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Effect of sesame seeds or oil supplementation to the feed on some physiological parameters in Japanese Quail

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ABSTRACT

A total No. of 200 three weeks old Japanese quail from the breeding flock in the Poultry Research Farm of Nuclear Research Center, Atomic Energy Authority, Cairo, Egypt, were used in this study. The quail chicks were randomly allotted equally to five groups (40 birds per each). For 4 weeks experimental period birds were kept in battery cages and water and feed were provided *ad libitum*. A basal diet of 24% protein and 3000 kcal M.E./Kg was formulated to cover all nutrients needed. The experimental design included five tested groups as follows: group (1): birds fed on the basal diet and served as control. Group (2): birds fed on the basal diet supplemented with 2% sesame seeds. Group (3): birds fed on the basal diet supplemented with 4% sesame seeds. Group (4): birds fed on the basal diet supplemented with 2%sesame oil. Group (5): birds fed on the basal diet supplemented with 4% sesame oil. The effect of sesame seeds or oil supplementations in feed on some physiological parameters in Japanese quails was investigated. It was observed that the groups of quails supplemented with 4% sesame seeds or 4%oil recorded the lowest body weight. Female and male carcass weight had significant increase in group supplemented with 4% oil as compared to the control group. Total lipids in the eggs significantly decreased in group supplemented with 4% oil as compared to the control group. Cholesterol content in the eggs significantly decreased in group supplemented with 4% sesame seeds while triglycerides in the eggs recorded significant decrease in the group supplemented with 2% sesame seeds. Eggs weight did not significantly change due to the feeding on sesame seeds or oil but, the group supplemented with 4%seeds laid higher number of eggs than other groups. Serum total protein, albumin, alanine transferase, aspartate transferase, alkaline phosphatase, gamma glutamyl transferase, urea, creastinine, total triiodothyronine (T3) and total thyroxin(T4) concentrations were with the normal level as compared to the control group. Blood components of liver and kidney functions are normal in all experimental groups. Total lipids and triglycerides in female and male groups supplemented with 4% sesame seeds significantly decreased as compared to the control group while serum cholesterol level in both female and male groups supplemented with 2% sesame seeds decreased significantly as compared to the control group. Thiobarbituric acid

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reactive substances (TBARS) significantly decreased in spleen and bursa homogenates in both female and male group supplemented with 4%oil. Glutathione content in spleen increased significantly in female and male groups supplemented with 4% oil as compared to the control group. While catalase increased significantly in group supplemented with 2% oil in spleen homogenate. Glutathione content in bursa homogenate was significantly increased in female group supplemented with 2%oil while in male group supplemented with 4%oil as compared to the control group. Catalase content in bursa homogenate increased significantly in both female and male group supplemented with 4%oil. Histological examination of ileum section showed long villi in group supplemented with 2% oil and other sections showing activation of mucous secreting cells lining intestinal villi in group supplemented with 4% oil. It could be concluded that sesame oil 2% or 4% supplementation to the feed can improve physiological performance of quails.

1. Introduction

Sesame (*Sesamum indicum* L.) is one of the most important oil seed crops, having seeds and its edible oil that are highly valued as a traditional healthy food ingredient (Snakar, Ramakrishna Rao, Sambandam, & Pugallendi, 2006). Among the bioactive components in sesame seeds are IP-6 (Phytate; one of the most powerful antioxidants yet found), lignans, pinoresinol, tocopherols, lecithin, myristic acid and linoleate have been identified as the major antioxidantswhich responsible for the resistance of oxidative deterioration of sesame seeds and oil (SiHyung et al., 2010). The potent antioxidant properties of sesame seed extract mainly are attributed to the presence of lignans which are phytoestrogens (Ikeda et al., 2003).

Sesame oil is very stable and contains an antioxidant system comprising sesamol and sesamolinol formed from sesamolin, which substantially reduces its oxidation rate. It is also highly nutritious, rich in vitamin A, B and E as well as the minerals iron, calcium, magnesium, copper, phosphorus acid and silicic (Prasanthi, Muralidhara, & Rajini, 2005). Sesame seeds are high in protein, carbohydrates, fiber and some minerals that are widely used in food items. Additionally, fat of sesame seeds contain about 2.25 times as much energy as the equal amount of carbohydrates from feed grains or forages (Choi et al., 2008). Oil bearing seeds contain their reserve primarily as fat, as their name implies. Oil bearing seeds are much higher in proteins than are the cereals seeds (Malik et al., 2012). Sesame seed showed a high content of oil (52%), protein (24%) and ash (5%) (Borchani, Besbes, Blecker, & Attia, 2010). Sesame oil comprises approximately 50% of the seed weight, contains large amounts of natural antioxidants, they also contain a good type of monounsaturated and polyunsaturated fatty acids (Choi et al., 2008). Lignans are a large class of secondary metabolites in plants, with numerous biological effects (HyunJung et al., 2009). Uzun, Arslan, Karhan, and Toker (2007) reported that sesame seeds contain oleic (Omega 9), linolenic (Omega 6) and arachidic acids but linoleic acid is predominant and plays an important role in the metabolic system.

Therefore, the present study was undertaken to investigate the effect of sesame seeds or oil supplementation as a traditional food to the diet for increasing the efficiency of physiological performance of quails under Egyptian condition to yield healthy gain in their body weights.

2. Materials and methods

A total number of 200 three weeks old, unsexed Japanese Quail birds, obtained from the farm of Biological Applications Dep., Nuclear Research Center, at Inshas area, were used in the present study. The quail chicks were randomly allotted equally to five groups (40 birds per each). For 4 weeks experimental period. Birds were kept in battery cages and water and

Table 1 – Composition and calculated chemical analysis of the basal diets.

Contents	Basal diet kg/100 kg diet
Ground yellow corn	53.00
Soybean meal (44%)	34.00
Corn gluten meal (60%)	7.00
Calcium carbonate	1.4
Dicalcium phosphate	1.6
Sodium chloride	0.40
Vegetable oil	1.5
L-Lysine-Hcl	0.20
DL-Methionine	0.28
Choline chloride	0.24
Premix[a]	0.38
Total	100
Chemical analysis (calculated)[b]	
Crude protein	24.00
ME	3000
Ca	1.01
Available P	0.45
Lysine	1.37
Methionine	0.64
Methionine + Cysteine	1.11

[a] Each kilogram of diet contains 12000I.UA, 2000I.UD3,10 mg E,2 mgK,1 mg B1,1.5 mg B6,10 μg B12,4 mg B2,10 mg pantothenic acid, 20 mg niacin, 1 g folic acid, 50 μg biotin, 500 mg choline chloride, 10 mg copper, 1 mg iodine, 30 mg iron, 55 mg manganese, 55 mg zinc and 1 mg selenium.

[b] Values were calculated according to the nutrient composition to the NRC (1994).