Prevalence of *Escherichia coli* and *Salmonella* Species in Table Eggs and Processed Eggs of Chennai City

P. Krishnamoorthy* and W.M. Paul
Department of Animal Biotechnology
Madras Veterinary College, Chennai-600 007

Received: 3.3.2005

Keywords: *Escherichia coli*, *Salmonella*, Processed eggs

Egg is one of the most essential commodities to fill the protein requirement of human beings. It contains highly nutritious substances and is prone to bacterial spoilage. The major reasons for spoilage of marketable table eggs is their contamination (either vertically or horizontally) with pathogenic bacteria especially coliforms (Board *et al*., 1968). Bacterial spoilage usually caused by Gram negative proteolytic bacteria may produce mustiness or rotting (Moats, 1979). Hence, the present study was undertaken to determine the prevalence of *Escherichia coli* and *Salmonella* species in marketable table eggs and processed eggs of Chennai city.

Random samples of 15 eggs each from 30 different egg outlets and processed eggs viz. half boiled egg, full boiled egg and egg omelette five each from 10 different centres (fast foods, canteens and hotels) in Chennai city were collected. Eggs were immersed in 50 ml of sterile nutrient broth for 10 minutes and the broth was used for the assessment of microbial load (Alaboudi *et al*., 1988). Then the eggs were taken from the nutrient broth, wiped with 70% alcohol and opened by making a circular cut with sterile scissors. The albumen was discarded and egg yolk contents were pooled and mixed well with sterile glass rods. Processed eggs like half boiled egg, full boiled egg and egg omelette were mixed thoroughly using blender for 10-20 minutes. Serial ten-fold dilution of nutrient broth, egg yolk and processed eggs were done. One ml of each dilution was poured in sterile Petri plates separately and in each plate about 15 ml of cooled molten agar was poured and rotated by circular movements in different directions. Agar was allowed to set and plates were incubated in inverted position at 37°C aerobically for 24 h. Assessment of *E. coli* was carried out with MacConkey agar and *Salmonella* species with brilliant green agar following APHA (1984).

The total viable counts were log $8.44 \pm 1.25$, log $6.42 \pm 0.93$ per ml, log $5.54 \pm 0.68$, log $5.62 \pm 0.89$ and log $5.49 \pm 0.54$ per g in egg shell, egg yolk, half boiled egg, full boiled egg and egg omelette, respectively. Andrews (1992) recorded bacterial load in unwashed egg shell as log 2.00 to log 6.00 per ml and egg contents as log 3.30 to log 4.39 per ml. Moats (1979) recorded the bacterial count in egg shell as log 5.00 per ml. In this study, the increased bacterial count may be attributed to hot and humid climate of this area. Moreover this is a densely populated city and often with poor hygiene and sanitary conditions. Improper handling, washing, packing of egg, use of

* Corresponding author
contaminated feed and water may contribute to the increased bacterial count.

The *E. coli* and *Salmonella* species were detected in 73% (22/30) and 30% (9/30) in egg shell and 63% (19/30) and 23% (7/30) in egg yolk, respectively. Processed eggs viz. half boiled egg, full boiled egg and egg omelette contained 30% (3/10), 20% (2/10), 20% (2/10) and 20% (2/10), 30% (3/10), 20% (2/10) of *E. coli* and *Salmonella* respectively. In the present study, *E. coli* were found to be high in both the egg shell and egg yolk. However, Cruickshank et al. (1975) reported that *E. coli* should not be detected in any concentration in food samples. This might be due to contamination of eggs by faecal material, litter, feed and water. The *Salmonella* was found to be slightly high in the egg shell and egg yolk. Prost and Riemann (1967) reported that 6 to 7% of eggs were contaminated with *Salmonella* infection. This may be attributed to the contamination of eggs by soiling, faecal material, wet infected litter, vertical transmission and horizontal transmission at hatchery. The *E. coli* and *Salmonella* species were found to be less in the egg omelette when compared to half boiled and full boiled eggs. This may be due to high temperature used for preparation and antimicrobial properties of ingredients added in the preparation. To eliminate the *E. coli* and *Salmonella* species contamination in eggs, pasteurization of eggs has to be done at 60°C for 3-5 minutes (Easwaran et al., 2001). In order to prevent contamination of eggs, proper sanitation, hygienic environment, good hygienic feed and water supply and personnel sanitation should be adopted in handling the wholesome eggs and processed eggs. Awareness among people must be created regarding probable health hazards arising from unsanitary processing and consumption of contaminated eggs.

**Reference**


