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Evaluate Effects of Different Inclusion of Oak Kernel with Determine Food Potential Oak Kernel Substitute with Corn Seed on Broiler Chicken's Ration

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Abstract: This experiment was conducted to evaluate effect of different inclusion of oak kernel with determine food potential oak kernel substitute with corn seed on broiler chicken's ration in particular their effect on feed intake, weight gain, feed conversion ratio and carcass broiler. The oak kernel was mixed with corn seed to replace 0, 7.5, 15 and 22.5% of dry matter. About 160 chickens are used in complete randomized design, 4 experimental treatments by 4 replication (per treatment 10 chicken replications) were feed to chickens in over 49 days. Statical analysis of dry matter intake, weight gain, feed conversion ratio for 7-35 days of chicken's age were not significant means ($p>0.05$).

Key words: Oak kernel, corn seed, broiler chicken, performance , Iran

INTRUDUCTION

The oak kernel is a plant product long used as a food and animal-feed by various cultures. Nowadays, it is not used as a foodstuff.

The harvesting of oak kernel can produce considerable feed; for example half of the 16 millions ha of woodland in Iran is oak.

Oak kernel has a large amount carbohydrate, mostly in the form of starch and as a result is a high source of energy (Maldonado and Norton, 1996). Tannins are present in many products of vegetable origin that are used as human foods or animal feeds. A number of adverse nutritional effects have been attributed to tannins (Wareham *et al*., 1993). It has been demonstrated that feeding growing animals diets containing these compounds brings about several undesirable physiological and biochemical effects. These effects are reflected by growth inhibition, negative nitrogen balances, reduced intestinal absorption of sugars and amino acids, reduced immune response and increased liver and protein catabolism (Santidrian and Marzo, 1989; Makkar, 2003).

High concentrations of tannins reduce voluntary feed intake and nutrient digestibility whereas low to moderate concentrations may improve the digestive utilisation of feed mainly due to a reduction in protein degradation in the rumen and a subsequent increase in amino acid flow to the small intestine. These effects on nutrition are reflected in animal performance (Frutos *et al*., 2004). The level of tannin in oak fruit is the principle concern of those employing oak fruit in poultry diets. The tannins present in oak kernels, however, can be toxic if consumed at high (9%) levels (Shamma and Saedi, 1992). As long as the levels of tannin are kept low oak kernel may be an economic substitution for corn in chicken rations.

The purpose of this study was to evaluate effect of different inclusion of oak kernel with determine food potential oak kernel substitute with corn seed on broiler chicken ration.

MATERIALS AND METHODS

Diet and experimental design: The feeding program consisted of a starter diet until 21 days of age and a finisher diet until 42 days of age. The composition of the experimental basal diets is shown in Table 1. All diets for each period were prepared with the same batch of ingredients and all diets within a period had the same composition.

Diets were formulated to meet or exceed requirements by the National Research Council (1994) for broilers of this age.

Supplying and oak fruits processing: Oak kernels were gathered from the Yasuj forests of Iran, with the kernel's surface layer removed and moisture dried off to allow accurate measurement of the remaining food portion.

Oak kernel analysis: Samplings of feed stock were sent to laboratories for chemical analyses that shown in Table 2.

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Table 1: Composition of experimental diets (%)

	Starter				Growth				Finisher			
Diets	----------(7-21 days)----------				----------(21-35 days)----------				----------(35-49 days)----------			
Oak	0.00	7.50	15.0	22.5	0.00	7.50	15.0	22.5	0.00	7.50	15.0	22.5
Corn	58.4	50.9	43.4	35.9	60.5	53.0	45.5	38.0	63.3	55.8	48.3	40.8
Soya meal	31.7	31.2	30.7	30.2	29.1	28.1	27.2	26.2	25.8	24.8	23.9	23.0
Fat	1.20	1.10	1.00	0.90	2,45	2.40	2.35	2.30	3.10	3.00	2.95	2.90
Fish meal	5.20	6.00	6.80	7.50	4.50	5.60	6.70	7.70	4.60	5.80	6.90	8.00
Oak	0.00	7.50	15.0	22.5	0.00	7.50	15.0	22.5	0.00	7.50	15.0	22.5
Ca_2po_4	0.70	0.60	0.50	0.40	0.70	0.60	0.40	0.30	0.50	0.40	0.20	0.05
Shell	1.10	0.95	0.80	0.70	1.00	0.90	0.75	0.60	1.05	0.80	0.70	0.55
Met	0.32	0.32	0.32	0.32	0.32	0.18	0.04	0.00	0.26	0.12	0.00	0.00
Lys	0.15	0.12	0.10	0.08	0.17	0.16	0.14	0.12	0.09	0.07	0.04	0.02
Salt	0.13	0.13	0.13	0.13	0.13	0.15	0.13	0.13	0.13	0.13	0.13	0.13
Baking soda	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Vitamin and mineral supplement	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Anticarboxidoz	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Sand	0.00	0.00	0.05	0.05	0.00	0.30	0.60	0.90	0.00	0.30	0.60	0.90
Metabolizable energy (kcal kg^{-1})	2975	2975	2975	2975	3070	3070	3070	3070	3140	3140	3140	3140
Protein (%)	22.0	22.0	22.0	22.0	20.6	20.6	20.6	20.6	19.5	19.5	19.5	19.5

