/kg had the poorer feed conversion compared to those fed diets contain rice bran at levels 7.5% and 15% RB/kg. The addition of 500mg AX to layer diets contains rice bran at levels 7.5, 15 and 22.5% RB/kg enhanced feed conversion compared to the control layer diet without significant differences. The previous results agree with Ensaf A. El-Full, et al., (2000) whom reported that rice bran substitution for YC up to 25% Golden Montazah layers diets enhanced feed conversion without significantly differences compared to the control diet. Generally adding the rice bran to the control diets at increasing rates had insignificant effects on feed conversion (Kratzer and Payne, 1977; Balnave, 1982; Sayre *et al.*, 1988; Farrell and Martin (1993); Annison *et al.* (1995) and Adrizal *et al.* (1996) while there was significant increasing in feed conversion by increasing rates of rice bran inclusion up to 60%. (Piliang *et al.*, 1982 and Zanuddin *et al.*, 1985).

The present results indicated that a diet containing 22.5% RB with or without AX had no adversely effect in BW, BWG and FC for Sina hens at the laying period 28-48 weeks.

Egg production and egg number:

The effects of dietary rice bran levels (7.5, 15 and 22.5 % RB) substitution of YC and dietary antioxidant (0 and 500 mg AX) level on hen-day egg production (EP) and eggs number (EN) in Sina laying hens during 28-48 weeks are presented in (Table 2). The effect of dietary rice bran levels was not significant on EP and EN. Numerical improvement was recorded in EP and EN with the decrease in dietary rice bran level.

Higher numerical improvement was recorded in EP and EN with the increase in dietary antioxidant level. For the effects of dietary rice bran levels (7.5, 15 and 22.5 % RB) and dietary antioxidant (0 and 500 mg AX) level it is observed that the level 15% RB with 500 mg AX recorded superior EP and EN followed by 7.5% RB with 500 mg AX and 22.5% RB with 500 mg AX. While, the worst value recorded by layers fed diet containing 22.5% RB without antioxidant supplementation.

Table (2): Effects of different dietary levels of rice bran and antioxidant level on the performance of Sinai laying hens for egg production and feed conversion, throughout the experimental period from 28 to 48 weeks of age.

Treatments	Initial body weight kg	Final body weight kg	Body weight gain kg	Change in body weight %	Daily feed intake (g)	Feed conversion (g feed/ g egg)	Egg Number	Hen-day egg production (%)	Egg weight (g)	Daily egg mass (g)
Available rice bran levels(RB)	NS	NS	NS	NS	**	NS	NS	NS	NS	*
0%RB	1.21	1.31	0.10	8.62	104.96a	4.24	77.05	55.36	46.10	26.22b
7.5% RB	1.22	1.33	0.09	9.01	103.55b	4.08	80.86	57.75	47.23	27.38ab
15% RB	1.22	1.33	0.10	9.01	102.37c	3.56	86.74	61.95	47.34	29.59a
22.5% RB	1.23	1.34	0.11	8.94	102.66c	4.14	84.95	60.68	47.91	27.89a
Dietary antioxidant levels (AX)	NS	NS	NS	NS	**	NS	NS	NS	NS	*
(0 mg/kg)	1.22	1.33	0.10	9.01	103.65a	4.03	82.83	59.16	47.12	27.81b
(500 mg/kg)	1.22	1.33	0.10	9.01	102.57b	3.91	83.51	59.65	47.16	28.16a
Interaction (RBxAX)	NS	NS	NS	NS	*	NS	NS	NS	**	NS
Control 0%RB	1.21	1.31	0.10	8.62	104.96a	4.24	77.50	55.36	47.23ab	26.22
7.5% RB	1.24	1.35	0.11	8.87	104.75a	4.30	80.67	57.62	47.88ab	27.67
15% RB	1.20	1.30	0.10	8.33	102.37c	3.66	86.28	61.63	46.62b	28.59
22.5% RB	1.24	1.35	0.11	8.87	102.33c	3.88	87.62	62.58	46.72ab	28.99
7.5% RB*500mg/kg.	1.20	1.31	0.09	9.16	102.36c	3.86	81.05	57.89	46.80ab	27.09
15% RB *500mg/kg.	1.25	1.35	0.10	8.00	102.37c	3.47	87.19	62.28	49.19a	30.58
22.5% RB*500mg/kg.	1.22	1.33	0.10	9.01	102.9b	4.41	2.28	58.77	45.48b	26.80
Overall SE	0.76	0.86	0.84	0.16	0.11	0.12	1.52	1.08	0.31	0.52

a-b: For each criterion, means in the same column bearing different superscripts differ significantly at P≤0.05.

