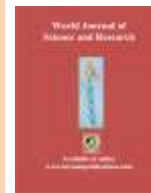




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Research Article

Zoology

BIOCHEMICAL ANALYSIS OF TWO DIFFERENT BIRDS EGG

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ABSTRACT

In the present study to investigate the nutritional content in broiler and Village hens egg. Increased content of protein, albumin, carbohydrate, amino acid in Village hen egg as compared with broiler hen egg. Increased content of vitamins (Thiamin and Riboflavin) in Village hen egg as compared with broiler hen egg. Increased content of minerals (calcium and phosphorous) in Village hen egg as compared with broiler hen egg. Increased content of lipids (cholesterol and phospholipids) content in broiler hen egg as compared with Village hen egg. Bird eggs are a common food and one of the most versatile ingredients used in cooking. They are important in many branches of the modern food industry. The most commonly used bird eggs are those from chicken.

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INTRODUCTION

Eggs are laid by female animals of many different species, including birds, reptiles, amphibians, and fish, and have been eaten by humans for thousands of years. Bird and reptile eggs consist of a protective eggshell, albumen (egg white), and vitellus (egg yolk), contained within various thin membranes. Popular choices for egg consumption are chicken, duck, quail, roe, and caviar, but the egg most often consumed by humans is the chicken egg, by a wide margin. Egg yolks and whole eggs store significant amounts of protein and choline, and are widely used in cookery. Due to their protein content, the United States Department of Agriculture categorizes eggs as Meats within the Food Guide Pyramid (Cantani, 2008). Despite the nutritional value of eggs, there are some potential health issues arising from egg quality, storage, and individual allergies.

Chickens and other egg-laying creatures are widely kept throughout the world, and mass production of chicken eggs is a global industry. In 2009, an estimated 62.1 million metric tons of eggs were produced worldwide from a total laying flock of approximately 6.4 billion hens (Cantani, 2008). There are issues of regional variation in demand and expectation, as well as current debates concerning methods of mass production (Roan, 2010).

Eggs from any source are widely taken as supplement to predominant carbohydrates. They play important roles in nutrition of a large proportion of the populace. The science of food nutrition, takes into account the study of nutrient that each organism obtains from the environment. Man needs for nutrition a highly complex mixture of chemical substance: amino acids carbohydrate, certain lipids, a great variety of minerals including several others which are required in minute amounts (trace elements) and vitamins. The whole egg has been used as a standard in nutrition. Bird eggs are a common food and one of the most versatile ingredients used in cooking. They are important in many branches of the modern food industry. The most commonly used bird eggs are those from broiler and Village hens. In the present study to investigate the nutritional content in broiler and Village hens egg.

MATERIALS AND METHODS

Collection of sample

Eggs of Broiler and Village species of birds were collected from Kulanthiranpattu, Pudukkottai. The whole-egg was weighed using digital balance (Metledo) and recorded. Each sample of egg was broken up with the aid of a sterilized stainless steel knife and the contents

poured into a clean conical flask and the weight recorded by differential. The egg white was separated from the yolk using micropipettes. The egg-white and yolk were placed in separate sample bottles and stored in the deep freezer for analysis of various biochemical parameters.

Biochemical analysis

Protein was estimated by the method of Lowry et al. (1951). Albumin was estimated by the method of Rodkey (1965). To estimate the amount of carbohydrate present in the given sample by using Anthrone method. Amino acid in tissues were estimated by the method of Rosen (1957). Cholesterol was estimated by Allain et al (1974). Calcium in sample was estimated by O-CPC (O-Cresolphthalein complexone) method. Thiamin was determined as per the method given by Okwu (2004). The inorganic phosphorus was estimated by the method of Fiske and Subbarow (1925). Riboflavin was determined as per the method given by Okwu (2004).

Qualitative Analysis of Vitamins

Test for Vitamin- A

Dissolve 250mg of sample in 5 ml of chloroform and filtered. Add 5ml of antimony trichloride solution. A transient blue colour is produced immediately.

Test for Vitamin-C

Dilute 1 ml of aqueous sample solution with 5 ml of water and add 1drop of freshly prepared 5% w/v solution of sodium nitroprusside and 2 ml of dilute sodium hydroxide solution. Add 0.6 ml of HCl drop wise and stir, the yellow colour turns blue.

Test for Vitamin -D

Dissolve a 500mg of sample in 10ml of chloroform and filtered. Add 10ml of antimony trichloride solution. A pinkish -red colour appears at once.