Table 2: Composition of oak kernel (%)

Constitutions	Values
Moisture	9.86
ASH	1.50
EE	5.00
Sugar component (starch)	65.00
CP	4.75
CF	5.50
CA	0.45
P	0.09
Tannin	1.76

Broiler chicken's and principle: The oak kernel was mixed with corn seed to replace 0, 7.5, 15 and 22.5% of dry matter. About 160 chickens are used in complete randomized design, 4 experimental treatments by 4 replication (per treatment 10 chicken replications) were fed to chickens in over 49 days.

Statistical analysis: Performance of broiler chickens in this experiment was statistically analyzed by one-way analysis of variance.

Differences among treatment means were tested using linear and quadratic contrasts at the 5% probability level (Steel and Torrie, 1980). Using the SAS Statistical Software Package.

RESULTS AND DISCUSSION

Weight gain: As shown in the Table 3, there were no significant differences ($p<0.05$) from 7-35 days but between 35-49 and the end of the experimental period the researchers observed a significant difference between control without oak kernel and other treatments ($p<0.05$).

The highest and lowest live weights were for 15% oak substitution of corn and control, respectively. It seems that oak not only reduce DMI but also till 15% oak

Table 3: Effect of different levels oak kernel on weight gain (g)

	Age of chicken (days)			
Oak (%)	7-21	21-35	35-49	1-49
0	128±13.47^a	750±42.47^a	1130±34.33^c	2231±23.97^d
7.5	296±7.50^a	805±60.29^a	1215±35.34^b	2361±31.39^b
15	302±4.19^a	800±12.83^a	1324±60.98^a	2494±27.09^a
22.5	297±4.99^a	800±12.83^a	1111±10.69^c	2277±1793.00^c

Similar letters in each column show non significant differences ($p<0.05$)

Table 4: Effect of different level oak kernel on feed intake (g)

	Age of chicken (days)			
Oak (%)	7-21	21-35	35-49	1-49
0	458±6.98^a	1788±472.62^a	3066±106.75^b	5130±142.28^b
7.5	467±19.45^a	1562±12.76^a	3180±109.97^{ab}	5275±102.84^{ab}
15	473±18.79^a	1578±9.71^a	3295±118.44^a	5415±113.81^a
22.2	475±13.36^a	1568±811^a	3104±68.81^b	5220±77.45^b

Similar letters in each column show non significant differences ($p<0.05$)

Table 5: Effect of different levels oak kernel on FCR (g)

	Age of chicken (days)			
Oak (%)	7-21	21-35	35-49	1-49
0	1.63±0.078^a	2.39±0.655^a	2.71±0.165^a	2.3±0.522^a
7.5	1.58±0.028^a	1.95±0.138^a	2.62±0.152^{ab}	2.23±0.152^{ab}
15	1.56±0.050^a	1.97±0.127^a	2.49±0.113^b	2.17±0.025^b
22.2	1.60±0.025^a	1.95±0.034^a	2.79±0.059^a	2.29±0.038^a

Similar letters in each column show non significant differences ($p<0.05$)

that chickens can bothered its tannin, increase DMI and because of that the live body weight increased.

Dry matter intake and feed conversion ratio: DMI, daily average and FCR are recorded in Table 4 and 5. The highest and lowest DMI were for 15% and control diets, respectively. These results were the same as other research that shown limited amount of dietary tannin does not have a significant effect on feed intake (Maldonado and Norton, 1996; Terril *et al*., 1992). It seems because of chicken's stomach capacity and the amount of tannin in

the oak kernels used in this study only at 22.5% oak DMI was reduced. Average of FCR was not significantly different till 35 days ($p<0.05$) with a significant different between control and other treatments present within 35-49 days and at the end of experimental period ($p<0.05$) (Table 5).

Carcass characteristics: There were no significant differences between the amounts of usable meat/body weight for the different oak treatments ($p<0.05$). The average percentages of abdominal fats/body weight and gizzard/body weight ratio did not differ significantly between treatments ($p<0.05$).

CONCLUSION

The result of this experiment show no significant differences between carcass characteristics, abdominal fat, liver and gizzard percentage among males and females ($p>0.05$). It is concluded that oak could be inclusion successfully in the chicken's diets up to 15% for meat production.

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