

Original Research Article

## Quantitative analysis of protein from different types of hen's egg

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### ABSTRACT

Protein contents from the egg white protein and egg yolk protein of three species of hens egg were estimated namely, poultry egg, domestic egg and Kadaknath egg. Biuret method was used to quantify the egg white protein and egg yolk protein to see richness in protein and which will helpful in health properties; study was carried out by using spectrophotometer. It was observed that poultry egg shown high amount of protein in egg white protein as compared to in egg yolk protein. Both protein shows high concentration as compared to domestic egg and Kadaknath egg.

### KEYWORDS

Spectrophotometer | Egg White protein | Egg Yolk protein | Biuret Method

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## Introduction

The word “protein” is derived from the Greek word “proteios” which is of primary importance”. Proteins are the most essential for the maintenance of human life its requirement is expressed in terms of grams/Kg body weight (Jain N.K. 1996). Hen eggs constitute one of the major protein sources of our diet (Friedman, 1996).

**Egg White Protein:** Egg White is a natural source of protein of recognized nutritional, biological and technological potential interest. The Egg White (Albumen) is made up of four individual layers; chalaziferous layer, thin layer, thick layer and chalazae cord. The thin layer accounts for about 23.3% of Egg White, which is further separated into two layers, i.e.; inner and outer thin layers. The outer and inner thin layers are separated by the thick and viscous layer which accounts for the most substantial portion of Egg White, i.e.; 57.3% (Brake *et al.*; 1997; Conrad and Philips, 1938; Li, 2006). Egg White accounts for about 58% of the entire egg mass and has a protein content of 10 – 12%. (Mine Y, 1995). Hen Egg White proteins are surprisingly less studied than other proteins source such as milk proteins or soya proteins (Desert *et al.*; 2001). Egg White also known as egg albumen is compositionally similar in chickens and ducks (~88% water and 11% protein) (Chaisayi *et al.*; 2019).

**Egg Yolk protein:** Egg Yolk is composed of plasma granules, located between the thin and thick albumen, supported by the chalazae. Yolk plasma constitutes 80% of the yolk fraction, and its protein content is of 23% on a dry basis (Freschi *et al.*; 2011). Protein composition is also depends on factors such

as feed intake and environment during the hen’s productive life. (Simitzis *et al.*; 2018; Hammershoj and Johansen, 2016; Novak *et al.*; 2004). Egg protein content varies throughout the productive cycle of hen. (Asli *et al.*; 2007). Egg Yolk proteins are synthesized in the liver of laying hen, they are transported via blood of the oviduct. Where they are deposited in the oocyte (Ranney, R.E.; and Chaikoff, I.L. 1951.; Schjeide, O.A.; *et al.*; 1963)

