Purchase, Store, and Prepare Eggs



EGGS are a true bargain. There are few foods that offer the nutrition, versatility of preparation, and sheer flexibility of eggs. About 76 billion eggs are consumed in the United States each year, according to the USDA. Eggs are available in a variety of forms, all requiring careful storage. All forms are usable for countless recipes. Eggs add flavor and color to foods, are a natural leavening agent (make things rise), bind foods together (e.g., meatloaf), thicken mixtures, act as an emulsifier (absorb an oil or butter and hold it in creamy suspension, such as mayonnaise), and act as a clarifier for soup.

Objectives:

1. Explain the various forms of eggs and egg products.
2. Describe how to safely store eggs and egg products.
3. Demonstrate methods to cook breakfast eggs.

Key Terms:

1-, 2-, or 3-minute eggs
albumen
boiling-water start technique
cholesterol
coddled eggs
cold-water start technique
egg products
egg size
egg white
emulsifier
fried eggs
grading
hard-boiled
omelet
organic
over-easy eggs
pasteurize
poached eggs
porous
potentially hazardous foods
Salmonellosis food infection
scrambled eggs
shell eggs
shirred eggs
soft-boiled
sunnyside up
whole eggs
yolk

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Eggs and Egg Products

Shell eggs are fresh eggs in the shell and are the most common form of eggs for purchase. In the United States, we think of eggs as hen's eggs (unfertilized). Fresh eggs are heavy. They are also known as **whole eggs** because both the yolk and the white are present in their natural states. The **egg white** or **albumen** of an egg is the clear liquid and is virtually all protein. The **yolk** is the yellow part of the egg and contains all the fat (lipids), including **cholesterol** (a particular type of fat associated with clogged arteries and heart disease). Shell eggs are available in white or brown outer shells. There is no flavor or nutritional difference between the two colors; it is simply a matter of what type of hen laid the egg and what the hen was eating.

FUNCTIONS

Eggs can be used for different purposes. They can add flavor, be used as a natural leavening agent, add color, be used for binding, provide a structural framework for leavening agents, be used as thickening agents, or be used as an **emulsifier**—egg yolks or whole eggs forced through agitation to absorb oil or butter and to hold it in a creamy, semi-liquid suspension as in mayonnaise and hollandaise sauce.

COOKED AND CATEGORIZED

Eggs are cooked and categorized in four traditional ways:

- Boiled (in the shell)
- Poached
- Omelet (including scrambled, fried, and frittata)
- Soufflé

INFECTIONS

Salmonellosis food infection is a food-borne illness of extreme concern to foodservices. Salmonellosis is caused by eating food that contains a large number of pathogenic (disease-causing) salmonella bacteria. These rod-shaped bacteria grow with or without oxygen. They grow best at human body temperature but are able to survive temperatures a bit above and a bit below 98.6°F. Salmonella bacteria are found in

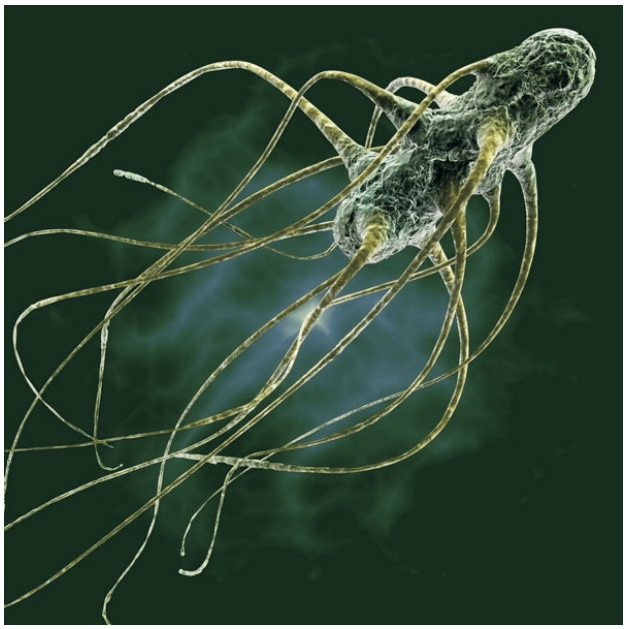


FIGURE 1. Salmonella bacterium.

