

Research Article

NUTRIENTS PRESENT IN EASILY AVAILABLE HEN'S AND DUCK'S EGGS IN THE MARKETS OF WEST BENGAL, INDIA

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ABSTRACT

Hen's eggs are most common palatable food containing most of nutrients required by man. Almost whole egg is consumed and digested by our intestine except the shell. Here the hen's eggs (*Gallus gallus domesticus*, Breed- BV-300) and duck's eggs (*Anas platyrhynchos domesticus*, Indian runner) were taken from Kolkata market. The protein, creatine, total fat, cholesterol, Triglyceride, Vitamin A, vitamin A aldehyde and carotene were estimated in egg yolk. Protein and creatine were also estimated in the white of the eggs. The contents of the egg prove its importance as food of high nutritive value. Amount of protein WAS as high as 132.1 ± 22.3 gm /L in white and 157.9 ± 16.4 gm /L in yolk in hen's eggs. The total fat, triglyceride, cholesterol in yolk were 195.3 ± 29.7 gram/L, 14.60 ± 2.89 gm % and 1.35 ± 0.25 gm % respectively. Similarly fertilized duck's eggs are also easily available in West Bengal and similar investigations were done in these types of eggs. The egg size and weight were larger in case of duck's eggs. These eggs were investigated for protein (111.4 ± 28.1 gm/L), fat (249.9 ± 42.7 gram/L), triglyceride (19.38 ± 3.13 gram%), Vitamin A (3.52 ± 0.72 microgram / gram), vitamin A aldehyde (5.58 ± 2.176 micro gram/gram), cholesterol (2.09 ± 0.47 gram%), the protein was in the yolk (174.1 ± 34.7 gram/L) and the white (111.4 ± 28.1 gram/L) and creatine (28.3 ± 7.4 mg/L) in white and (31.7 ± 8.1 mg/L) in yolk. We are reporting creatine in the egg yolk and white but literature is almost silent about its presence in eggs. From this observation we can recommend that egg is one of the most nutritive food for all age groups of people who are suffering from protein or calorie malnutrition an also for daily diet. Children above one year also can consume eggs to supplement Protein, Cholesterol, fats, vitamins and calorie. But we are afraid to advise egg yolk for those who are suffering from coronary heart disease as high quantity of cholesterol is present in egg yolk. Egg albumin is a good source of protein and creatine, so it can be taken whenever there is protein requirement irrespective of age and sex. Barring these findings each egg (hens') can provide energy of 12.25 kJ/gram. Similarly the duck's egg can provide 14.26 kJ/gram. Average weight of each hen's egg was 51.58 ± 3.83 grams and average weight for each duck's egg was 57.74 ± 3.85 grams.

Key Words: Hen's egg, Duck's egg, Vitamin A, Vitamin A aldehyde, Carotene, Protein, Fat, Cholesterol, Triglyceride

INTRODUCTION

Several varieties of eggs are available in the markets of West Bengal. These are hen's eggs or duck's eggs. Again these eggs may be fertilized or unfertilized. This is well known that egg is a good food containing animal protein along with fats and vitamins. It is a rich source of vitamin A containing about 200 micro gram of vitamin A per egg. The vitamin A is again found in three forms like retinol, retinal (retinene) and retinylesters (Plack and Kon ., 1961; Das., 2005). Provitamin A or carotene is also present in the eggs yolk. The work on the composition of the eggs in our country is poor. In India fertile and non-fertile eggs from white leghorn were studied for the estimation of different components of Vitamin A (Joshi et.al., 1973). Currently a study was done in Hy-Line Brown layers to show the different components of eggs (Anderson., 2011).

So to know the exact amount of Fat, cholesterol, triglycerides, carotene and vitamin A fractions in the yolk as well as protein and creatine in white and yolk, the present work is proposed.

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MATERIALS AND METHODS

Ten fertilized hens' eggs (*Gallus gallus domesticus*. Breed- BV-300) and ten fertilized duck's (*Anas platyrhynchos domesticus*, Indian runner) egg were collected by random sampling. Protein estimation was done by Biuret method (Fine., 1935). During these investigations cholesterol (Artiss and Zak., 1997; Deeg and Ziegentom., 1983) and triglyceride (Cole, Klotzsch and McNamara., 1997) were measured by the auto analyzer (BS 300; Mindray). Total Vitamin A was measured by the method described by Bayfield and Cole, 1980; Bayfield., 1975. Retinal was measured after extraction with 90% ethanol (Futerman and Saslaw., 1961). Carotene (beta) was estimated by the method Austin and Shipton, (1944). Total fat was estimated by gravimetric method. Creatine was estimated after conversion to creatinine (Owen, Iggo, Scandrett and Stewart., 1954 ;). Vitamin A, retinal and carotene were purchased from Sigma- Aldrich. Other chemicals were purchased from Merck.

RESULTS AND DISCUSSION

Results are given in following tables.

Table I - Weight of different eggs in grams. [Mean \pm SD, (n=10)].

