Effects of Aniseed (*Pimpinella anisum L.*), on egg production, quality, cholesterol levels, hatching results and the antibody values in blood of laying quails (*Coturnix coturnix japonica*).

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ABSTRACT

This study was carried out to determine the effects of Aniseed (*Pimpinella anisum*) on egg production (EP), egg weight (EW), egg cholesterol levels (ECL), egg quality [egg shell thickness *(EST)* and haugh unit *(HU)*], feed consumption (FC), feed conversion ratio (FCR), hatching results (HR) and antibody levels in serum after vaccination to against Newcastle virus in laying quails. A total of 180 laying quails were divided into six groups. One basal diet was used in the experiment. There were 5 experimental groups which were supplemented with aniseed as follows: Group I; 1 %, Group II; 2%, Group III; 3%, Group IV; 4%, Group V; 5%, respectively. The control group received no aniseed. Experiment lasted for 13 weeks. There were statistical differences among the groups in terms of FC, FCR and EW ($P<0.01$) except the EP, ECL HU, EST and HR. Antibody levels were increased by aniseed positively ($P<0.05$). It is concluded that the aniseed could be used up to 4 % level in laying quail diets with beneficial effects on immune responses. However it is not recommended to be used at 5 % level because of its negative effects on feed intake and feed conversion ratio.

Keywords: aniseed, egg, quail, hatching, cholesterol

INTRODUCTION

As an aromatic plant, anise (*Pimpinella anisum L.*) is an annual herb indigenous to Iran, India, Turkey and many other warm regions in the world. Anise oil contains *anothole* (85 %) as an active ingredient, in addition to *eugenol, methylchavicol, anisaldehyde* and *estragole*. Anise has been used as a

carminative, antiseptic, antispasmodic, expectorant, stimulant, and stomachic. In addition, it has been used to promote lactation in nursing mothers and as a medicine against bronchitis and indigestion. Oil of anise is used today as an ingredient in cough medicine and lozenges and is reported to have diuretic and diaphoretic properties. If ingested in sufficient quantities, anise oil may induce nausea, vomiting, seizures, and pulmonary edema. Contact of the concentrated oil with the skin can cause irritation (Simon et al., 1984). Ciftci et al. (2005) showed that adding anise oil to hen diets supplemented increased weight gain in which group added to 400 mg/kg anise oil to the diets. Simsek et al (2005) reported that adding mix oil which has anise oil to ration of broiler did not affect body weight, feed conversion and carcass characteristics, except gizzard weight.

This study was carried out to determine the effects of aniseed on egg production, weight, quality (egg shell thickness and haugh unit), cholesterol levels, feed consumption, feed conversion ratio, hatching results and antibody levels in serum of laying quail.

MATERIALS AND METHODS

A total of 180 laying quails (*Coturnix coturnix japonica*) used in the experiment. They were 8 week age at the start of experiment and divided into six groups of 30 birds. Each treatment group was further subdivided into six subgroups of 5 birds (4 female and 1 male) per replicates. There were 5 experimental groups which were supplemented with aniseed as follows: Group I; 1 %, Group II; 2%, Group III; 3%, Group IV; 4%, Group V; 5%, respectively. The control group received no aniseed. Feed and water provided as *ad libitum*. Artificial light was supplied 16 hours per day. Egg production recorded daily, feed consumption and egg weight collected weekly. Egg quality parameters (egg shell thickness and haugh unit) and egg cholesterol levels were also evaluated in the experiment. A total of 432 eggs were used for the hatching trial. Eggs were collected and incubated in the hatchery at the end of the experiment. Birds were vaccinated against Newcastle virus (with inactivated NDV vaccine; 0.5 cc/per animal) at the initial period of trial. Forty eight animals were slaughtered and their blood samples were collected in order to determine antibody levels at the end of the experiment. Antibody levels were examined by using ELISA. The trial was lasted in 13 weeks. Nutrient requirements of the rations determined according to NRC (1994). The diets used in the experiment nutrient contents as follows 20 % crude protein, 2900 kcal/kg metabolisable energy, 2,5 % calcium, 0.35 % available phosphorus, 3% crude cellulose, 4% crude fat, 9.44% crude ash, 1.00% lysine, 0.38% methionine, 2.1% linoleic acid, respectively.

Data were analyzed by variance analyses and Tukey test as statistical methods in the experiment (SPSS inc. 2001).

Table 1 Mean performance, egg quality, egg cholesterol, hatching rate and antibody values of the experimental groups

	Control	Group 1	Group 2	Group 3	Group 4	Group 5	P
Egg production, % / daily	84.94	84.49	85.48	86.35	86.37	86.10	NS
Feed consumption, g/day	30.92^{b}	32.72^{a}	33.08^{ab}	33.08^{ab}	32.34^{ab}	33.65^{a}	**
Feed conversion ratio+	1.99^{c}	2.23^{bc}	2.30^{b}	2.32^{b}	2.30^{b}	2.42^{a}	**
Egg weight, g	12.23^{a}	12.23^{a}	12.30^{a}	11.99^{b}	12.23^{a}	12.01^{b}	**
Egg cholesterol, mg/dl	167	156	150	127	143	140	NS
Haugh units	90.36	88.44	89.50	86.45	86.89	87.14	NS
Antibody levels (mean titer)	2315^{b}	2378^{b}	2341^{b}	2498^{ab}	2436^{ab}	2822^{a}	*
Hatching rate,%	60.80	59.70	63.80	56.90	51.40	56.90	NS
Egg shell thickness, mmx10^{-2}	20.06	20.56	20.68	20.62	20.00	19.75	NS