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domestic and wild animals as well as in human beings. The bacteria are killed at temperatures of 140°F and above. To prevent Salmonellosis food infection from eggs, all dry eggs should be pasteurized. Eggs with dirty, cracked, or broken shells should be discarded (thrown away). Only whole shell eggs should be used in foods that will not receive thorough cooking, such as Caesar salad dressing or meringue.

GRADING

Grading is a process of evaluating the quality of the egg. Shell eggs are graded according to government standards. Egg grades from highest to lowest quality are AA, A, B, and C. Generally, only AA or A grades are sold to the public. Grade B and C eggs are used in commercial processing of other foods or as an additive.

SIZING

The **egg size** is a practice of judging based on federal standards from smallest to largest, and shell eggs are always sold by size. The size ranges from smallest to largest: pee wee, small, medium, large, extra large, and jumbo. The industry standard for restaurants is large eggs, which average 2 ounces each.

ORGANIC EGGS

Chickens that are fed on natural foods, roam freely on farms, and are not given any drugs or chemicals produce **organic** (natural) eggs. Organic eggs are more expensive, but their nutritional value is the same as non-organic eggs.

EGG PRODUCTS

Egg products are eggs removed from their shells for processing. They can be purchased in a liquid state and come in cartons (e.g., milk cartons). Dried forms of eggs are used in many cake, muffin, and doughnut mixtures. Dried eggs must be reconstituted (made liquid again) by adding water. Egg products are widely used in homes and foodservices and have a USDA inspection mark. Fast food chains, restaurants, hospitals, and nursing homes use egg products to make sure they serve safe food for customers and patients. Egg products are convenient (have a longer shelf life) and are not purchased by grade or size.

PASTEURIZED

Liquid, frozen, and dried egg products are pasteurized or heat-treated to destroy bacteria. According to the USDA, to **pasteurize** liquid eggs, they *"must be rapidly heated and held at a*

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minimum required temperature for a specified time. This destroys Salmonella, but it does not cook the eggs or affect their color, flavor, nutritional value, or use. Dried egg whites are pasteurized by heating in the dried form, again for a specific time and at a minimum required temperature."

Pasteurized eggs can be purchased as whole eggs, egg whites, or egg yolk only. Liquid eggs can also be sold as "non-fat" or reduced cholesterol versions, where most or all the yolk has been removed, with coloring and flavoring added to simulate whole eggs.

Storing Eggs and Egg Products

Due to their high protein and moisture content, eggs are **potentially hazardous foods** to consumers; they contain bacteria that can make people ill. Shell eggs must be stored in the refrigerator at 34° to 45°F to keep bacterial growth under control. Keep them on slotted shelves in the refrigerator so air can circulate. Due to the potential of a cracked egg running or dripping and contaminating the foods below, the bottom shelf of the refrigerator or cooler is the safest and coolest location to store shell eggs.

POROUS

Egg shells are **porous** (not air tight), and eggs can easily absorb strong flavors they are stored near, so keep eggs stored in their original container or in another sealed container. Do not wash shell eggs because each shell contains 15,000 tiny pores. So eggs do breathe, and they dehydrate.

PURCHASE BY OR USE BY DATE

Shell egg cartons are stamped with a "purchase by" or a "use by" expiration date. Eggs should be used within three weeks of their purchase by date.

LIQUID PASTEURIZED EGGS

Liquid pasteurized eggs must be kept refrigerated between 34° and 40°F in their original container. Liquid egg cartons have an expiration date stamped on the carton and should be thrown away after that date. If purchased frozen, they can be kept in the freezer for up to one year. Thaw frozen eggs under refrigeration or under cold running water. Do not thaw frozen eggs on the counter. After thawing, do not refreeze.

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POWDERED EGGS

Powdered (dried) eggs come boxed, bagged, or canned and require no refrigeration until water is added. There is no expiration date on powdered eggs, nor is there a grade or size. Reconstitute only the amount needed for one day. Reconstituted products should be used immediately or should be refrigerated and used that day.



