



Assuring Food Safety

Shell eggs must be transported and stored at a temperature of 45°F or below at all times. Proper storage and handling are important in maintaining quality. If not refrigerated properly, Grade AA eggs can rapidly degrade to Grade B eggs. Eggs kept at room temperature (or above 68°F) may lose more quality in one day than in one week under refrigeration.

Kept under proper refrigeration at 45°F or below (do not freeze), eggs will retain their quality for several weeks. Cool temperatures slow or stop the growth of most bacteria. Eggs should be stored in their original packaging materials to prevent the loss of moisture. Store eggs away from foods such as fish, onions, apples, and cabbage as eggs can absorb strong odors.

Any food, particularly protein-rich animal foods, can carry microorganisms that cause disease or spoil the food. Shell eggs without cracks have chemical and physical properties that help to deter bacterial growth. Examples of chemical barriers to bacterial growth are iron binding complexes and the presence of lysozyme in the egg white. The egg shell and the membranes between the shell and the white, and between the white and the yolk act as physical barriers to bacterial growth inside the egg. However, eggs are susceptible to bacterial growth once the shell membranes are broken, the egg is exposed to oxygen, and the nutrients from the white and yolk are mixed. The microorganism of particular importance to eggs and egg products is a bacterium called *Salmonella* (Sal'mo'nell'a). This bacterium is typically found in the gastrointestinal tract of warm-blooded animals. Although, *Salmonella* may not make the carrier animal ill, if it gets in the human food supply it can make people ill.

The safety of shell eggs is first ensured by diverting any eggs with cracks, chips or breaks (which encourage bacteria to pass through the shell) away from the human food supply. Additionally, intact eggs are washed and sanitized shortly after they are laid to remove any microorganisms that might be present on the surface of the shell. A continuation of sanitary practices (with particular emphasis on handwashing during food preparation) is necessary to ensure that food is not re-contaminated with bacteria, viruses or parasites.

In recent years, *Salmonella Enteritidis* (which is abbreviated as SE) has adapted itself to survive in an unusual location—the reproductive tract of the hen. In rare instances (estimated to be 1 in 20,000 eggs in the U.S.), this bacterium can be deposited inside the shell in the egg white. Although, the number of bacteria per egg is likely to be very low (because the egg white discourages bacterial growth), once the shell is cracked and the iron-rich yolk mixed with the white, bacteria grow with great ease. Likewise, if the yolk membrane deteriorates (which it will in several weeks or at temperatures over about 60°F) bacteria can grow inside the intact shell egg. Even though SE in eggs is rare, eggs must be treated in a way to block the transmission of disease.

Food safety control measures include keeping eggs cool and using eggs less than 28 days old. Since bacteria can grow readily once the shell is broken, the practice of pooled eggs is discouraged. Menu items made with shell eggs and cooked in response to a consumer's order should be prepared for immediate service. For the preparation of large quantities of eggs, pasteurized egg products are recommended. The use of a thermometer when preparing sauces and casseroles will ensure that the food has reached appropriate temperatures. Reaching a temperature of 160°F or holding food at 145°F for 3-1/2 minutes will destroy SE if it is present. Additionally, containers that have held raw egg must be washed and sanitized before being used again, even for the same recipe. Vulnerable populations, such as the very young or the aged, can be protected by using pasteurized egg products.

Egg Products

The term “egg products” refers to processed or convenience forms of eggs obtained by breaking and processing shell eggs. Egg products include whole eggs, egg whites, and egg yolks in frozen, refrigerated liquid, and dried forms, available in a number of different product formulations, as well as specialty egg products. Specialty egg products include: prepeeled hard-cooked eggs, egg rolls or “long eggs,” omelets, egg patties, quiches, quiche mixes, scrambled eggs, fried eggs, and others.

Egg products are becoming increasingly popular in foodservice operations. That’s because they’re convenient to use and also provide a cost savings with regards to labor storage, and portion control.

Frozen, refrigerated liquid, and dried egg products are similar to shell eggs in nutritional value and most functional properties.

By law, all egg products are processed in sanitary facilities under supervision of the USDA and bear the USDA inspection mark. They must be pasteurized (which removes all harmful bacteria) and are routinely sampled and analyzed for Salmonella. If a product was contaminated with Salmonella, it would be barred from consumer channels. Keep in mind that even though egg products are pasteurized, proper handling and storage is still vital.

Pasteurized egg products are being used more often to help ensure food safety. They may be used to protect high-risk populations or when preparing lightly cooked foods (such as sauces, salad dressings, French toast or Monte Cristo Sandwiches).

With foodservice operators looking for labor-saving and cost-saving measures, egg products such as frozen, refrigerated liquid, or dried eggs are becoming more and more popular. These convenient, real egg products are USDA inspected and pasteurized, and virtually indistinguishable from shell eggs in nutritional value, flavor, and usage. Keep in mind, however, that even though egg products are pasteurized, proper handling and storage is vital. Note, some foods are particularly difficult to prepare in quantity for optimum safety. In such cases, it would be wise to consider using a pasteurized egg product.