It can be concluded that the dietary rice bran at levels 15 and 22.5% RB with antioxidant were satisfactory for egg production of Sina layers from 28 to 48 weeks of age.

Sharara *et al.* (2003) stated that these differences in egg production between hens receiving 10 or 15% versus 0% rice bran in Dandarawi layers, the previous results agreement with the Lodhi and Ichhponani (1975) and Warren and Farrell (1990).

Ensaf A. El-Full, et al., (2000) receded that the egg number for birds fed 25% rice bran substituted for YC insignificantly differed during all periods compared with those fed the corn diet. Similarly, Majun and Payne (1977) found that a 30% inclusion of rice bran in layer diets had no adverse effect on egg production percent (EP%), while a significant decline in EP % was noted in hens fed diets containing 60 % rice bran. However, there was insignificant decrease in EP % when hens were fed the rice bran diets compared with those fed the control diets (Balnave, 1982 and Piliang *et al.*, 1982).

Egg weight (g.):

Results in (Table 2) indicated that the dietary rice bran levels dietary antioxidant levels (0 and 500 mg AX) during 28-48 weeks had no significant effect on egg weight (EW). The diet containing 15% RB and supplemented with 500 mg AX recorded significantly the heights average egg weight compared with the other groups.

The average egg weight of layers fed the highest rice bran level diet (22.5% RB) without AX and either (15% RB) with AX were significantly ($P \leq 0.05$) lower than that of the other groups. Simultaneously, increasing of dietary rice bran level (22.5% RB) with or without antioxidant has a negative effect ($P \leq 0.05$) on average egg weight of layers. These results are in agreement with that reported by Ensaf A. El-Full *et al.* (2000) Found that insignificant differences in egg weight during all periods among hens fed rice bran diets as compared with those fed the control diet, except for hens fed 100 % rice bran substitution during the period from 31-34 weeks of age. Similar trend was reported by Majun and Payne (1977), Balnave (1982) and Piliang *et al.*(1982).

Egg mass (g. egg/hen/day):

Results in Table (2) indicated that, the high level of rice bran (7.5% RB) produced less egg mass than those of the other levels of rice bran. While, the average egg mass of layers fed the highest antioxidant level (500 mg AX) was heavier than those fed without antioxidant diet.

Simultaneously, increasing dietary rice bran level (22.5% RB) with both antioxidant level (0 and 500 mg AX) have no negative effect on average egg mass.

Egg Quality Traits:

Results in (Table 3) showed that antioxidant level (0 and 500 mg AX) had no significant effect on egg quality traits. While, decreasing dietary level of rice bran % significantly ($P \leq 0.05$) improved most of the egg quality traits. With the exception of egg shape index, yolk weight, yolk index and Haugh Units,

Table (3): Effects of different dietary levels of rice bran and antioxidant level on external, internal egg quality traits[1] and Yolk Cholesterol value of Sinai laying hens.

