EGG HYGIENE AND EGG SAFETY FOR THE CONSUMER

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ABSTRACT

Eggs are an inexpensive, source of nutrients for a healthy diet and life. There are two possible ways of bacterial infection of eggshells, vertically and horizontally. The presence of many different bacterial species on the surface of the shells of eggs represents a potential risk of contamination of egg content. Salmonella bacteria is responsible for food borne illness and is usually associated with eggs and egg products. Egg safety for the consumer: they purchase uncracked eggs and store them, cooked at the proper temperature. Also, during the transportation and serving of egg products, necessary precautionary measures should be taken.

INTRODUCTION

Chicken egg is considered one of the most complete natural foods due to its high nutritional value. It contains a variety of nutrients, vitamins, minerals, fatty acids and protein. These nutrients are easily absorbed and are essential for the proper functioning of the human body. In addition, it has low cost and high availability in many countries, making it possible to increase the consumption of high-value foods by low-income people (Sfaciotte et al., 2014). Global egg consumption is increasing each year with a with increasing productivity. The average annual increase in egg production worldwide was 2.2% compared to the period from 2009-2018. In 2019, the world production of eggs was 82.17 million metric tons. China is the main producer (661.79 billions), followed by the United States (113.25 billions), Indonesia (105.63 billions), India (105 billions), Mexico (55.65 billions), Brazil (55.4 billions) and Russia (44.49 billions). Eggs are composed of approximately 65% water, 12% protein, 11% lipid, and 12% ash; it also has low carbohydrate content and provides 72 calories. In addition, it is a source of water-soluble and soluble vitamins such as retinol, tocopherol, ascorbic acid, riboflavin, pantothenic acid, vitamin D and minerals such as calcium, iron, phosphorus, copper and zinc. Egg is food of high biological value, because it has all the amino acids required in human nutrition. It is not an unknown fact that most people follow hygiene practices when handling chickens, meat and fish, but they will ignore the same when handling eggs. Fresh eggs, even those with clean, undressed shells, can contain Salmonella bacteria that can cause foodborne illness. The pathogen Salmonella is generally found on eggs’ surfaces, and improper handling can lead to contamination of raw egg products. Salmonella bacteria is responsible for food borne illness and is usually associated with eggs and egg products. Salmonella infection causes gastroenteritis.
and symptoms can include headache, fever, stomach cramps, diarrhoea, nausea and vomiting which can last days or weeks. The main contaminants in the eggshell are usually Gram-positive cocci and bacillus such as Micrococcus and Arthrobacter respectively. While Gram- negative bacteria dominate the eggshells the internal contaminants are namely Alcaligenes, Achromobacter, Pseudomonas and Escherichia (Board et al., 1994).

**EGG SAFETY FOR THE CONSUMER**

1. **HANDLING OF RAW EGGS:** The proper precautions should be taken when handling raw eggs. Wash hands before and after handling eggs. Store eggs in refrigeration until required, ensure that utensils, equipment and other food items such as benches are thoroughly cleaned and sanitized after handling of eggs. Open the carton/box and check the eggs whether they look clean or dirty and are not cracked before purchasing. Surface contamination of eggs may be due to the result of either infection of the lower reproductive tract or faecal contamination (Svobodova and Tumova, 2014). To avoid cross contamination, cartons/box that contain cracked eggs should be discarded properly and not reused.

2. **BUY EGGS FROM MARKET:** Buy eggs only if they are sold in the refrigerator or refrigerated case. After opening the box, make sure the eggs are clean and the shells are not cracked. Store immediately in a clean refrigerator at a temperature of 4°C or less. Use the refrigerator thermometer to test. Store the eggs in their original boxes/carton and use them within three weeks to get the best quality.

