



IJCSPUB PUBLICATION (IJCSPUB.ORG)

INTERNATIONAL JOURNAL OF CURRENT SCIENCE (IJCSPUB)

An International Open Access, Peer-reviewed, Refereed Journal

A COMPARATIVE STUDY ON THE NUTRITIVE VALUE OF QUAIL AND DUCK EGG

Logeshwari S* and Thiripurasundari B**

*Post Graduate Student, ** Assistant Professor , Department of Biochemistry, Valliammal College for Women, E-9, Annanagar East, Chennai -600102, Affiliated to the University of Madras, Chennai, Tamilnadu, India.

Corresponding Author: Thiripurasundari B, Assistant Professor, Department of Biochemistry, Valliammal College for Women, E-9, Annanagar East, Chennai -600102.

ABSTRACT

Egg constitutes well-known sources of high biological value of protein, lipid, essential amino acids and vitamins. Quail is one of the most studied avian species in terms of egg composition and quality. Duck Eggs have a relatively higher percentage of egg yolk, compared to other avian eggs. The present study was defined to compare the Biological value & Protein efficiency ratio of quail and duck egg. The samples were processed and the following parameters were studied in both quail and duck egg. (Moisture content, Carbohydrate, Protein, Fat, Cholesterol, Vitamin A, Leucine & Proline). The results of the study showed that quail egg had better Biological value and Protein efficiency ratio compared to duck egg. The results of the present study showed that duck egg have higher moisture content (85%) than quail egg (75%). The protein, fat, cholesterol were high in quail egg compared to duck egg but the carbohydrate content was found to be high in duck egg than quail egg. Hence the results of present study show that quail egg is comparatively an excellent source of nutrients with high protein, fat, and cholesterol & PER and Biological value (BV). It can be recommended for good growth and development.

KEYWORDS: Quail egg, Duck egg, Nutrients, PER & BV.

1. INTRODUCTION:

Egg constitutes well-known sources of high biological value of protein, lipid, essential amino acids and vitamins. The egg also represents an important source of energy, protein and other nutrients for humans and their rational consumption stimulates the metabolic functions in the body and increase resistance to disease. Quail eggs are packed with minerals and vitamins even in their small size. Duck eggs can be used for baking, since they contain more albumins. Egg consists of a protective eggshell, albumin (Egg white) and vitellus (Egg yolk) contained within various thin membranes. The most popular choice for egg consumption is chicken eggs. Other popular choice for egg consumption is duck, quail, roe and caviar. Eggs are a very good source of inexpensive, high quality protein. Egg yolks contain more calories and fat. They are the source of cholesterol, fat soluble vitamins A, D, E and K. Egg white provides essential nutrients as well as protection against invading bacteria for embryo development.

Quail is one of the most studied avian species in terms of egg composition and quality. They are smaller than chicken eggs. Quail eggs are considered to be one of the best known natural treatment products. Quail eggs as a treatment for hundreds of years with brilliant results. As quail eggs are slowly becoming an easy to get product on the market more and more people are beginning to show interest in their use as an active natural medicine instead of the chemical products with so many side effects. Experts in natural treatment methods claim that quail eggs have positive effects on people with stress problems, hypertension, digestive disturbance, gastric ulcer, liver problems, blood pressure and lipid control, migraine, asthma, anaemia, various types of allergies, eczema, heart problems, bronchitis illnesses, depression, and panic and anxiety illnesses. Quail eggs are also known to stimulate growth, increase sexual appetite, stimulate brain functions which improve intelligence quotient and generally rejuvenates body.

Duck eggs are an excellent source of nutrition. Their dark yellow yolk indicates that they hold more antioxidants, more omega-3 fatty acids, and 50% more vitamin A than chicken eggs. Duck eggs offer more Protein than chicken Eggs, even taking size into consideration. Protein can help you build lean muscle, maintain a healthy weight, and recover after exercise or injury. The Duck eggs are slightly high in energy content due to high fat percentage. However, the saturated fat content of duck eggs that is having adverse health implications is comparable with other avian species.

Hence the present study was designed to study and compare the nutritive value, biological value and protein efficiency ratio of quail and duck egg.

2. MATERIALS AND METHODS:

SAMPLE: Samples of Quail and Duck eggs were bought from local shop.