Treatments	Egg shape Index (%)	Shell weight (%)	Shell thickness (mmx100)	Albumen weight (%)	Yolk weight (%)	Yolk index (%)	Haugh units	Yolk Cholesterol (10 weeks) mg/g	Yolk Cholesterol (20 weeks) mg/g
Available rice bran levels(RB)	NS	*	*	*	NS	NS	NS	**	**
0%RB	76.50	14.42a	36.10a	54.20b	31.17	44.35	84.71	11.66a	
7.5% RB	76.80	14.22ab	35.37ab	54.26b	31.22	40.70	84.11	11.47a	11.37a
15% RB	77.27	13.94ab	34.47bc	54.80ab	31.24	40.90	84.21	10.90b	10.73b
22.5% RB	77.63	13.77b	33.75c	55.55a	31.61	53.60	83.39	10.66b	10.49c
Dietary antioxidant levels (AX)	NS	NS	NS	NS	NS	NS	NS	NS	NS
(0 mg/kg)	77.09	14.03	34.79	54.60	31.31	46.94	83.99	11.16	10.99
(500 mg/kg)	77.18	14.05	34.72	55.01	33.35	41.02	84.06	11.02	10.91
Interaction (RBxAX)	NS	NS	**	NS	NS	NS	NS	**	**
Control 0%RB	76.50	14.42	36.10a	54.20	31.17	40.35	84.71	11.66a	11.53a
7.5% RB	76.70	14.02	35.45ab	54.31	31.22	40.55	84.65	11.59a	11.48a
15% RB	77.20	13.97	34.05bc	54.33	31.25	40.85	84.34	10.94b	10.78b
22.5% RB	77.95	13.71	33.55c	55.56	31.60	66.00	82.25	10.54c	10.46bc
7.5% RB*500mg/kg.	76.90	14.42	35.30ab	54.21	31.21	40.85	83.57	11.35a	11.27a
15% RB *500mg/kg.	77.35	13.92	34.90abc	55.27	31.23	41.00	84.07	10.87b	10.67bc
22.5% RB*500mg/kg.	77.30	13.82	33.9bc	55.53	31.61	41.20	84.3	10.77bc	10.52c
Overall SE	0.01	0.08	0.20	0.17	0.11	0.03	0.35	0.09	0.10

a-b: For each criterion, means in the same column bearing different superscripts differ significantly at P≤0.05.
1: Means represent an average of three egg quality tests.

It is obvious that layers fed diets containing 22.5 % RB produced eggs of significantly (P≤0.05) lower values for shell weight %, shell thickness and albumen percentages, compared to those fed diets containing the 15 or 7.5 % RB. On the other hand, layers fed on the 22.5 % RB-diets produced eggs higher numerically of egg shape index, yolk weight, yolk index and Haugh Units score during 28-48 weeks.

Egg quality traits were not affected significantly by either antioxidant level (0 and 500 mg AX) and feeding different levels of rice bran (7.5, 15 and 22.5% RB), except egg shell thickness. High dietary RB level (22.5 %) with either antioxidant level (0 and 500 mg AX) significantly (P≤0.05) had thinner eggs shell thickness while the diets contain RB at level (7.5%) with either antioxidant level (0 and 500 mg AX) produced significantly (P≤0.05) thicker eggs shell thickness.

Similar results were found by Piliang *et al.* (1982) and Abd El-Ghany *et al.* (1997). However, adding different rates of rice bran (25 up to 100%) to layer diets resulted in adverse and significant effects on yolk color. Majun and Payne (1977) who reported that shell thickness was adversely affected at 60% rice bran inclusion.

Also, Ensaf A. El-Full, *et al.* (2000) recorded that using different rates of rice bran in Golden Montazah layers diets resulted in insignificant increase in shell thickness and insignificantly affected albumen, yolk and shell percentages, HU, yolk index and shape index.

Yolk Cholesterol Value (mg/g).

Results in (Table 4) indicated that, the high level of rice bran (22.5% RB) produced less Yolk cholesterol values than those of the low levels of rice bran. Also, the average Yolk cholesterol values of layers fed the highest antioxidant level (500 mg AX) was lower than those fed without antioxidant diet.

Simultaneously, increasing dietary rice bran level (22.5% RB) with both antioxidant level (0 and 500 mg AX) have decreasing in average Yolk cholesterol values in Sina eggs after 10 and 20 weeks of the experiment.

In general, lower (P<.01) yolk cholesterol was found with 7.5, 15 and 22.5% rice bran diets compared with the control diet (Table 4). The yolk cholesterol values showed a reducing with increasing rice bran level for 10 and 20 weeks of the experiment period compared to the control group. This reduction was early pronounced at 22.% level of rice bran than the 7.5, 15% level. The reduction in yolk cholesterol levels was increased with the advancement in time of feeding rice bran. The reduction in egg yolk cholesterol of layer fed rice bran could be elevated because of the characteristic composition of rice bran (soluble fiber and polyunsaturated fatty acids). Sharara *et al.* (2003) reported that lower yolk cholesterol was found with 10 and 15% rice bran diets compared with the control diet. Hargis (1988) reported that fiber influences cholesterol metabolism of laying hens by decreasing absorption of cholesterol, binding with the bile salts in the intestinal tract, shortening intestinal transit time and increasing fecal sterol excretion. The hypocholesterolemic effect of dietary fiber has been reported for other animals as well (Rouanet *et al.* 1993 and Shen et al., 1998). Hargis (1988) reported that several variables have been shown to affect the HMG-

