COMPARISON OF CHOLESTEROL CONTENT IN CHICKEN, DUCK AND QUAIL EGGS

Zarina Aziz [1], Stella Cyriac, [2] V. Beena,[3] and P.T. Philomina[4]

Department of Veterinary Physiology
College of Veterinary and Animal Sciences
Mannuthy-680 651, Thrissur,Kerala

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Abstract

Forty eggs each of Gramasree chicken (Gallus domesticus), Kuttanad ducks (Anas platyrhynchos domesticus) and Japanese quails (Coturnix coturnix japonica) procured from University Poultry Farm, Mannuthy were utilised for the study. The cholesterol content (mg/g yolk) was estimated as per Wybenga and Pileggi method (Wybenga et al., 1970). Duplicate samples were prepared from each egg and the concentration of cholesterol in each sample was estimated from the optical density measured using spectrophotometer at 530 nm. The average cholesterol content in chicken, duck and quail eggs was 7.65 ± 0.28 mg/g of yolk, 10.36 ± 0.94 mg/g of yolk and 16.05 ± 0.63 mg/g of yolk. On analysis of the data, it was found that there was a significant difference in the cholesterol content in the egg yolk of all the three species. The concentration of cholesterol per gram of yolk was significantly lower in chicken eggs compared to duck and quail eggs. Quail eggs had significantly higher concentration of cholesterol per gram of yolk. The cholesterol concentration per egg was higher in duck eggs when compared to chicken and quail eggs.

Keywords: *Chicken, ducks, quail, cholesterol*

Eggs of poultry can be considered as the most preferred poultry products in our State. High nutritive value, better digestibility, low cost and easy availability are some of the reasons for this preference. Some medicinal values are also attributed to duck and quail eggs. Since the society is becoming more and more health conscious, it is thought worthwhile to conduct a comparative study of cholesterol content in chicken, duck and quail eggs. Hence, the present experiment was conducted to estimate the cholesterol content in eggs. In this experiment, mostly accepted and comparatively easy method of cholesterol estimation was adopted.

Materials and Methods

Eggs of Gramasree chicken (*Gallus domesticus*), Kuttanad ducks (*Anas platyrhynchos domesticus*) and Japanese quails (*Coturnix coturnix japonica*) procured from University Poultry Farm, Mannuthy were utilised for the study. Duplicate samples were prepared from forty eggs each of chicken, ducks and quails. The cholesterol content (mg/g yolk) was estimated as per Wybenga and Pileggi method (Wybenga *et al*., 1970). The yolk was separated from the egg. The egg albumen adhered to the yolk membrane

[1, 3] *Assistant Professors*
[2] *Ph. D. Scholar, Dept. of Poultry Science, CVAS, Mannuthy*
[4] *Professor and Head(Retd.)*

was removed by rolling the intact egg yolk over a filter paper carefully without breaking the yolk membrane. The egg yolk was then transferred into a glass container and homogenised using a glass stirring rod.

Egg yolk (0.5g) was taken in a centrifuge tube and mixed with 7.5ml of 2:1 chloroform methanol solution and this was shaken well for 12 times by hand. 2.5ml of distilled water was added and again shaken well for 12 times. This was centrifuged at 2500 rpm for 10 min. The aqueous methane layer was removed by suction and discarded. The chloroform layer remaining was kept over water bath (90^0C) to evaporate chloroform and 4ml of glacial acetic acid was added using a micropipette. The samples were then tested for cholesterol using Wybenga and Pileggi kit (Biolab Diagnostics, Maharashtra) as follows:

The standard was prepared by adding 0.05ml of cholesterol standard and 5 ml of cholesterol reagent. A blank was prepared by mixing 0.05ml distilled water and 5ml of cholesterol reagent. Cholesterol reagent (5ml) was added to 0.05ml of the samples to be tested in the rest of the test tubes.

The composition of cholesterol reagent was acetic ethyl acetate: 6.5mol/l, sulphuric acid: 3.8mmol/l and ferric ion: 306µmol/l and that of cholesterol standard was 200mg/dL cholesterol and sufficient quantity of acetic acid.

All the solutions were mixed well for 20 seconds and kept in a boiling water bath for 90 seconds and this was cooled immediately for 5 minutes under running tap water. Optical Density (OD) was read at 530 nm against blank.

$$\text{Total Cholesterol (mg/g yolk)} = \frac{\text{OD of sample x 200 x 4}}{\text{OD of standard x 100 x 0.5}}$$

The results obtained were statistically analysed using one-way analysis of variance (Snedecor and Cochran, 1994).

Results and Discussion

The average cholesterol content in chicken eggs was 7.65 ± 0.28mg/g of yolk, whereas that of ducks and quails was 10.36 ± 0.94mg/g of yolk and 16.05 ± 0.63mg/g of yolk (Fig.). The cholesterol content was significantly higher ($p \leq 0.05$) in quail eggs when compared to chicken and duck eggs and was significantly lower in chicken eggs when compared to quail and duck eggs. The cholesterol concentration of duck eggs was also significantly different ($p \leq 0.05$) from that of chicken and quail eggs. The results obtained in the present study were numerically different from that reported by Jalaludeen *et al.* (2004) who reported higher value of cholesterol for duck eggs (884 and 548mg per 100g egg, respectively, for duck and chicken eggs) when compared to chicken eggs. Jalaludeen *et al.* (2006) also reported that the eggs of chicken, duck and quail contain 423, 884 and 844mg of cholesterol per 100g, respectively, which was not in agreement with the present findings. Even though the above reports on cholesterol content were numerically different from the present findings, the cholesterol content in duck and quail eggs were on the higher side and that of chicken eggs was on the lower side.

On perusal of literature, it was found that the reports available so far about the comparison of cholesterol content in chicken, duck and quail eggs using the Wybenga and Pileggi method were meagre. But similar works were conducted in different breeds of chicken. Thankachan (2011) observed that the yolk cholesterol content in native chicken and White Leghorn chicken was 15.93 ± 0.98 and 16.52 ± 0.84mg/g yolk, respectively using Wybenga and Pileggi method. Antony (2011) reported that the mean cholesterol content in mg/g of yolk was significantly higher for Aseel × Rhode Island Red (19.11 ± 1.02mg/g of yolk) when compared with Aseel × Naked Neck (15.25 ± 0.88mg/g of yolk) and Aseel × New

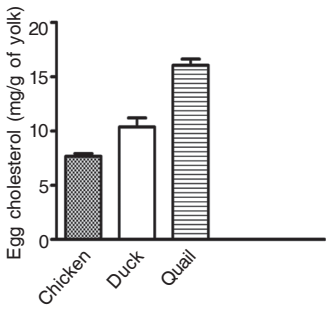

Fig. Cholesterol content (mg/g of yolk) of chicken, duck and quail eggs

Hampshire (14.84 ± 0.70mg/gm of yolk) using this method. Assuming, an average of 30 per cent yolk content per egg and taking the average egg weight as 50, 60 and 10g for chicken, duck and quail eggs, respectively, the cholesterol concentration will be higher for duck eggs (186.46mg) when compared to chicken eggs (114.75mg) and quail eggs (48.15mg). It could be concluded that this study might form a foundation for further studies in this regard and might help for evolving value added eggs in future.

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