

Soft Drinks: Inside & Out

For nearly 200 years, soft drinks have been part of our lifestyle. In those two centuries, our world has changed dramatically, yet surprisingly, many of today's soft drinks are the same as the first ones enjoyed in the 1800s.

Ingredients

The essence of soft drink production is the creation of a flavored syrup. Each brand has its own proprietary recipe and, as you would expect, each is a closely-guarded company secret. The syrup is mixed with purified water and then carbonated by adding carbon dioxide gas under pressure. This carbonation creates the "tingly fizz" that gives soft drinks a refreshing taste. The ingredients used in soft drinks are approved and closely regulated by the U.S. Food and Drug Administration (FDA).

Water

Soft drink production starts with a pure source of water. Regular soft drinks contain 90% water, while diet soft drinks contain up to 99% water. Drinking water often contains trace amounts of various elements that affect its taste. Bottlers use sophisticated filtering and other treatment equipment to remove any residual impurities and to standardize the water used in soft drinks. That's why your favorite soft drink tastes the same everywhere you go.

Carbon Dioxide

A colorless and odorless gas, carbon dioxide is the essential characterizing ingredient in all "carbonated" beverages. It is given off when we breathe and is used by plants to produce oxygen.

When dissolved in water, carbon dioxide imparts a unique taste. For that reason natural sources of carbonated or effervescent mineral waters were once highly prized. These rare mineral waters were also believed to have beneficial medicinal properties. Efforts to make and sell "artificial effervescent mineral water" were well underway in Europe and the U.S. by 1800.

It was the innovative step of adding flavors to these popular "soda waters" that gave birth to the soft drink beverages we enjoy today. In the early days of soft drink manufacturing, carbon dioxide was made from sodium salts. This is why carbonated beverages were called "sodas" or "soda water."

Today, bottlers buy pure carbon dioxide as a compressed gas in high-pressure cylinders. Carbon dioxide gas is absorbed into the flavored soft drink in a carbonator machine just before the container is sealed. While under pressure and chilled, the soft drink may absorb up to four times the beverage volume of carbon dioxide.

When you open a soft drink bottle or can, the "pop" you hear and the "fizz" you see is the rapid escape of carbon dioxide gas caused by the sudden release of pressure on the beverage.

Flavors

Natural flavors in soft drinks come from spices, natural extracts and oils. Fruit-flavored soft drinks such as orange and lemon-lime often contain natural fruit extracts. Other flavors such as root beer and ginger ale contain flavorings made from herbs and spices.

There are also some artificial or man-made flavorings used in soft drinks. Nature just doesn't produce enough of some flavors to satisfy world demand. Most soft drink bottlers mix many individual flavors to create distinctive tastes. Also, some natural flavors are limited geographically and seasonally.

Colors

Believe it or not, color is very important to taste perception. Color affects our psychological impression of food. If you don't believe it, try eating a familiar food in the dark. The colors used in foods and beverages come from both natural and synthetic sources.

Caffeine

Caffeine is a substance that occurs naturally in more than 60 plants including coffee beans, tea leaves, kola nuts and coca beans. In some cases, small amounts of caffeine are added to soft drinks as part of the flavor profile. The amount of caffeine in a soft drink is only a fraction of that found in an equal amount of coffee or tea.

Caffeine has a classic bitter taste that enhances other flavors. It has been part of cola- and pepper-type beverages since they were first formulated more than 100 years ago and has been enjoyed in coffee, tea and chocolate beverages for centuries.

Even though some people feel the effects of caffeine are harmful, scientific research has refuted these claims. The long history of caffeine's use confirms that it is safe when consumed in moderation. For people who wish to restrict their caffeine intake, many caffeine-free soft drinks are available.

Acidulants

Similar to fruit juices and many other food products, most soft drinks are slightly acidic. Acidulants add a pleasant tartness to soft drinks and act as a preservative. Some soft drinks contain a small amount of one or two common food acidulants - phosphoric acid and citric acid. Occasionally, other acidulants such as malic acid or tartaric acid are also used.

Preservatives

Soft drinks do not normally spoil because of their acidity and carbonation. However, storage conditions and storage time can affect taste and flavor. For this reason, some soft drinks contain small amounts of preservatives that are commonly used in many foods. A freshness date is listed on many soft drink cans, letting you know that for the best taste, drink by that date.

Potassium

Potassium is another essential nutrient found in many natural and man-made food ingredients. Like sodium, potassium exists naturally in drinking water and, therefore, soft drinks.

Small amounts of potassium are also found in some of the flavoring agents and other ingredients used in soft drinks.