CoA reductase activity, including nutritional status, level of dietary fat and cholesterol, and hormonal factors. It seems that there are active components in rice bran which can inhibit hydroxymethyl glutaryl coenzymeA (HMG-CoA) reductase activity, thus decreasing cholesterol synthesis as reported by Hegsted and Kousik (1994). However, additional work might be conducted to examine the potential of inclusion higher levels of rice bran for yolk cholesterol reduction.

Simmons and Somes (1985) demonstrated that egg cholesterol levels have been shown to vary with species of bird, breed or strain as well as age of fowl. Vargas and Naber (1984) concluded that when body energy stores are substantial, any excess of energy ingested will be reflected as increased body weight and increased cholesterol biosynthesis (with excess cholesterol transferred to the egg yolk). Thus, when the bird is in positive energy balance the concentration of egg yolk cholesterol increases. When the hens are losing weight or consuming less than 340 kcal/ day, yolk cholesterol is then inversely related to body weight.

Table (4): Effects of different dietary levels of rice bran and antioxidant level on the performance of Sinai laying hens on the off egg, embryonic mortality, chick weight, fertility, abnormal chicks and hatchability percentage.

Treatments	Off Egg (%)	Embryonic mortality (%)	Chick weight (g)	Fertility (%)	Abnormal Chicks (%)	Hatchability (%)
Available rice bran levels (RB)	NS	NS	NS	NS	NS	NS
0%RB	3.00	3.00	295.00	97.18	3.86	85.97
7.5% RB	3.00	3.00	297.17	96.86	3.78	85.67
15% RB	3.50	4.00	294.00	94.91	3.95	85.81
22.5% RB	4.00	5.17	292.17	93.83	5.03	84.75
Dietary antioxidant levels (AX)	NS	NS	NS	NS	NS	NS
(0 mg/kg)	3.50	4.00	294.67	95.89	4.50	85.31
(500 mg/kg)	3.33	3.78	294.33	94.94	3.78	85.71
Interaction (RBxAX)	NS	NS	NS	NS	NS	NS
Control 0%RB	3.00	3.00	295.00	97.18	3.86	85.91
7.5% RB	2.33	3.00	296.00	96.43	3.58	85.59
15% RB	3.33	3.33	294.67	94.96	2.72	85.87
22.5% RB	4.33	5.00	292.00	93.43	5.05	88.66
7.5% RB*500mg/kg.	3.67	3.00	298.00	97.28	3.97	88.75
15% RB *500mg/kg.	3.67	4.67	293.33	94.86	5.18	85.75
22.5% RB*500mg/kg.	3.67	5.33	292.33	94.24	5.00	83.84
Overall SE	0.33	0.47	1.02	0.58	0.42	0.90

a-b: For each criterion, means in the same column bearing different superscripts differ significantly at P≤0.05.

Reproductive performance:

The data of off eggs, abnormal embryo, cheeks weight (g), fertility, abnormal cheeks and hatchability percentage are shown in (Table 4). It is clear that, embryonic mortality, cheeks weight (g), fertility, abnormal cheeks

and hatchability percentage of eggs did not significant differ due to RB levels (7.5, 15.0 and 22.5%) with either antioxidant level (0 and 500 mg AX). However fertility and hatchability of total eggs of high RB level (22.5% diet) were lower numerically than that of the other levels (7.5 or 15 % RB diet), Antioxidant level (500 mg AX) improved numerical of the reproductive performance exception of fertility percentage.

Conclusion:

It could be concluded that the inclusion of rice bran at levels 7.5, 15 and 22.5% with or without antioxidant into laying hen diets without adverse effects on performance, egg production, egg quality, fertility and hatchability. While, yolk cholesterol values showed a reducing with increasing rice bran level.