FIGURE: 1 Quail and Duck Eggs

SAMPLE PREPARATION: The sample were washed with distilled water and dried. After breaking the Eggs, whole Eggs were dried in the oven for 8hours Temperature between 60-70°C. The below picture shows the Egg yolk and Egg white of Quail and Duck Egg contains 100g of each fresh and dried sample.

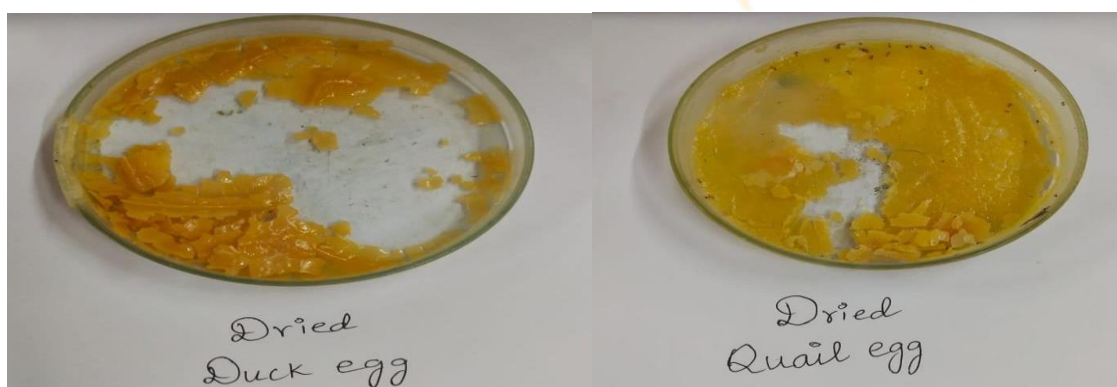


FIGURE 2 & 3: Preparation of Quail and Duck Egg sample

2.1 DETERMINATION OF TOTAL CARBOHYDRATE:

The total carbohydrate in quail and duck egg was determined. 1g of sample was mixed with 100 μ l of distilled water, from that 100 μ l of sample was taken for the test. To that 0.5ml of 5% phenol was added followed by addition of 2.5ml of sulphuric acid was added and read at 500nm.

2.2 ESTIMATION OF TOTAL PROTEIN:

The estimation of total protein was done by Barfoed Method. 100 μ l of sample was taken in two test tubes and add that 3ml of CBB reagent and read at 595nm.

2.3 DETERMINATION OF TOTAL LIPID:

The total lipid in quail and duck egg was determined. 5 μ l of sample was taken and add 20ml of Folch reagent and shaken well before filtration. Petri plate was pre weighted and the filtrate was added and dried in the Petri plate.

2.4 DETERMINATION OF VITAMIN A:

Vitamin A in quail and duck egg was determined. 0.1g of sample was taken. 1ml of ethanol and 2ml of Petroleum ether added to the sample and mixed well. The mixed sample was filtered and dried. 0.5ml of chloroform and 1ml of prepared reagent was added and read at 620nm.

2.5 DETERMINATION OF CHOLESTEROL:

Cholesterol in quail and duck egg was determined. 0.1g of sample was taken. Add 3ml of folch reagent. The sample was filtered and dried. In dried sample dissolve 0.5ml of ethanol. 1ml of reagent, 1ml of 2M Sodium hydroxide was added. And make up to 5ml of distilled water. Read at 428nm.

2.6 DETERMINATION OF AMINO ACID (PROLINE & LEUCINE):

PROLINE

Proline in quail and duck egg was determined. 20mg of sample was taken. Add 350 μ l of ethanol and 120 μ l of distilled water mix well. From that 500 μ l of sample was taken. Add 1ml of Reaction mixture. Heating at 95°C for 20 minutes. After heating, cooled at room temperature and Read at 520nm.

LEUCINE

Leucine in duck and quail egg was determined. 10mg of sample was dissolved in 1ml of distilled water. From that 0.5ml of sample was taken. Add 1ml of ninhydrin reagent to all the test tube including blank labelled as blank and unknown. Mix the tubes then cover all the test tubes with paper. Place all the test tubes in boiling water bath for 15 minutes. Cool the test tubes in cold water and add 5ml of diluent solvent to each test tube and mix well. Read at 570nm.

