

DIETARY SUPPLEMENTATION OF OMEGA-3 PUFA RICH OIL SOURCES ON SENSORY CHARACTERISTICS OF JAPANESE QUAIL EGGS

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Abstract: A study was conducted to assess the Sensory egg quality attributes of Japanese quail upon enrichment of Omega-3 Polyunsaturated fatty acid (PUFA) rich oil sources like fish oil and linseed oil, independently and simultaneously at 2 and 4 per cent levels. Japanese quail layers were fed with seven experimental diets by incorporating different levels of fish and linseed oils as T₁ (Control), T₂ (2% Fish oil), T₃ (2 % Linseed oil), T₄ (4% Fish oil), T₅ (4 % Linseed oil), T₆ 2% (1% Fish oil + 1% Linseed oil) and T₇ 4% (2% Fish oil + 2% Linseed oil). The mean colour, flavour, texture and overall acceptability scores of eggs from overall 7 to 26 weeks of age as influenced by supplementing various PUFA rich oil sources independently and simultaneously in feed were assessed. The results of the study revealed that the sensory evaluation values of eggs due to lipid supplementation were not significantly influenced by the incorporation of various n-3 PUFA rich oil sources at graded level in Japanese quail layer diets.

Keywords: Omega-3 PUFAs - Designer foods- Japanese quail eggs-Sensory evaluation.

INTRODUCTION

Commercial quail farming is becoming more popular and nutritional awareness among the consumers as well as low cost of Japanese quail eggs is being increasingly gaining momentum in Asian countries especially India. In general, Lipid profile of eggs can be modified by the inclusion of specific oils such as Fish and Linseed oils in varying proportions. As the sensory characteristics influence the consumer acceptability of any foods, the present research study was carried out to assess the effect of Omega-3 Polyunsaturated fatty acid (PUFA) rich oil sources on sensory attributes of Japanese quail eggs.

MATERIALS AND METHODS

Organoleptic studies

Japanese quail layers were fed with seven experimental diets which were formulated by incorporating different levels of fish and linseed oils as T₁ (Control), T₂ (2% Fish oil), T₃ (2 % Linseed oil), T₄ (4% Fish oil), T₅ (4% Linseed oil), T₆ 2% (1% Fish oil + 1% Linseed

oil) and T₇ (2% Fish oil + 2% Linseed oil). The mean colour, flavour, texture and overall acceptability scores of eggs from overall 7 to 26 weeks of age as influenced by supplementing various PUFA rich oil sources independently and simultaneously in feed were assessed. Six eggs per treatment were drawn randomly to assess the organoleptic properties of Japanese quail eggs once in every 28 days period. The eggs were hard-cooked and served as uniform sized hard-boiled eggs to the six-member semi trained taste panel. The results were recorded on a seven point hedonic scale with ascending ratings for the desired attributes of colour, flavour, texture and overall acceptability.

The data collected in all the above experiments of this study were subjected to statistical analyses as per Snedecor and Cochran (1989). Angular transformation is applied to percentages before statistical analysis wherever needed. The non-parametric values were subjected to Kruskal-Wallis non-parametric test (Sokal and Rohlf, 1995).

RESULTS AND DISCUSSION

SENSORY EVALUATION OF EGGS

The mean colour, flavour, texture and overall acceptability scores of eggs from overall 7 to 26 weeks of age as influenced by supplementing various Omega-3 PUFA rich oil sources independently and simultaneously in feed are presented in Table 1.

Colour

The eggs collected from the birds in T₆ (2 % fish oil + linseed oil) recorded the lowest egg colour score (2.29) and the highest egg colour score was observed in T₂ (2% Fish oil) (3.57) when compared to control. The statistical analysis revealed non-significant difference due to dietary treatments on egg colour values.

Flavour

The values of flavour due to various treatments ranged between 3.57 and 4.00. Incorporation of various PUFA rich oil sources in graded levels in Japanese quail layer feed did not alter egg flavour scores.

Texture

The egg texture scores ranged between 3.14 and 3.43. Supplementation of various PUFA rich oil sources failed to exhibit statistical significance on egg texture scores.

Overall acceptability

Eggs collected from the birds in 2 per cent fish oil (T₂) group as well as 2 per cent (fish oil + linseed oil) (T₆) recorded higher overall acceptability scores (6.57) over the eggs collected from the birds in other treated groups. The statistical analysis revealed non-

significant effect due to different oil supplementation in Japanese quail layer feed on egg overall acceptability scores.

The organoleptic evaluation of eggs remained acceptable without causing fishy flavour by feeding up to three per cent fish oil to layers (Zhi- Bin Huang *et al.*, 1990), incorporation of n-3 polyunsaturated fatty acids did not alter egg flavour when hens were fed up to seven per cent fish oil (Damiani *et al.*, 1994), enrichment of omega-3 fatty acid content of egg yolk might increase consumer acceptance (Van Elswyk *et al.*, 1992), no difference in sensory quality of eggs from hens fed regular menhaden oil (Gonzalez-Esquerra and Leeson 2000), feeding of flax seed oil up to nine per cent to laying hens (Huyghebaert, 1995) and taste of hard-boiled eggs was not influenced by flaxseed oil (Tallarico *et al.*, 2002) which are almost agreeable to the results of this study.

However, Meluzzi *et al.* (2000) reported that sensory analysis of boiled and scrambled eggs showed a substantial difference between the two marine oils with EPA oil and fishy flavour is easily identified, particularly in boiled eggs when oil supplementation exceeded two per cent, which is not in agreement with this study.

TABLE 1
MEAN (\pm S.E.) SENSORY EVALUATION VALUES OF EGGS IN JAPANESE QUAIL LAYERS AS INFLUENCED BY FEEDING OMEGA-3 PUFA RICH OIL SOURCES FROM 7 TO 26 WEEKS OF AGE

TREATMENT GROUPS	COLOUR	FLAVOUR	TEXTURE	OVERALL ACCEPTABILITY
T1- Control	3.14 \pm 0.40	3.86 \pm 0.14	3.14 \pm 0.55	6.43 \pm 0.20
T2- 2% Fish oil (FO)	3.57 \pm 0.30	4.00 \pm 0.00	3.43 \pm 0.30	6.57 \pm 0.30
T3- 2% Linseed oil (LO)	2.71 \pm 0.29	4.00 \pm 0.00	3.29 \pm 0.36	6.14 \pm 0.26
T4- 4% Fish oil	2.43 \pm 0.53	3.57 \pm 0.20	3.43 \pm 0.30	6.29 \pm 0.29
T5- 4% Linseed oil	3.00 \pm 0.31	3.86 \pm 0.14	3.43 \pm 0.30	6.29 \pm 0.29
T6- 2 % (1%FO +1%LO)	2.29 \pm 0.29	3.71 \pm 0.18	3.43 \pm 0.37	6.57 \pm 0.30
T7- 4 % (2%FO + 2%LO)	2.43 \pm 0.37	4.00 \pm 0.00	3.14 \pm 0.34	6.29 \pm 0.29

Value within each cell is a mean of six observations

SUMMARY

The results of this study revealed that the eggs collected from the birds in 2 per cent fish oil (T₂) group as well as 2 per cent (fish oil + linseed oil) (T₆) recorded higher overall acceptability scores (6.57) over the eggs collected from the birds in other treated groups. Hence the sensory evaluation values of eggs due to lipid supplementation were not significantly influenced by the incorporation of various n-3 PUFA rich oil sources at graded level in Japanese quail layer diets.

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