Test for Vitamin -E

500mg of the sample was macerated with 10ml of ethanol for 5 minutes and then filtered. Few drops of 0.1% ferric chloride in ethanol and 1ml of 0.25% of 2'-2'-dipyridyl to 1ml of the filtrate. Bright-red colour was formed on a white background. The background gradually assumes a pink (Pearson, 1976; Patel, 2005).

Statistical analysis

The results were presented as mean \pm SD. Data was statistically analyzed using student "t" test. P. values set as lower than 0.05 was considered as statistically significant.

RESULTS AND DISCUSSION

Variations in the micronutrients of various species of birds origin are imperative and justifiable in an environment where the birds are reared in different localities. Inadequate nutrient in the diet become vital for sourcing and development of food composition data. In fact Feeney et al. (1980),

reported that the amount of nutrient varies greatly from one specie to the other, and that the variation can be larger, small or appear to be completely absent in some species. The three of the various bird species of proximate nutrient composition of eggs of Village and broiler hens are shown in Table 1.

Table 1 Proximate nutrient composition of eggs of Village and broiler hens

S.NO	Analysis	Village egg	Broiler egg
1	Protein (mg)	216.66±25.17	433.32±30.55
2	Albumin (mg)	570.00±170	880.00±140
3	Carbohydrate (mg)	41.52±2.50	99.72±2.87
4	Amino acid (mg)	47.91±9.54	17.70±7.86
5	Calcium (mg)	7.49±0.73	6.10±0.27
6	Thiamin (mg)	4.46 ± 1.26	3.61 ± 2.49
7	Phosphorous (mg)	1.78±0.08	7.81±0.20
8	Riboflavin (mg)	4.57 ± 2.55	3.65 ± 0.50
9	Cholesterol (mg)	12.06 ± 0.71	13.02 ± 0.69
10	Phospholipids (mg)	33.00 ± 6.38	37.9 ± 20.04

Values were expressed as Mean ± SD for triplicates

The birds egg is one of most complex and highly differentiated reproductive cell, germinal cell accumulated relatively enormous amounts of food substances (yolk and albumen material) and all are enclosed in protective structures (shell), birds egg diverge widely in shape, volume, weight and the amount of yolk and albumen material. The shape of the egg is recognizable species characteristic, species lay egg diverge widely from oval to conical shape, with one end rounded and the other more pointed (Faris et al., 2012).

From the result, broiler and Village hens egg have high protein value compared to other nutrient, the broiler which are less recognized has the highest nutrient contents especially protein and calcium. Thus the egg may supply all essential amino acids for human (FAO,2010) and provide several vitamins and minerals, including retinol, Vitamin A, riboflavin (Vitamin B2) Folic acid (Vitamin B9), Vitamin B6, Chorine, Iron, Calcium, Phosphorus and Potassium. Focusing on the protein and crude fat content of hen and pigeon the result show that there were no significant differences (P > 0.05).

As for the minerals element content, while calcium was by 6.10 and 7.49 in broiler hen and Village hen eggs; phosphorous was low in the

Village hen egg. The high content of calcium and phosphorus of broiler hen and Village eggs make it to be more preferable to patient deficient in mineral element. However in all the eggs the Ca/P ratio elicited between 0.5 to 4 Thus, in accordance with report of Niemans et al. (1992) that food is considered good if the Ca/P ratio is > 1 but poor if < 0.5.

Calcium and phosphorus are important in bone, teeth and muscle metabolism (Dosunmu, 1997). In term of vitamins, thiamine was found in an appreciable amount in pigeon eggs; appreciable amount of riboflavin in the same species. The results indicate that the pigeon species have considerable amounts of vitamins and mineral which are contributory to the nutrient need of the populace. In our study, broiler egg appears to have the highest cholesterol value compared to broiler hen and Village hen egg. The chicken egg, typical of birds generally contains about 12% by weight of protein (Gilbert, 1979).

Qualitative analysis of Vitamins

The vitamins of the Village and Broiler egg investigated and summarized in Table 2 and Plate 1. The vitamin analysis of Village and Broiler hens egg showed that the presence of Vitamin C, E while A, D was absent.

Table. 2: Qualitative analysis of vitamins in Village and Broiler hens egg

S.ON	Vitamins	Village egg	Broiler egg
1	Vitamins A	-	-
2	Vitamins C	+	+
3	Vitamins D	-	-
4	Vitamins E	+	+

(+) Presence, (-) Absence



Village hen egg



Broiler hen egg

Plate 1: Qualitative analysis of vitamins in Village and Broiler hens' egg

Vitamins are organic substances that are essential in tiny amounts for growth and activity of the body. They are obtained naturally from plant and animal foods. Organic in this definition refers to the chemistry and molecules of vitamins. The word organic means that the molecules of the substance contain the element carbon. The term also means that vitamins can be destroyed and become unable to perform their functions in our bodies. Too much heat, certain kinds of light and even oxygen can destroy some vitamins. Vitamins work with other substances in the body like enzymes and minerals. Together they perform such functions as strengthening bones, healing wounds, keeping the skin healthy, building cells, and helping to resist infections. The amounts of vitamins ingested from food are measured in micrograms or milligrams (Okwu, 2004).