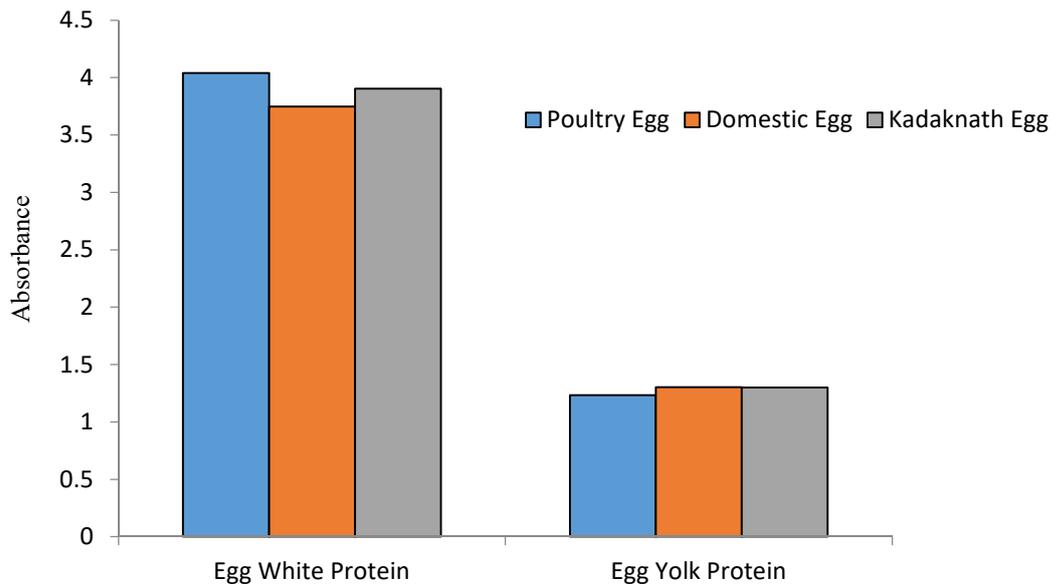
## Material and Methods

Three different species of Hen’s egg namely, Poultry egg, Domestic egg and Kadaknath egg. Estimation of Egg White protein and Egg Yolk protein were measured using Biuret Method (Mahesha *et al.*; 2012) and the data was analysed statistically by calculating p and t value Arora and Malhan (1996).

## Observation and Results

| Egg Sample    | Protein Type      | Mean Value       | P value  |
|---------------|-------------------|------------------|----------|
| Poultry Egg   | Egg White Protein | 4.0393 ± 0.0299  | p<0.0001 |
|               | Egg Yolk Protein  | 1.2343 ± 0.00285 | p<0.0001 |
| Domestic Egg  | Egg White Protein | 3.7477 ± 0.0301  | p<0.0001 |
|               | Egg Yolk Protein  | 1.3037 ± 0.00367 | p<0.0001 |
| Kadaknath egg | Egg White Protein | 3.9043 ± 0.0236  | p<0.0001 |
|               | Egg Yolk Protein  | 1.3 ± 0.00379    | p<0.0001 |

**Table 1:** Showing Concentration of Albumin and yolk protein in Poultry egg, Domestic egg and Kadaknath egg. (Values are mean ± SE)



**Fig. 1:** Showing Concentration of Egg White Protein and Egg Yolk Protein in Egg samples.

As per the estimation of proteins of egg white protein and yolk protein as measured by Biuret method it showed that all three egg of different species shows differences in the concentration of protein. In poultry egg mean of egg white protein observed  $4.0393 \pm 0.0299$  and yolk protein observed was  $1.2343 \pm 0.00285$ . In Domestic hen the Egg white protein calculated and found  $3.7477 \pm 0.0301$  and yolk protein observed was  $1.3037 \pm 0.00367$  and in Kadaknath Hen egg the egg white protein shows  $3.9043 \pm 0.0236$  while yolk protein calculated was  $1.3 \pm 0.00379$ .

### Discussion

Egg is product from hen which is rich in nutrient composition. Proportion of protein from its compartment varies due to genetic makeup and food intake. In present study all three egg namely egg of poultry; Domestic and Kadaknath were subjected for the estimation of protein concentration of Egg white and Yolk protein. Egg white protein concentration is more as compared to yolk protein same finding were coated by Ikegwe et al.; in 2016 and Kusum et al.; in 2018. As

there exist mathematic relationship between the egg weight and volume of egg liquid. Our results showed that egg white protein (Albumin) concentration was high as compared to yolk protein. In poultry egg white protein concentration  $4.0393 \pm 0.0299$  ( $p < 0.001$ ) and yolk protein  $1.2343 \pm 0.00285$ , in domestic egg, egg white protein concentration was observed to be  $3.7477 \pm 0.0301$  and yolk protein  $1.3037 \pm 0.0236$ ; in Kadaknath egg white protein calculated  $3.9043 \pm 0.0236$  and yolk protein  $1.3 \pm 0.00379$ . As per result it is noted that high egg white protein present in poultry egg followed by Domestic egg and quite low amount of egg white protein concentration observed in Kadaknath and as far as yolk proteins are concerned high amount of yolk protein concentration shown by poultry egg followed by Kadaknath and is followed by Domestic egg with low concentration. As egg white protein shows high absorbance as compared to yolk protein spectrophotometrically, similar findings were coated by Linxing et al.; 2014. Values of egg white protein and yolk protein differs significantly in all three types of egg.

From foregoing it is concluded that egg white protein is best source of protein as compared to yolk protein.

### Conclusion

It is observed that egg white protein differs insignificantly between all three eggs types, it is higher in poultry egg followed by the Kadaknath egg and quite low amount observed in Domestic hen egg. Contribution of egg yolk protein is very important for nutrition as it is analyzed and confirmed. No significant difference was found in the yolk protein of all e selected samples of hen. But again poultry eggs shows high yolk protein level followed by domestic hen and Kadaknath egg shows little low amount of yolk proteins as compared to poultry and domestic egg.

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