REFERENCES

Abd El-Ghany, A.E.; Ibrahim, S.A.; El-Ganzory, E.H. and El-Faham, A.I. (1997). Influence of lysoforte and enzyme preparation on laying hen performance. PP 79-89. Second Hungarian Egyptian Poultry Conference, 16-19 September 1997, Godollo, Hungary.

Adrizal, P.E. Palo and Sell, J.L. (1996). Utilization of defatted rice bran by broiler chickens . Poultry Sci., 75 : 1012-1017

Annison, G.; Moughan, P.J. and Thomas, D.V. (1995). Nutritive activity of soluble rice bran arabinoxylans in broiler diets. Brit. Poultry Sci., 36: 479-488.

Association of Official Analytical Chemists, (A.O.A.C, 1980). Official Methods of Analysis. 13th Washington, D.C.USA.

Balnave, D. (1982) . Egg weight and production responses of laying hen fed rice pollard J. Sci. Food Agric. 33 : 231-236

Creswell, D.C.; Dharana, R. and Ketaren, P. (1977). Rice bran and rice polishing in diets of young chickens . Proceeding 1st Seminar Poultry Sci. and Industry II , Bogor , Indonesia , p. 2 .

Duncan, D. B. (1955). Multiple range and multiple F tests. Biometrics 11:1-42.

Ensaf A. El-Full; N. E. A. Asker; M.M.M. Ali; Hala M. Abdel Wahed and E.M. Omar(2000). The use of rice bran in broiler and laying diets with reference to enzyme supplementation. Egypt Poultry Sci., 20:517-543.

Farrell, D.J. (1994). Utilization of rice bran in diets for domestic fowl and duckling . World's Poultry Sci. J., 50: 115-131.

Farrell, D.J. and Martin, E. (1993). The effect of microbial phytase on the performance of ducks given diets with high amounts of rice bran. Proceedings of the Nutrition Society 52: 207A.

Farrell, D.J. and Martin, E. (1998). Strategies to improve the nutritive value of rice bran in poultry diets. The addition of food enzymes to target the non-starch polysaccharide fraction in diets of chickens and ducks gave no response. Brit. Poultry Sci., 39:549-554.

Folch, J.; Lees, M; and Sloane-Stanley, G. H. (1956). A simple method for the isolation and purification of total lipids from animal tissues. J. Biol. Chem. 226:497-509.

Hargis, P. S. (1988). Modifying egg yolk cholesterol in the domestic fowl- a review. World's Poult. Sci. J. 44:17-29.

Hegsted, M. and Kousik, C. S. (1994). Rice bran and rice bran oil may lower heart disease risk by decreasing cholesterol synthesis in the body. Louisiana-Agriculture 37:16-17.

Houston, D.F. (1972). Rice bran and polish. In: Rice Chemistry and Technology (Ed. Houston, D.F.), American Association of Cereal Chemists Inc, Minnesota . p.272.

Kratzer, F.H. and Payne, C.G. (1977). Effect of autoclaving , hot-water treating ,parboiling and addition of ethoxyquin on the value of rice bran as dietary ingredient for chickens. Brit. Poultry Sci., 18:475-482.

Kratzer, F.H.; Earl, L. and Chiaravanont, C. (1974). Factors influencing the feeding value of rice bran for chickens. Poultry Sci . 53:1795-1800.

Lodhi, G. N.; and Ichhponani, J. S. (1975). Effect of feeding deoiled rice polish on the growth and subsequently productive performance of White Leghorn pullets. J. of the Sci . of Food and Agri. 26: 641-652.

Majun, G.K. and Payne, C.G. (1977). Autoclaved rice bran in layer's diet . Brit. Poultry. Sci., 18: 201-203.

National Research Council (1994). Nutrient Requirements of Poultry. 9th rev. ed. National Academy Press, Washington, DC.

Piliang, W.G.; Bird, H.R. and Sunde, M.L. (1982). Rice bran as the major energy source for laying hens. Poultry Sci., 61: 357-363.

Rouanet, J. M.; Laurent, C.; and Besancon, P. (1993). Rice bran and wheat bran: selective effect on plasma and liver cholesterol in high-cholesterol fed rats. Food Chemistery 47:67-71.

