

## **A comparative Study on the Nutritive Value among Quail, Hen and Duck eggs of Poultry Farm around Dhaka City**

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### **Abstract**

Quail is quiet familiar bird in Bangladesh but its egg is not as popular as that of hen or duck though, their low cost of production and low risk of diseases. To compare the nutritional value among the quail, hen and duck egg, a study was carried out by collecting the sample from different poultry farm around Dhaka city. After analyzing the three types of egg it was found that moisture content was highest in hen's egg ( $77.33 \pm 0.19\%$  /100g), as compared to Quail's egg ( $72.83 \pm 0.85\%$ /100g) and Duck's egg ( $70.59 \pm 0.39\%$ /100g). Protein content was almost same in quail's egg ( $15.29 \pm 0.43\%$ /100g) and duck's egg ( $15.13 \pm 0.27\%$ /100g) but lower in hen's egg ( $12.76 \pm 0.23\%$ /100g). Slight difference in fat content was found among three types of egg, the values being  $13.22 \pm 0.16\%$ /100g,  $13.47 \pm 0.16\%$ /100g and  $13.15 \pm 0.69\%$ /100g respectively for Hen, Duck and Quail's egg. Total mineral content was almost same in duck's egg ( $1.23 \pm 0.04\%$ /100g) and quail eggs ( $1.26 \pm 0.05\%$ /100g), but the value was slightly low in hen eggs ( $1.03 \pm 0.09\%$ /100g). The value of cholesterol in quail's egg ( $422.88 \pm 11.5\text{mg}$ /100g) was slightly greater than that of hen's egg ( $373.76 \pm 10.1\text{mg}$ /100g), but in case of duck's egg it was  $537.05 \pm 3.3\text{mg}$ /100g. It indicates that cholesterol content in duck egg was far higher than that of quail's egg and hen's egg. At the end of the study it is inferred that nutritive value of the quail egg was better than hen eggs in aspect of protein and mineral content.

**Key words:** Quail egg, Duck egg, Hen egg, Cholesterol, Nutritive value

### **Introduction**

The quail egg is prized as a dietary and healing food. It is recorded that Chinese medical practitioners have used quail eggs for thousands of years to remedy ailments such as rhinitis, asthma, hay fever, spasmodic cough along with skin conditions such as eczema and psoriasis.

Recent investigation shows that quail eggs are packed with vitamins and minerals. Even with their small size, their nutritional value is three to four times greater than chicken eggs. In addition, quail eggs provide five times as much iron and potassium. Unlike chicken eggs, quail eggs have not been known to cause allergies or diathesis. Actually they help fight allergy symptoms due to the ovomucoid protein they contain<sup>1</sup>.

Cholesterol is a fat-like substance found in every living cell in the body and is made in necessary amounts by the body and is stored in the body. It is especially concentrated in the liver, kidney, adrenal glands and the brain. Cholesterol is required for cell wall structure, for producing vitamin D, for producing digestive juices, for insulating nerve fibers, and so on<sup>2,3,4</sup>.

The total cholesterol is the sum of the low-density lipoproteins (called low-density lipoprotein-cholesterol or bad cholesterol) and high-density lipoproteins (called high-density lipoprotein-cholesterol or good cholesterol). Dietary excesses, too much saturated fat and high intakes of cholesterol may increase the level in the blood<sup>4,5</sup>.

Quail eggs contain many essential substances for human growth and development, and especially for child nutrition. Its protein and amino acid content is higher than that of other egg types<sup>6</sup> and it is supposed that quail egg strengthens the body immune system<sup>4,7</sup>. Quail egg has a spherical form and its shell color has different color characteristics, from dark brown to blue or white and as black and blue spotted. Its taste and flavor are similar to a laying hen's egg. It is consumed as raw and boiled, and is utilized for meal and salads. It is recommended that quail egg should be consumed as soft-boiled egg ('rafadan') or mixed with regular milk and honey<sup>4</sup>.

The objectives of this study were to determine the protein, fat, ash, cholesterol content of some egg quality criteria.

## **Materials and Methods**

The eggs of quail, duck and hen used for this study were collected from Postogola, Soniakhra and Rayer Bazar. The eggs were collected on the 4<sup>th</sup> day after lay.

### **Evaluation of egg quality**

The egg was broken gently by using a scalpel and its contents were taken on the flat glass plate. Egg weight (with shell/ without shell) was measured with a Mettler PC 2000 balance after washing and drying with towel to remove contaminants from shell. In case of cholesterol estimation sample was drawn from the egg yolk using the micro-pipette.

### **Analytical Methods**

Moisture content was determined by drying at 100–102°C for 5 hours as described by AOAC (1990)<sup>8</sup>. Crude protein was estimated by multiplying 6.25 to nitrogen content obtained through semi-micro Kjeldahl method<sup>8</sup> (AOAC 1984). Crude fat and ash were analyzed by soxhlet extraction and 550° C muffle furnace method respectively<sup>9</sup>. Cholesterol content was estimated by spectrophotometric method<sup>10</sup>.