Type of egg	Whole Weight	Weight of pulp	Weight of shell	Weight of white	Weight of Yolk
Hen's egg	51.58 \pm 3.83	45.87 \pm 3.48	5.52 \pm 0.32	31.62 \pm 3.29	14.31 \pm 1.01
Duck's egg	57.74 \pm 3.85	51.43 \pm 3.51	6.31 \pm 0.63	30.43 \pm 2.49	21.04 \pm 2.36

Table II - Cholesterol and triglyceride in the egg yolk (gram/100gram of yolk) [Mean \pm SD, (n=10)].

Type of egg	Cholesterol	Triglyceride
Hen's egg	1.35 \pm 0.25	14.60 \pm 2.89
Duck's egg	2.09 \pm 0.47	19.38 \pm 3.13

Table III-Total fat in grams/ yolk and in grams/L in egg. [Mean \pm SD, (n=10)].

Type of egg	gram/ yolk	gram/L
Hen's egg (n=06)	2.74 \pm 0.52	195.3 \pm 29.7
Duck's egg (n=10)	5.29 \pm 1.21	249.9 \pm 42.7

Table IV-Total amount of Vitamin A, vitamin A aldehyde, carotene in micro gram / gram of yolk. [Mean \pm SD, (n=10)].

Type of egg	Vitamin A	Vitamin A aldehyde	Carotene
Hen's egg	2.51 \pm 0.21	3.36 \pm 0.43	5.46 \pm 1.54
Duck's egg	3.52 \pm 0.72	5.58 \pm 2.176	8.67 \pm 1.72

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Table V-Creatine in egg in milligrams/L of yolk and white. [Mean \pm SD, (n=10)].

Type of egg	White	Yolk
Hen's egg	27.6 \pm 8.2	24.1 \pm 5.4
Duck's egg	28.3 \pm 7.4	31.7 \pm 8.1

[Mean \pm SD, (n=10)]

Table VI-Protein content of egg white and yolk: (n=10), in grams/L [Mean \pm SD, (n=10)].

Type of egg	White	Yolk
Hen's egg	132.1 \pm 22.3	157.9 \pm 16.4
Duck's egg	111.4 \pm 28.1	174.1 \pm 34.7

[Mean \pm SD, (n=10)]

Table VII-Energy calculated from mean weight of protein and fat in eggs: kJ/gram.

Type of egg	From protein	From fat	Total kJ/gram
Hen's egg	4.87	7.38	12.25
Duck's egg	4.79	9.45	14.26

In the present investigation we have estimated total fat, cholesterol, triglyceride, protein, Vitamin A, vitamin A aldehyde, carotene and creatine in egg yolk. We also estimated protein and creatine in egg white. Vitamin A and vitamin A aldehyde were comparatively lesser amount than previous investigation (Plack and Kon., 1961). Our investigation shows high amount of cholesterol, triglyceride and total fat i.e., 1.35gram %, 14.6gram % and 195.3 gram/L respectively in hen's egg. We also estimated creatine in egg yolk and white, which were 27.6 milligram /L and 24.1 milligram/L in hen's egg respectively. In duck's egg these figures are slightly higher. Literature is inadequate regarding the presence of creatine in egg. Different components of egg both in white and yolk are investigated here are rarely investigated in the eggs in our country. In India fertile and non-fertile eggs from white leghorn were studied for the estimation of different components of Vitamin A. (Joshi et.al., 1973). Each hen's egg and duck's egg can provide energy of 12.25kJ/gram and 14.26 kJ/gram respectively. Average weight of each hen's egg is 51.58 \pm 3.83 grams and average weight of each duck's egg 57.74 \pm 3.85 grams.

Dietary energy and protein deficiency usually occur together, both in Kwashiorkor and Marasmus. Besides vitamin A and cholesterol deficiency may occur in the same patients (Torun and Chew., 1999). As hen's egg and duck's egg now investigated, found to contain protein, fat, cholesterol and vitamin A in sufficient quantity. Egg if regularly consumed by the children it is likely the protein energy malnutrition would be prevented (Butarbutar., 2004; Rand, Uauy and Scrimshaw eds., 1984; Torun, Young and Rand eds., 1981; Cameron and Hofvander., 1976). Besides the protein, fat, vitamins of the eggs can provide sufficient calories per egg. As these eggs' yolk contain huge amount of cholesterol it may supplement the deficiency in malnutrition, though the adults should consume with regular intervals but egg yolk of any variety cannot be recommended in adults with coronary heart disease as yolk contain huge amount of cholesterol (Tarun and Chew., 1999). ATP is in reversible equilibrium with phosphocreatine in the cells. Energy from ATP can be used by the different function of the cells including synthesis and growth, muscular contraction, glandular secretion, nerve impulse conduction, active absorption and other function. If greater amount of energy are demanded for cellular activities that can be provided by oxidative metabolism, the phosphocreatine store house is used first. If oxidative metabolism cannot deliver adequate energy to the cells as anaerobic process can, then at slower rates of usage, the oxidative processes can continue as long as energy stores (mainly fat) exist (Levine.,2005; Hall.,2011).

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