Saunders, R.M. (1986). Rice bran composition and potential food uses. Food Reviews International 1: 465-495.

Sayre, R.N.; Earl, L.; Kratzer, F. H. and Saunders, R. M. (1988). Effect of diet containing raw and extrusion-cooked rice bran on growth and efficiency of food utilization of broilers. Brit. Poult Sci., 29:815-823.

Sharara H.H, M. N. Makled And H. Abd El-Fattah (2003). Rice bran as a factor in decreasing cholesterol level in blood and egg of laying hens. Egypt Poult Sci., 23:655-668.

Shen, H.; He, L.; Price, R. L.; and Fernandez, M. L. (1998). Dietary soluble fiber lowers plasma LDL cholesterol concentrations by altering lipoproteins metabolism in female guinea pigs. J. Nutr. 128:1434-1441.

Simmons, R. A.; and Somes, R. G. jr. (1985). Chemical characteristics of Araucana chicken eggs. Poult. Sci. 64:1264-1268.

SPSS(1997). SPSS User s Guide Statistics Version 8. Copyright SPSS Inc., Washington, D.C.USA.

Summers, J.D. and S. Leesom. (1993). Influence of diets varying in nutrient density on the development and repoductive performance of White Leghorn pullets. Poultry Sci. 21:1500-1509.

Vargas, R. E.; and Naber, E. C. (1984). Relationship between dietary fiber and nutrient density and its effect on energy balance, egg yolk and cholesterol and hen performance. J. Nutr. 114:645-652.

Warren, B. E. and Farrell, D. J. (1990c). The nutritive value of full-fat and defatted rice bran. III. The apparent digestible energy content of deffated rice bran in rats and pigs and the metabolisability of energy and nutrients in deffed and full-fat bran in chickens and adult cookerels. Animal feed Sci. and Technology, 27:245-247.

Washburn, K.W.; and Nix, D.F. (1974). A rapid technique for extraction of yolk

Zanuddin, Z.; Iskandar, S. and Gozali, A. (1985). Addition of rice bran to commercial broiler feed for feeding to confined village chickens. Research Report 1984/1985. Research Institute for Animal Production, CRIAS, Bogor, pp. 21-22.

Zlatkis, A.; Zak, B.; and Boyle, A. J. (1953). A new method for the direct determination of serum cholesterol. J. Lab. Clin. Med. 41:486-487.

تأثير التغذية على رجيع الكون مضاد التأكسد على الآداء النتاجى للدجاج المحلـــى البياض

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تم استخدام 210 دجاجة بياضة من سلالة سينا (عمر 28 اسبوع) لدراسة تأثير اســتبدال الذرة الصفراء بمستويات مختلفة من رجيع الأرز على معدل الأداء الإنتاجى والتناســلى وكــذلك مستوى الكلوستيرول فى صفار البيض مع أو بدون مضاد التأكســد. قســمت التجربــة الــى 7 مجموعات. تم تكوين 3 علائق تجريبية بدون و باضافة مضاد التأكسد(بمعــدل صــفر و 500 مجم/كجم علف) حيث يحل رجيع الأرز محل الذرة الصفراء بالمســتويات صــفر ، 7.5 ، 15 ، 22,5%. ثم غذيت بعد ذلك وحتى نهاية الفترة التجريبية (20أسبوع) على علائق تحتــوى علــى 16% بروتين خام و2700 كيلو كالورى طاقة ممثلة/كجم علف فى الفترة التجريبية (20 اسبوع)

و قد تم الحصول على النتائج التالية:

1. يمكن لرجيع الأرز أن يحل محل الذرة الصفراء فى علائق دجاد سينا البياض وحتى 22.5% بدون أية آثار ضارة على عدد البيض ووزن البيضة وكتلة البيض ومعدل التحويــل الغــذائى والجودة النوعية للبيضة ومعدلات الاخصاب والفقس كما قلل من نسبة الكلوستيرول فى صفار البيض .
2. أدت إضافة مضاد التأكسد الى تحسن طفيف فى صفات عدد البــيض ووزن البيضــة وكتلــة البيض ومعدل التحويل الغذائى والجودة النوعية للبيضة ومعدلات الاخصاب والفقس كما قلل من نسبة للكلوستيرول فى صفار البيض .