3. **STORAGE OF EGGS AND EGG PRODUCTS:** Proper eggs storage is important for both quality and safety of eggs. When storing eggs and egg products should be stored under refrigeration, to reduce the growth of harmful Salmonella bacteria. Store eggs in their original carton/ boxes in the refrigerator and do not use expired eggs. When delivering food containing a raw egg pack in an insulated cooler/ cool frozen place with enough ice, frozen blocks and do not put cold cooler in the car boot - carry it inside a an air-conditioned vehicle. Use hard-boiled eggs within one week after cooking. Use frozen eggs within one year. The eggs should not be frozen in their shells. To freeze whole eggs, beat the yolks and whites together. Refrigerate remaining cooked egg dishes use within three to four days. When refrigerating huge amount of hot egg-containing dishes leftover then you separate it into several shallow containers so that it cools down quickly. Several factors contribute to the strong association between food borne illness caused by Salmonella. These include, contamination of egg content by Salmonella from eggshell. Failure to clean and sanitise equipment and food processing contact surfaces. Temperature abuse (e.g., storage above 5°C), as well as keeping egg storage beyond recommended storage life at refrigerated temperature. From other external factors, which contribute to size of contamination and penetration into the eggs and also the method and time of storage play an important role. It is believed that a positive temperature difference, combined with the presence of moisture, provides an ideal opportunity for bacteria to penetrate egg shell (Berrang et al., 1999). Food Safety and Standards Authority of India (FSSAI) has proposed new fresh egg standards in the Food Safety and Standards (Food Products Standards and Food Additives) Amendment Regulations, 2017. The FSSAI has laid down parameters that egg shells must be free of blood clots, should not be contaminated by faecal matter or other dirty material and should not be broken or soiled. The FSSAI sets the amount of water, protein, fat and carbohydrates that eggs must have as hygiene...
parameters and hygiene controls, such as time and temperature, to be considered during production, processing and handling including sorting, grading, washing, drying, treatment, packing, storage and transfer away to point of consumption. FSSAI also emphasized storage conditions such as humidity and temperature to reduce contamination as microbes are harmful to human health.

4. PREPARING OF EGG PRODUCTS: Egg handlers must wash hands with soap water properly. Clean the equipment, utensils, and work surfaces with hot soap water before and after contact with raw eggs and raw egg-containing products to avoid contamination of pathogenic bacteria. Eggs are safe to eat if properly cooked, which means they should be cooked until their eggs yolks and whites are firm. Egg shells should not be used as separator for egg white and yolk to minimize the cross contamination from *Salmonella*. Separating the eggs using bare hands is also dangerous as the hands can be contaminated with *Salmonella* bacteria which leads to the cross contamination. Use a clean egg separator so that if *Salmonella* bacteria are present in the shell, they do not contaminate the egg yolk or egg white. Casseroles and other dishes containing eggs as ingredients should reach an internal temperature of 160°F, which is the required temperature for *Salmonella* to be destroyed by cooking. Use a food thermometer to be sure for accurate temperature. Do not mix batches of raw egg products. Make fresh batches of egg products daily. Only make foods that contain raw egg products on the day you plan to eat them. Store separate eggs in shopping bags and refrigerate them. Refrigerator temperature should be maintained at 33 to 40°F. Eggs should be eaten within two weeks. Eating raw eggs is not recommended.

5. SERVING OF EGGS AND EGGS PRODUCTS: Serve cooked eggs such as hard-boiled eggs and fried eggs and foods containing eggs such as quiches and soufflés just after cooking. Cooked eggs and egg dishes can be refrigerated for later use but should be preheated to 165 °F before serving. Never leave boiled eggs or egg dishes in the refrigerator for more than 2 hours or more than one hour at temperature above 90°F. Germs can cause illness and quickly grow in warmer temperatures (between 40 °F and 140°F). For party planning, keep hot egg dishes hot and cold egg dishes cold. Store egg dishes in the refrigerator until serving time. Store cold egg dishes in the ice if they will last longer than 2 hours.

6. TRANSPORTATION OF EGGS: For picnics, pack boiled eggs and egg dishes in a cool freezer or frozen jelly packs to keep them cool. Transport the cooler to the passenger compartment of the car, not to the very warm trunk. In the picnic area, put cooler in the shade if possible and keep the lid closed as much as possible. For school or work, pack boiled eggs in a little frozen gel.

**CONCLUSION**

Among natural foods, egg is considered very important and complete food. An egg is often contaminated with faeces, soil, litter or equipment after laying. Eggs that are clean, uncracked, handled hygienically, thoroughly cooked, and stored at a reasonable temperature should not present a food safety risk.
REFERENCES


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