FIGURE 2. The fine powder of powdered eggs makes them easier to reconstitute with water. Most powdered egg product is used for cake and other baking mixes.

Cooking Breakfast Eggs

Cooking changes the flavor and the texture of eggs. Most breakfast eggs are cooked in a dry (e.g., fried or scrambled) or a moist (e.g., boiled, poached, or shirred) heat method. There are several versions of each. Cooking times and temperatures vary with the size of the egg, the number of eggs being cooked, and the temperature of the eggs. Carefully note the suggested temperature of the egg for each recipe you prepare. Some suggest using cold eggs, and some suggest using room temperature eggs.

DRY HEAT EGG COOKERY

Scrambled Eggs

Scrambled eggs are a soft and creamy cooked mixture of whole eggs that were beaten to combine the yolks and whites before cooking. When the egg mixture is heated in a heavy-bottomed fry or sauté pan or on a griddle and continuously moved, the eggs "scramble" and are fluffy. Scrambled eggs should be removed from the heat slightly before they reach the desired degree of doneness. The heat from the pan will continue to cook them after the pan is removed from the heat.

Omelets

An **omelet** is scrambled eggs with a shape and sometimes a filling. It begins as a lightly beaten scrambled mixture that is only beaten at the last minute before you place it into a hot sauté pan. However, an omelet is not moved continuously in the pan while cooking. Instead, it is left to "set up" in the pan. The cook alternately moves or lifts the edges and tips the sauté pan to allow additional liquid egg to reach the bottom of the pan to firm up. An omelet is cre-

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ated in layers. Also, an omelet will often include any number of additional ingredients (e.g., cheese, vegetables, fruits, sauces, jelly, and diced or shredded meats, poultry, and fish). It is usually served in one of three ways: folded like a business letter around the filling; pancake style (cooked as a pancake shape, filled, and folded in half); and rolled like a cigar.



FIGURE 3. Note how the pancake-style omelet is folded over around cherry tomatoes, grilled red onions, mozzarella cheese, goat cheese, and herbs.

Fried Eggs

Fried eggs are popular and are served in two primary ways: sunnyside up and over-easy.

Sunnyside Up

Sunnyside up is a common euphemism (sounds prettier) for basic fried eggs. Shell eggs are cracked directly into a pan or onto a grill and are cooked until the white and yolk are at the desired doneness.

Over-Easy Eggs

Over-easy eggs begin as sunnyside up eggs. In this case, the eggs are flipped over in the frying pan after cooking partially. "Over-easy" refers to gently flipping the eggs over so the yolks do not break.

MOIST HEAT EGG COOKERY

Moist heat cooking methods involve cooking eggs in water.

Hard-Boiled and Soft-Boiled Eggs

Hard-boiled and **soft-boiled** eggs are simmered (185° to 210°F), not boiled in their shell, until cooked to the desired degree of doneness.

1-, 2-, or 3-Minute Eggs

The **1-, 2-, or 3-minute eggs** (soft-cooked) are the amount of time the eggs remain in the hot simmering water. Each minute egg results in an egg that is more cooked than a coddled egg, but far less cooked than a hard-boiled/cooked egg. For minute eggs, it is recommended to begin the process with a **boiling-water start technique**: The water is boiled, reduced to

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simmer, and then the room temperature eggs are added and timed. Cold eggs will require a bit more time.

Hard-Cooked Eggs

Hard-cooked eggs are in the simmering water about 8 to 10 minutes. The best product is usually with a cold-water start technique. When using a **cold-water start technique**, it is necessary to place a single layer (when possible) of shell eggs in a saucepan and cover them with cold water; bring them to a boil; and immediately remove the pan from the heat, cover, and let stand for 10 to 15 minutes for large eggs and 18 minutes for extra large and jumbo eggs. Then it is essential to pour off the hot water and to run cold water over the eggs to stop the cooking for 15 to 20 minutes.



FIGURE 4. Hard-boiled eggs are cooked in the shell until the entire egg is firm.