Vitamin C

Vitamin C, or ascorbic acid, is one vitamin humans cannot make; they have to get it from food. Vitamin C helps hold the cells together, heal wounds, and build bones and teeth. The best sources for vitamin C are citrus fruits, strawberries, melons, and leafy green vegetables. Vitamin C also helps to absorb and use Iron. It is important to protect the vitamins in fruits and vegetables from being destroyed; simple ways of doing this include refrigeration, washing them before cutting them, storing them in airtight containers, and avoiding high temperatures and long cooking times (Okwu, 2003).

Vitamin E

Vitamin E remains the most mysterious of vitamins. The body needs it but its lack does not lead to any known disease. Vitamin E is the most exploited vitamin in that it is sold as a cure-all and even as an anti-aging potion. Vitamin E, vitamin C, and beta carotene are antioxidants. Some studies suggest that the trio might help to strengthen the

body's immune system and play a role in cancer prevention (Okwu, 2004).

CONCLUSION

The Village and broiler hens' egg is an important reserve of highly digestible proteins, lipids, vitamins and minerals which are very important in health preservation and diseases prevention. Among the Village hen egg is an excellent source of vitamins and minerals, especially phosphorus digestible as compare with broilers egg. This study suggested that hens and Village hen egg may be supplemented to malnutrition populace, pregnant women and growing child.

REFERENCES

- Allain CC., Poon LS., Chan CSG., Richmond W and Fu PC.(1974) Enzymatic determination of total serum cholesterol. *Clinical Chemistry* 20: pp 470-5.
- Cantani A (2008). *Pediatric Allergy, Asthma and Immunology*. Berlin: Springer. pp. 710–713.
- Dosunmu, (1997). Altered thiol and calcium homeostasis in oxidative hepatocellular injury. *Hepatology* 5,876–82.
- FAO. (2010). Food and Agriculture Organization; Article on eggs". (<http://www.fao.org/AG/againfo/subjects/en/eggs.html>)Fao.org.
- Faris A. Al-Obaidi, Basim I. Mehdi and Shahrzad M. Al- Shadeedi (2012) Identification of inorganic elements in egg shell of some wild birds. *Advances in Applied Science Research*, 3 (3):1454-1458.
- Feeney, RE, Chary, J., Edward, D.L., Clack, J.A. (1980). A general varying minor protein constituent of chicken egg white. *Journal of Biological Chemistry*, 238, 1738 – 1736.

- Fiske CH and Subbarow K. (1925) The colorimetric determination of phosphorus. *Journal of Biological Chemistry* 66: 375-400.
- Gilbert, A.B. (1979). In *Four and Faction in Birds* (King, A.S and McLelland, J. Eds.)
- Lowry OH., Rosenbrough NJ., Farr AL., Randall RJ. (1951) Protein measurement with the Folin's reagent. *Journal of Biological Chemistry* 193, 265-276.
- Niemans, Hirsch JI and Moore EW. (1992) Premicellar taurocholate enhances calcium uptake from all regions of rat small intestine. *Gastroenterology* 106: 866-874.
- Okwu DE. (2003) Investigation into the medicinal and nutritional potential of garcinia Kala (Bitter kala) Heckel and Demettia tripetala G.Beaker Ph.D. Dissertation of Michael Okpara University of Agriculture Umudlike , Nigeria. 5-10.
- Okwu DE. Phytochemicals and vitamin content of indigenous spices of Southeastern Nigeria. *J. Sustain. Agric. Environ.* (2004) 6 (1): 30- 37.
- Patel KK. (2005) Master dissertation. *Shorea robusta* for burn wound healing and antioxidant activity. Department of Pharmacology, KLESS College of Pharmacy, Karnataka, India, 33.
- Pearson D. (1976) *The Chemical Analysis of Food*, 17th ed. Churchill Livingstone, London, pp 3-4.
- Roan S. (2010) "Eggs and salmonella: What you need to know". *Los Angeles Times*. Retrieved September 14, 2011.
- Rodkey FL. (1965) Direct spectrophotometric determination of albumin in human serum. *Clinical Chemistry*. 11: 478-479.
- Rosen, F., Roberts, N.R. & Nichol, C. A. (1957). *J. biol. Chem.*234, 476.

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