BREAKFAST CEREALS

Breakfast cereal is a processed food manufactured from grain and intended to be eaten as a main course served with milk during the morning meal. Three types of breakfast cereals are manufactured. They are the ones that are ready-to-eat before or after adding milk, hot cereals which are ready-to-cook, and breakfast products such as cereal bars, pastries, muffins and bagels.

The most important raw material in any breakfast cereal is grain. The grains most commonly used are corn, wheat, oats, rice, and barley. Most breakfast cereals contain other ingredients, such as salt, yeast, sweeteners, flavoring agents, coloring agents, vitamins, minerals, and preservatives.

Whole wheat grains are used in the preparation of flaked cereals. Soft white wheat is the primary cereal used in the production of shredded cereals.

Manufacturing process

Grain is received at the cereal factory, inspected, and cleaned. It may be used in the form of whole grains or it may require further processing. Often the whole grain is crushed between large metal rollers to remove the bran. It may then be ground more finely into flour. Whole grains or partial grains (such as corn grits) are mixed with flavoring agents, vitamins, minerals, sweeteners, salt, and water in a large rotating pressure cooker. The time, temperature, and speed of rotation vary with the type of grain being cooked. The cooked grain is moved to a conveyor belt, which passes through a drying oven. Enough of the water remains in the cooked grain to result in a soft, solid mass which can be shaped as needed.

If flour is used instead of grains, it is cooked in a cooking extruder. This device consists of a long screw within a heated housing. The motion of the screw mixes the flour with water, flavorings, salt, sweeteners, vitamins, minerals, and sometimes food coloring. The screw moves this mixture through the extruder, cooking it as it moves along. At the end of the extruder, the cooked dough emerges as a ribbon. A rotating knife cuts the ribbon into pellets. These pellets are then processed in much the same way as cooked grains.
The cooked grains are allowed to cool for several hours, stabilizing the moisture content of each grain. This process is known as tempering. The tempered grains are flattened between large metal rollers under tons of pressure. The resulting flakes are conveyed to ovens where they are tossed in a blast of very hot air to remove remaining moisture and to toast them to a desirable color and flavor. Cereals may be puffed in ovens or in so-called "guns." Oven-puffed cereals are usually made from rice. Gun-puffed cereals may be made from rice or wheat. The rice grains require no pretreatment, but the wheat grains must be treated to partially remove the outer layer of bran. This may be done by abrading it off between grindstones, a process known as pearling. It may also be done by soaking the wheat grains in salt water. The grain is placed in the gun, a small vessel which can hold very hot steam and very high pressure.

Shredded cereals are usually made from wheat. The wheat is cooked in boiling water to allow moisture to fully penetrate the grain. The cooked grain is cooled and allowed to temper. It is then rolled between two metal rollers. One roller is smooth and the other is grooved. Hot cereals are made by processing the grain as necessary (rolling or cutting oats, cracking wheat, or milling corn into grits) and partly cooking it so the consumer can cook it quickly in hot water. Salt, sweeteners, flavors, and other ingredients may or may not be added to the partly cooked mixture. After shaping, the cereal may be coated with vitamins, minerals, sweeteners, flavors such as fruit juices, food colors, or preservatives. Frosting is applied by spraying a thick, hot syrup of sugar on the cereal in a rotating drum. As it cools the syrup dries into a white layer of frosting.

Most cereals must be packaged in airtight, waterproof plastic bags within cardboard boxes to protect them from spoiling. Since cereal is a food intended for human consumption, sanitation is essential. The machines used are made from stainless steel, which can be thoroughly cleaned and sterilized with hot steam. Grain is inspected for any foreign matter when it arrives at the factory, when it is cooked, and when it is shaped.

The latest innovation in the industry is the twin-screw cooking extruder. The two rotating screws scrape each other clean as they rotate. By using a twin-screw extruder, along with computers to precisely control temperature and pressure, cereals that usually require about 24 hours to make may be made in as little as 20 minutes.