**Result****Table 1: Cholesterol content of hen's, duck's and quail's egg**

Name of the egg type	Area-1 (mg/100g) n=10	Area-2 (mg/100g) n=10	Area-3 (mg/100g) n=10	Mean (mg/100g) n=30
Hen's egg	369.16±9.19	366.95±9.54	385.17±5.43	373.76±10.1
Duck's egg	538.24±1.64	533.60±0.56	539.30±1.70	537.05±3.03
Quail's egg	420.28±17.46	435.12±12.20	412.38±17.31	422.88±11.5

Values are mean±SD  
n= number of sample

**Table 2: Moisture content of hen's, duck's and quail's egg**

Name of the egg type	Area-1 (g/100g) n=10	Area-2 (g/100g) n=10	Area-3 (g/100g) n=10	Mean (g/100g) n=30
Hen's egg	77.20±0.10	77.23±0.12	77.55±0.06	77.33±0.19
Duck's egg	70.20±0.19	70.99±0.20	70.58±0.26	70.59±0.39
Quail's egg	73.77±0.12	72.11±0.11	72.60±0.20	72.83±0.85

Values are mean±SD  
n= number of sample

**Table 3: Fats content of hen's, duck's and quail's egg**

Name of the egg type	Area-1 (g/100g) n=10	Area-2 (g/100g) n=10	Area-3 (g/100g) n=10	Mean (g/100g) n=30
Hen's egg	13.10±0.07	13.40±0.11	13.16±0.11	13.22±0.16
Duck's egg	13.36±0.12	13.40±0.06	13.65±0.12	13.47±0.16
Quail's egg	12.94±0.18	13.93±0.13	12.59±0.19	13.15±0.69

Values are mean±SD  
N= number of sample

**Table 4: Protein content of hen's, duck's and quail's egg**

Name of the egg type	Area-1 (g/100g) n=10	Area-2 (g/100g) n=10	Area-3 (g/100g) n=10	Mean (g/100g) n=30
Hen's egg	12.60±0.17	13.02±0.13	12.66±0.14	12.76±0.23
Duck's egg	15.40±0.12	14.85±0.11	15.14±0.20	15.13±0.27
Quail's egg	14.86±0.12	15.72±0.17	15.28±0.13	15.29±0.43

Values are mean±SD  
n= number of sample

**Table 5: Ash content of hen's, duck's and quail's egg**

Name of the egg type	Area-1 (g/100g) n=10	Area-2 (g/100g) n=10	Area-3 (g/100g) n=10	Mean (g/100g) n=30
Hen's egg	0.93±0.08	1.10±0.06	1.05±0.05	1.03±0.09
Duck's egg	1.26±0.03	1.24±0.02	1.18±0.04	1.23±0.04
Quail's egg	1.26±0.02	1.20±0.03	1.31±0.04	1.25±0.05

Values are mean±SD  
N= number of sample

## Discussion

The sample of the research was collected from three different areas (which are selected randomly) in Dhaka city. Then quail, duck and hen's eggs was collected from each of those places. At least one farm was selected from each area for each type of sample collection. These were done for the representativeness of the sample.

Table-1 depicts the Cholesterol content of the three different type of egg sample collected from each area. Mean Cholesterol content of Hen eggs ranged from 369.16 mg to 385.17mg per 100g sample. Cholesterol content of Duck eggs ranged from 538.24mg to 539.30mg per 100 g sample. Cholesterol content of Quail eggs, which was our choice of concern, ranged from 412.38mg to 435.12mg per 100 g sample. So, it can be inferred that cholesterol content of Quail eggs (422.88mg/100g) was higher than that of Hen eggs (373.76mg/100g) but the content was lower than Duck's egg (537.05mg/100g). A previous study<sup>11</sup> evolved that cholesterol content of quails egg was 42.15 mg per egg.

Table-2 shows the moisture content of three different types of eggs. Moisture content of Hen's, Duck and Quail's eggs were 77.33%, 70.59% and 72.83% respectively.

The moisture content of Quail's is lower than that of Hen's egg, but higher than that of duck's egg. A Previous study reported the moisture content of quail egg to be 74.26%<sup>12</sup>. This value is higher than that of present study.

Table-2 depicts the value of fat content of three different types of egg. Here fat content was almost same among the Hen (13.22%), Duck (13.47%) and Quail (13.15%) egg. A previous study reported that lipid levels of quail egg yolk and laying hen's egg yolk were 11.10% and 11.23% respectively<sup>13</sup>.

Table-3 presents the protein content of three different types of eggs. There was a great range in the estimated value of protein content, the values being 12.76g in the hen eggs, 15.13g in the duck eggs and 15.29g in the quail eggs per 100g of sample. Among them Quail's egg contains highest amount of protein, which is the building nutrients. Another study evolved that protein value of quail egg (13.12%) was higher than that of laying hens' eggs<sup>13</sup>. But protein value of present study is higher that of this previous study.

From table-5 shows the ash content of three different types of eggs. The ash content of the eggs was found to be in a range of 1.03% for hen egg and 1.25% in quail egg. So, total ash content of quail's egg is the highest among the three egg types. A study evolved in the past that quails egg total ash content was 1.04% which lower that of our present study<sup>11</sup>. The ash level of quail egg was also higher on the other experiment that that of chicken egg and was 1.16% (n = 72) (P <0.01)<sup>13</sup>.

## Conclusion

The present study reveals that hen's eggs contain comparable amount of nutrient but cost of production of quail's egg is far below the cost of production of hen's egg. So, we can use it as complement of hen's egg in our country.

Quail eggs contain 15.13 percent proteins compared to 12.76 percent in chicken eggs. So we can substitute quail egg in place of hen egg when protein is the main concern particularly in the first year of a child's life.

We have an accepted food composition table. But most of our nutrient value is taken from the Indian food composition table and other food composition tables. On the other hand our food composition table shows only 8 nutrients. Other nutrient values are not provided in our food composition table. So, we need a complete set of data which contains most of the essential nutrient value of Bangladesh food item. This experiment not only help us to find out the nutrient composition of three types of eggs items but also reveals the difference among the three types of eggs available in our country in respect of their nutritive value. We should analyze for other nutrients such as individual vitamins, minerals, essential fatty acids and essential amino acids. This will fulfill the data gap that exists in our food composition table. For better