* P<0.05, ** P<0.01, Mean values with different superscripts within a row differ significantly.
NS: non significant
+FCR, (kg feed / kg egg)

RESULTS AND DISCUSSION

Performance results (egg production, feed consumption, feed conversion ratio, egg weight), egg quality parameters, hatching results and antibody levels of the experimental groups are shown in Table 1. There was no statistical significance between groups in all parameters except for feed consumption, feed conversion ratio and egg weight (P<0.01). Ertas et al (2005) showed that, essential oil mix (EOM) which contained anise, oregano and clove could promote body weight gain and feed conversion ratio however did not effect feed consumption in the broiler. This improvement may be due to the appetizing effect the active ingredient (such as carvacrol, thymol, eugenol and anethole) in essential oil groups. Moreover eugenol and anethole have digestive stimulating effects (Çabuk et al., 2003). Besides, same oils affected the pathogen microorganism in the digestive system and increased live weight gain and feed conversion. Essential oils have been shown antimicrobial (Prabuseenivasan et al., 2006), antifungal (Pina-Vaz et al., 2004) and antioxidant effects (Hinneburg et al., 2006). Our results were different to other presented experiments. This may be due to utilized different animals and instead of aniseed oil. There were no statistical differences in terms of egg cholesterol and hatching rates among the groups. These results confirmed those of Cetingul et al., (2007) who have studied the effect of tymus vulgaris leaf to the laying quail on egg cholesterol and hatching rate as well. There were statistical differences in terms of antibody levels in sera among the groups (P<0.05). The group 5 had the highest level

compared to the control and groups 1 and 2. Our results were supported by Sirvydis et al., (2003) who have demonstrated that the phytobiotics have been shown to activate digestion, strengthen the immune system and or have antibacterial properties.

CONCLUSIONS

It is concluded that aniseed (*Pimpinella anisum*) did not change egg production, cholesterol and quality. However, when aniseed used up to 5%, it increased feed consumption and feed conversion ratio. Therefore, it could be used up to 4 % in the laying quail rations. Moreover aniseed enhanced humoral immune response to Newcastle virus.

REFERENCES

Cabuk,M.A., Alcicek,A., Bozkurt,M. and Imre,N. (2003) Antimicrobial properties of the essential oils isolated from aromatic plants and using possibility as alternative feed additives. II. National Animal Nutrition congress. 18-20 september,pp: 184-187.

Cetingul, I.S., Bayram,I., Yardimci,M., Sahin, E.H. and Sengor, E.(2007) The effect of oregano on egg production, cholesterol, hatching results of the laying quails. Research Project of University of Afyon Kocatepe-TURKEY

Ciftçi,M., Guler,T., Dalkilic, B. and Ertas, N. (2005) The effect of Anise oil (Pimpinella anisum L.) on broiler performance. Int.J. Poult.Sci. 4(11): 851-855.

Ertas, O.N., Guler, T., Ciftci, M., Dalkilic, B. and Simsek, G. (2005) The effect of essential oil mix derived from oregano, clove and anise on broiler performance. Int.J. Poult.Sci. 4(11): 879-884.

Hinneburg,I ., Damien Dorman, H.J. and Hiltunen, R. (2006) Antioxidant activities of extracts from selected culinary herbs and spices. Food Chemist. 97, 122-129.

National Research Council (1994) Nutrient requirements of poultry. 9th ed. Natl. Acad. Pres, Washington, DC.

Pina-Vaz, C., Goncalvez, R.A., Pinto, E., Costa de Oliveira, S., Tavares, C., Salgueiro, L., Cavaleiro, C., Goncalvez, M.J. and Martinez de Oliveira, J. (2004) Antifungal activity of thymus oils and their major compounds. J. Eur. Acad. Dermatol. Venereol., 18:73-78.

Prabuseenivasan, S., Jayakumar, M and Ignacimuthu, S. (2006) In vitro antibacterial activity of some plant essential oils. Altern. Med. 30; (6), 39-42.

Simon, J.E., A.F. Chadwick and L.E. Craker. (1984) Herbs: An Indexed Bibliography. 1971-1980. The Scientific Literature on Selected Herbs, and Aromatic and Medicinal Plants of the Temperate

Zone. Archon Books, 770 pp., Hamden, CT.

Simsek, U.G., Guler, T.,Çiftçi, M.,Ertaş, O.N., Dalkiliç, B. (2005) Esans yağ karışımının (kekik, karanfil ve anason) broylerlerde canlı ağırlık, karkas ve etlerin duyusal özellikleri üzerine etkisi. YYÜ Vet Fak Derg .,16 (2):1-5

SPSS Inc. (2001) SPSS for Windows 10.0 Base system user's guide, release 10.0 SPSS Inc. Printed in the USA.

Sirvydis, H.V., Robiniene, R., Pirudokiene, V. and Vencius, D. (2003) Phytobiotics add value to broiler feed. World Poult. 19. (1), 16-17.