Effect of Turmeric (*Curcuma Longa*) on the Egg Production and Bio-Chemical Parameters in Layers

P. Kanagaraju1, A.V.Omprakash, S.Rathnapraba and G.Rajmanohar

Department of Poultry Science, Madras Veterinary College, Tamil Nadu Veterinary and Animal Sciences University, Chennai, India 600 007.

(Received : 06-05-2016 198/16  Accepted : 06-08-2016)

Abstract

A nutritional trial was carried out to investigate the effect of supplementing Turmeric powder different levels of (0, 0.25, 0.5 and 1%) on the egg production and serum metabolites of layer chicken (Nandanam Chicken-4). Data on hen day and hen housed egg production, feed conversion ratio, livability, serum and yolk cholesterol were recorded, statistically analysed and reported. Results revealed that the supplementation of turmeric powder in layer diets significantly (P<0.05) increased hen day and hen housed egg production, FCR, livability and significantly (P<0.05) decreased serum total cholesterol, VLDC, LDC, triglycerides but increased HDL cholesterol at 0.5 per cent level.

Key words: Nandanam chicken-4, turmeric powder, bio-chemical parameters, yolk cholesterol.

Turmeric (*Curcuma longa*) is a Indian traditional medicinal plant widely cultivated and used in tropical regions of India. It is reported that the extracts of turmeric were found to have antimicrobial activity (Namagirilakshmi *et al.*, 2010) imunomodulatory (Antony *et al.*, 1999) and antioxidative (Osawa *et al.*, 1995) activities. Hence, this study was planned to investigate the effect of different levels of turmeric powder on the egg production and Bio-chemical parameters in layers.

Materials and Methods

Two hundred 20 weeks old Nandanam Chicken-4 with uniform body weight were randomly divided into four groups each with five replicates of 10 birds each. The experimental birds were fed *ad libitum* with iso-caloric and iso-nitrogenous diets (BIS, 2007) supplemented with turmeric powder viz., 0 (T1- Control), 0.25 (T2), 0.50 (T3) and 1.0 (T4) per cent. The chemical composition of the experimental diets was determined by following AOAC (2005). Data on daily egg production, weekly feed consumption and mortality were recorded and feed conversion ratio (FCR) was calculated. Blood samples were collected for the estimation of serum total cholesterol, very low density cholesterol (VLDC), low density cholesterol (LDL-C), high density cholesterol (HDL-C) and glycerides by using M/s Agape kit. Yolk cholesterol was determined by enzymatic method and the values were expressed as mg% of yolk. All data were analyzed using the one-way ANOVA procedure of SPSS® (Version 16) for analysis of variance.

Results and Discussion

Hen day and hen housed egg production were significantly (P<0.01) increased in treatment groups supplemented with 0.25, 0.5 and 1% turmeric powder than control (Table I). The findings of the present study was in contrast to Malekizadeh *et al.* (2012) who reported that hens fed with 1% turmeric powder had lower egg production (P<0.05) as compared with the control diet. The FCR was significantly (P<0.01) improved by the supplementation of turmeric powder when compared to control. However, there was no significant difference among treatment groups.

Turmeric supplementation at 1% level had significantly (P<0.05) improved livability (100 per cent) as compared with other treatment groups (96.55 per cent in 0.25 and 97.24 per cent in 0.5 % turmeric supplemented groups) and control (96.77 per cent). The improved livability in groups fed with 1% turmeric powder may be

---

1Corresponding author: Email : kanraj2007@gmail.com
due to antimicrobial and anti-oxidant properties (Panda et al., 2006) and Namagirilakshmi (loc. cit.) of turmeric used in the diet. The total serum cholesterol in laying hens fed with different levels (0.25, 0.5 and 1.0 %) of turmeric powder was significantly (P<0.05) lowered as compared to control. Similar trend was observed in VLDL and LDL. However, HDL was significantly (P< 0.05) increased in turmeric supplemented groups as compared to control. The serum triglyceride was significantly (P< 0.05) reduced in laying hens fed with diets supplemented with 0.25, 0.5 and 1 % turmeric powder. Kermanshahi and Riasi (2006) reported that turmeric powder (0.05, 0.10, and 0.15) in laying hens decreased serum triglyceride, total cholesterol and LDL-cholesterol. Hence, it could be concluded that dietary supplementation of turmeric powder improves some of good indices of serum blood components and can be utilized for manipulating egg composition. The results obtained in the present study are in agreement with the above results that adding turmeric rhizome powder could be useful in the management of cardiovascular disease due to atherosclerosis.

The yolk cholesterol was significantly (P<0.05) reduced in birds provided with diet containing 0.5 and 1 % turmeric powder as compared to other treatment group (0.25 %) and control. A similar finding was reported by Narahari et al. (2003).

