Vitamin E concentration in eggs of rural and urban range and cage reared chicken in two seasons

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ABSTRACT


A factorial experiment of three rearing systems in two seasons was conducted using eggs from range birds of rural and urban areas and commercial chicken eggs from cage layers. The eggs from rural poulty were collected in villages spread throughout Tamil Nadu and urban eggs from ten places around Chennai city; the commercial eggs were from ten wholesale outlets in the city of Chennai. 300 eggs each for rural, urban and commercial eggs respectively were collected in each season comprising a total of 1800 eggs. Three eggs each were randomly selected from thirty eggs collected from each area/location (10 eggs per system) to estimate the total α-Tocopherol in the eggs. There was a highly significant (P<0.01) difference in the α-Tocopherol content of the egg between the different rearing systems and seasons. Eggs collected from the commercial layers gave significantly (P<0.01) higher α-Tocopherol when compared to the eggs from urban range reared or the rural range reared birds. Eggs laid during the monsoon season had significantly (P<0.01) higher α-Tocopherol. Eggs from the cage reared commercial layer and eggs collected during the monsoon season had significantly (P<0.01) higher α-Tocopherol levels.

Key words: Vitamin E, egg, rearing system, season

Avian eggs have been highly esteemed as a whole some food for centuries because of their incomparable nutritious properties. In addition to the nutritional value, they have played a special role in human daily livelihood due to their easy digestibility, good taste, and numerous applications in preparing a wide variety of foods.

The demand for backyard poultry eggs is on the increase because people believe that the eggs from the free range bird are superior to that of the farm reared chicken, without knowing the actual nutritional composition of the eggs. It is believed, that these eggs are more nutritious and have some medicinal value. Hence, rural and urban backyard poultry egg is preferred to farm eggs.

Vitamin-E (α-Tocopherol) an antioxidant which serves as a health promoting component in egg was taken to study in this experiment. Not much work has been carried out on the effect of rearing systems on α-Tocopherol in the egg content. Hence this study was planned.

Eggs were collected from the rural birds raised on range and the urban backyard birds. Rural chicken eggs were collected from ten rural areas spread throughout Tamil Nadu and the urban chicken eggs from ten places within the city of Chennai, for comparison, the commercial farm chicken eggs were collected from ten wholesale outlets located within the city of Chennai.

A sum of nine hundred eggs, three hundred from rural range reared birds, three hundred urban backyard reared chicken and three hundred from commercial layers were collected for each season (summer and monsoon). Thirty eggs were collected from each of the ten places for rural, urban and farm. From each of these thirty eggs, three eggs each were randomly selected and utilized for analysing Vitamin-E (α-Tocopherol) levels. Vitamin-E (α-Tocopherol) levels in the yolk samples were quantified after extraction, using HPLC, according to the techniques described by Jiang et al. (1994). All the data collected were subjected to analysis of variance for significance according to the methods of Snedecor and Coehran (1989). The significance was tested using Duncan's multiple range test (Duncan, 1955).

The effect of rearing systems, seasons and its interaction on Vitamin-E (α-Tocopherol levels) in the egg is presented in Table 1.

Vitamin-E (α-Tocopherol) levels showed significant (P<0.01) differences between range, urban backyard and cage raised chicken and seasons. The interaction effect of α-Tocopherol x rearing systems x seasons was highly significant (P<0.01). Eggs from farm birds had significantly (P<0.01) highest α-Tocopherol level, while the rural chicken eggs had significantly (P<0.01) lowest α-Tocopherol levels. Eggs collected during the monsoon season had the highest α-Tocopherol level which was highly significant (P<0.01). Eggs collected from caged layers during monsoon season, had significantly (P<0.01) highest α-Tocopherol level when compared to eggs laid by birds in summer.
A highly significant (P<0.01) difference in α-Tocopherol levels were observed in eggs laid by commercial layers in cages. Range reared rural birds and the backyard raised urban chickens eggs had very low α-Tocopherol levels. This is not in agreement with the report of Majchrzak and Elmadfa (1997). The α-Tocopherol levels linearly increased in the egg as the levels increased in feed (Cherian and Sim 1997), Meluzzi et al. (2000) and Surai (2000). Most of the commercial layer feed had some Vitamin-E (α-Tocopherol) supplementation but this is not so with rural and urban birds raised on range and backyard respectively. Eggs collected during the monsoon season had higher α-Tocopherol level than those collected during summer. These observations agreed with the findings of Whitehead et al. (1998) and Lee et al. (1998 and 1999). During summer, there is a lowering of Vitamin-E (α-Tocopherol) level in the blood and an increase in Vitamin-E (α-Tocopherol) level by supplementation; this can increase vitellogenin in which intum increases egg production. Eggs collected from birds raised in farms during the monsoon season had higher α-Tocopherol levels when compared to the others. This could be due to supplementation of Vitamin-E in the layer diet and also the effect of seasons which interferes with the biochemistry of bird to lower vitamin-E levels as explained by Cherian and Sim 1997; Whitehead et al., 1998; Meluzzi et al., 2000.

Layer chicken reared in cages had significantly (P<0.01) higher levels of Vitamin-E in their egg content when compared to eggs laid by the rural chicken reared under the extensive system of management and the urban chicken which is reared in the back yard. There was an increased Vitamin-E content in the eggs of birds reared under all three systems of management during monsoon season.

REFERENCES