Eggs cooked in their shell in boiling or simmering water may form a green film around the yolk. This film is a result of a combination of three things: cooking too long, cooking at too high a temperature, and improper cooling. The chemicals in the eggs—sulfur in the white and iron in the yolk—react to form the green film. One way to eliminate the green film is to use the cold-water start technique discussed for hard-cooked eggs.

Coddled Eggs

Coddled eggs are eggs that are similar to soft-cooked eggs but are much softer and runnier. Coddled eggs may be prepared in a special device called a coddler (a cup with a screw-on cap). To coddle eggs without a coddler, lower a fresh shell egg into boiling water. Cover the pan and immediately remove it from the heat. Let stand covered for six to eight minutes for a delicate egg.

Poached Eggs

Poached eggs are eggs cooked out of their shell in acidified water (e.g., vinegar and salt). The liquid eggs are cracked and placed directly into simmering water. The use of



FIGURE 5. Poached eggs are soft and tender, served here on toast.

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vinegar and salt or other liquids to poach eggs results in a quicker coagulation (congealing; prevention of spreading) of the albumen and thus a more compact product. Poached eggs are generally cooked until the white is firm and the yolk is hot and thick but not firm. A famous dish made with poached eggs is Eggs Benedict.

Shirred Eggs

Shirred eggs are baked eggs cooked out of the shell in a buttered ramekin or small dish and topped with milk or cream, bits of butter, and salt. It is effectively "poached" in the oven in this flavorful liquid. The hot ramekins continue to cook the eggs after they are removed from the oven.

Ingredient

Eggs are also a very important ingredient in other recipes (e.g., cakes, bread, pies, custards, cookies, and other pastries). Eggs also play an important role in pasta, dumplings, and foods where the egg is essential in holding the other ingredients together for binding (e.g., meatloaf and stuffing). Eggs are invaluable to some food items as an emulsifier (e.g., mayonnaise and Hollandaise sauce).

Summary:



Eggs are available as fresh shell and as egg products that are pasteurized (liquid, frozen, or dried). Fresh eggs come in white, brown, or speckled shells. Shell eggs are sized and weighed from pee wee up to jumbo and are graded from AA down to C. Fresh eggs are usually sold by the case. They are potentially hazardous and need to be kept refrigerated between 34° and 45°F; they can be kept and used for several weeks after their use by date.

Liquid, frozen, and dried eggs are pasteurized (heated) to kill potentially hazardous bacteria, such as Salmonella. Liquid eggs are kept refrigerated between 34° and 40°F until the expiration date is reached, and then they are discarded. Powdered eggs need no refrigeration until they are reconstituted; they have no expiration date. Regardless of the form, whole eggs contain the white (albumen protein) and the yolk (fat and cholesterol).

Egg is a major ingredient in other recipes, including custard, meatloaf, mayonnaise, cake, and pastry. Dry cooking methods are scrambled, omelet, and fried (sunnyside up or over-easy). Moist cooking methods are hard- or soft-boiled, shirred, poached, and coddled.

Checking Your Knowledge:



1. What is the nutritional difference between a white and brown shell egg?

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2. What is albumen, and where is it found?
3. At what temperature range are fresh eggs stored?
4. Name three moist cooking methods for breakfast eggs.
5. What are the USDA grades for fresh shell eggs? In what grade are powdered eggs available?

Expanding Your Knowledge:



In the United States, we think of eggs as only chicken eggs. What most people don't know is that eggs from all poultry sources are completely edible, and other cultures make good use of them. What about non-poultry sources? Do some research and find out what other types of eggs are available. Where are they commonly used? How do they taste compared to hen's eggs? Are there nutritional differences between eggs from hens, other birds, reptiles, and fish? Why are these eggs less commonly used in the United States?

Web Links:



Baking Management: Eggs vs. Additives
http://baking-management.com/rd_applications/bm_imp_8806/

USDA Food Safety and Inspection Service
http://www.fsis.usda.gov/PDF/Egg_Products_and_Food_Safety.pdf

Egg Recipes
http://allrecipes.com/Recipes/Breakfast-and-Brunch/Egg-Dishes/Main.aspx

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