2.7 CALCULATION OF PROTEIN EFFICIENCY RATIO (PER)

Protein efficiency ratio was calculated using the equation mentioned by ALSMEYER et al., 1974 as follows:

$$\text{PER} = -0.684 + 0.456(\text{Leucine}) - 0.047(\text{Proline}) \text{ (g/100g Protein)}$$

2.8 CALCULATION OF BIOLOGICAL VALUE (BV)

Biological value of Protein was calculated according to the equation of Oser, 1959 as follows:

$$\text{BV} = 49.09 + 10.53(\text{PER})$$

2.9 DETERMINATION OF MOISTURE CONTENT:

Moisture content in quail and duck egg was determined. 3g of sample was weighed. The sample was heated in oven for 100°C for 1 hour. Initial weight of sample and dried weight of sample was noted. From the noted weight standard moisture content in egg was determined.

3. RESULTS:

The following table of contents shows the value of nutritive components of quail and duck egg. From this experimental study, it shows protein in quail egg is higher than duck whereas carbohydrate in duck egg is higher than quail egg. The cholesterol in the duck egg has high value than quail egg. Vitamin A in quail egg has low value whereas duck egg has more value. Proline and Leucine content of quail egg is higher than duck egg. Duck egg has higher moisture content (85%) than quail egg(75%).

TABLE 1 – AMOUNT OF PROTEIN IN QUAIL AND DUCK EGG

Sample	mg/g
Quail egg	396mg/g
Duck egg	194mg/g

TABLE 2 – AMOUNT OF CARBOHYDRATE IN QUAIL AND DUCK EGG

Sample	mg/g
Quail egg	101.14mg/g
Duck egg	123.14mg/g

TABLE 3 – AMOUNT OF CHOLESTEROL IN QUAIL AND DUCK EGG

Sample	mg/g
Quail egg	12.07mg/g
Duck egg	5.93mg/g

TABLE 4 – AMOUNT OF VITAMIN A IN QUAIL AND DUCK EGG

Sample	mg/g
Quail egg	4.23mg/g
Duck egg	7.23mg/g

TABLE 5 – AMOUNT OF PROLINE IN QUAIL AND DUCK EGG

Sample	mg/g
Quail egg	8.07 mg/g
Duck egg	5.13 mg/g

TABLE 6 – AMOUNT OF LEUCINE IN QUAIL AND DUCK EGG

Sample	mg/g
Quail egg	5.60 mg/g
Duck egg	3.07 mg/g

TABLE 7 – AMOUNT OF FAT IN QUAIL AND DUCK EGG

Sample	mg/g
Quail egg	250mg
Duck egg	210mg

TABLE 8 - MOISTURE CONTENT IN QUAIL AND DUCK EGG

Sample	Percentage
Quail egg	75
Duck egg	85

4. DISCUSSION:

The results of the present study show that duck egg have higher moisture content (85%) than quail eggs (75%). The protein, fat, cholesterol were found to be high in quail egg compared to duck egg but the carbohydrate content was found to be high in duck egg than quail egg. The results were supported by the findings of Al-Obaidi & Al-Shadeedi (2017) and Uzoichukwu et al., (2017) reported that the carbohydrate value may be increased due to yolk weight in duck egg. The lower carbohydrate content in quail egg than duck may be due to variation in strain, feed, and bird growth stage and environment condition as recorded by Adeniyi et al.

(2016). The Vitamin A content in duck egg was found to be high compared to quail egg. The results were similar with that of Sahein et al. (2006) & Tunsaringkarn et al. (2013). The Protein Efficiency Ratio is still used as the biologically determined measure of Protein quality. Quail egg comparatively had a higher PER than duck egg. The PER of quail egg was found to be 2.9g and Duck Egg was found to be 2.3g. According to Hoffman and Falvo (2004) any PER value exceeds 2.2g is considered to be an excellent protein source. Hence both eggs were considered to be an excellent source of protein. The Biological Value (BV) provides a measurement of how efficient the body utilizes protein consumed in diet. A food with high BV value correlates to a high supply of the Essential Amino Acids (Hoffman & Falvo, 2004). The biological value of quail egg was higher than duck egg. Hence the results of the present study showed that quail egg is comparatively an excellent source of nutrients with high protein, fat, and cholesterol & PER and Biological Value (BV). Hence it can be recommended for good growth and development.

5. CONCLUSION:

This study shows the value of nutritive components of quail and duck egg Hence it may be concluded that from the results of present study that quail egg is comparatively an excellent source of nutrients with high protein, fat, and cholesterol & PER and Biological Value (BV). Hence quail egg has better nutritive value and can be recommended for good health and development.

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