**Summary**

It was concluded that the egg production, FCR and livability was improved irrespective of level of turmeric powder supplementation. Supplementation of turmeric powder reduced serum total cholesterol, VLDL, LDL-C, glycerides and yolk cholesterol. Whereas good cholesterol (HDL-C) has increased. Hence, the turmeric powder can be included in the layer diet at the rate of 0.5 per cent level.

**Acknowledgement**

The authors greatly acknowledge Tamil Nadu Veterinary and Animal Sciences University for providing necessary infrastructural facilities for

---

Table I. Effect of turmeric powder supplementation on egg production, serum (mg/dl) and yolk (mg/g of yolk) lipid profile of the layers

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Control (0 %)</th>
<th>Turmeric Powder (0.25%)</th>
<th>Turmeric Powder (0.50%)</th>
<th>Turmeric powder (1.0%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hen day egg production (%)**</td>
<td>47.21± 1.17</td>
<td>50.32± 1.46</td>
<td>51.14±1.80</td>
<td>52.52± 0.54</td>
</tr>
<tr>
<td>Hen housed egg production (%)**</td>
<td>39.34±1.17</td>
<td>46.13±1.46</td>
<td>47.80±1.77</td>
<td>48.25± 0.54</td>
</tr>
<tr>
<td>Feed Conversion Ratio**</td>
<td>4.76± 0.04</td>
<td>4.26±0.03</td>
<td>4.16± 0.02</td>
<td>3.96± 0.07</td>
</tr>
<tr>
<td>Livability (%)**</td>
<td>96.77±0.01</td>
<td>96.55±0.02</td>
<td>97.24±0.02</td>
<td>100±0.01</td>
</tr>
<tr>
<td>Total Serum Cholesterol**</td>
<td>174.50± 7.54</td>
<td>153.00± 6.72</td>
<td>151.20± 6.30</td>
<td>150.35± 5.66</td>
</tr>
<tr>
<td>Very low density cholesterol **(mg/dl)</td>
<td>102.24± 8.24</td>
<td>70.12± 5.34</td>
<td>71.50± 5.54</td>
<td>80.80± 7.42</td>
</tr>
<tr>
<td>Low Density Cholesterol**</td>
<td>31.40± 1.22</td>
<td>26.68± 1.03</td>
<td>25.78± 0.71</td>
<td>24.76± 0.61</td>
</tr>
<tr>
<td>High Density Cholesterol**</td>
<td>40.86± 2.87</td>
<td>56.21± 0.57</td>
<td>53.92± 2.21</td>
<td>44.79± 5.94</td>
</tr>
<tr>
<td>Triglycerides**</td>
<td>835.25± 19.59</td>
<td>725.30±30.05</td>
<td>723.80± 19.05</td>
<td>721.23± 25.43</td>
</tr>
<tr>
<td>Yolk cholesterol (mg/g of yolk)*</td>
<td>10.23±0.10</td>
<td>10.12±0.22</td>
<td>9.72±0.12</td>
<td>9.76±0.23</td>
</tr>
</tbody>
</table>

Means within each row not bearing at least one common superscript differ significantly; ** Highly Significant (P<0.01) and * Significant (P<0.05)
Microbial Analysis of Ice Cream Incorporated with Encapsulated Flavor

A.Vanathi¹, R.Palanidorai and C.Naresh Kumar
Department of Dairy Science, Madras Veterinary College, Vepery, Chennai – 600 007.

(Received : 11-03-2016 198/16 Accepted : 15-09-2016)

Abstract

The aim of this study was to estimate the microbial quality of the ice cream incorporated with encapsulated flavor compounds. In this study FEIC 0 (regular ice cream), two treatments FEIC 1 and FEIC 2 incorporated with FE 0, FE 1 and FE 2 respectively. FEIC 0, FEIC 1 and FEIC 2 were analyzed for standard plate count and coliform count on different storage period 0 day 3rd day and 7th days. Microbial analysis revealed no significant (P > 0.05) difference between the total bacterial count and coliform count of different flavor encapsulated ice cream mixes on different storage period.

Key words: Flavor encapsulated ice cream, Microbial analysis.

Ice cream is popular and nutritionally enriched dairy products produced by freezing pasteurized mixture of milk solids other than fat, sugar, emulsifiers and stabilizer not fat (Joshi et al. 2004 and Marshall et al.2003). As the ice cream is a milk based product, has high nutritive value, almost neutral pH and long storage period, it is highly prone to spoilage by microorganisms (Elahi et al 2002).

The present study was conducted to investigate the microbial levels in ice cream that was prepared by incorporating encapsulated flavor compounds.

Materials and Methods

Ice cream was prepared as per the Bureau of Indian Standard Specification (IS: 2802-1964). To this FE 0 regular flavor compound, encapsulated flavour compound FE 1 and FE 2 were added to the FEIC 0, FEIC 1 and FEIC 2 ice cream mixes respectively before freezing. For FE 1 wall materials like maize starch, gum powder,