Sodium

With terms like "soda pop" and "soda water", many people falsely believe that carbonated beverages contain significant amounts of sodium. Not true.

Sodium, in the form of various salts, is present in many natural and man-made compounds. It is an essential mineral nutrient responsible for regulating and transferring body fluids, as well as other important body functions. Although an adequate daily intake of sodium is necessary for good health, excessive consumption has been tied to high blood pressure in some people.

Soft drinks are not significant sources of sodium in the diet. In fact, the local drinking water supply used in making soft drinks contributes most or all of the sodium. Small amounts of sodium in some soft drinks can also come from other ingredients.

Soft drinks are classified by FDA as "low" or "very low" sodium foods. Even people who are advised to restrict their intake of sodium by their doctor can usually drink and enjoy soft drinks with their doctor's approval. Sodium-free soft drinks are also available.

Sweeteners

Non-Diet Soft Drinks

Most regular (non-diet) soft drinks are sweetened with either sucrose or high fructose corn syrup, (HFCS). A mixture of these sweeteners may also be used. Sucrose, the familiar sweetener in your sugar bowl, comes from sugarcane or sugar beets. HFCS is a newer and more convenient liquid sweetener, similar to sucrose but made from corn. It is now used in many prepared foods.

With either, the amount of sweetener in a soft drink ranges from 7 to 14%, about the same amount as a glass of pineapple or orange juice. Both sucrose and HFCS are easily digested carbohydrates, and carbohydrates are an important part of the diet. They provide calories, which are the source of energy for the body.

Sometimes thought to be more fattening than other foods sugar actually contains the same number of calories by weight as protein (4 calories/gram), and less than half the calories of fat (9 calories/gram). Sugars also contain far fewer calories than alcohol (7 calories/gram).

Diet Soft Drinks

Diet soft drinks are made possible by the intensely sweet substances we refer to as "diet" or "low calorie" sweeteners. Aspartame and saccharin are approved for use in soft drinks. As well as newer diet sweetener innovations like Acesulfame-K.

Aspartame

After many years of scientific testing, aspartame was first approved for use in some foods in 1981, and for soft drinks in 1983. It has been reviewed and approved, not only by the

U.S. Food and Drug Administration (FDA), but also by the governments of more than 60 countries and the World Health Organization.

Aspartame is a "nutritive" sweetener, meaning it is easily digested and provides calories. However, its sweetening power is so great that the tiny amount needed to sweeten a soft drink adds less than one calorie per 12-ounce can.

Soft drink companies use slightly different amounts of aspartame in various flavor recipes. Most diet soft drinks are sweetened with aspartame alone, but some may contain a blend of aspartame and saccharin. If aspartame is the only sweetener used, about 15 milligrams per ounce of beverage is added. As other diet sweeteners become available, more sweetener blends are likely to be used.

Saccharin

Discovered more than 100 years ago, saccharin is the only non-caloric diet sweetener currently approved for soft drink use in the U.S.

Saccharin has many desirable properties that make it a valuable food ingredient. It is extremely sweet - about 300 times sweeter than sugar - and contributes no calories. It is stable in foods and is metabolically inert, which means that it goes through the body without changing. Finally, it is relatively inexpensive.

Because of some concerns raised in the late 1970s, labels are required on all products containing saccharin. It is now generally accepted by scientists that there is no risk in consuming saccharin. The many years of saccharin use demonstrate not only its popularity with soft drink manufacturers, but also with consumers.

Alternative Sweeteners

Several new diet sweeteners are starting to appear in the U.S. market. By choosing from a variety of different sweeteners, manufacturers can blend sweeteners to match beverage formulations and better appeal to all consumer tastes and preferences.

Acesulfame-K, under the brand name of "Sunette," is an example of a new diet sweetener recently approved for certain food uses.

A number of other fascinating low-calorie sweeteners are being used or currently undergoing safety evaluations for future use. Some examples are sucralose, a derivative of sucrose that is 600 times sweeter than sucrose, and alitame, a compound similar to aspartame that is remarkably 2,000 times sweeter than sucrose. Also, various naturally occurring plant derivatives, such as stevia and thaumatin, are being used as sweeteners.

Packaging

Packaging is a very important part of the soft drink industry.

Packaging and Recycling

Since 1989, soft drink container recycling has risen from 48.7 percent to more than 60 percent -- a 23 percent increase. Nearly 48 billion soft drink containers were recycled in 1995. Soft drink containers account for less than 1 percent of the U.S. solid waste stream. Although beverage containers account for less than 20 percent of materials collected in most curbside programs, they generate up to 73 percent of total scrap revenue. Packaging innovations have lightened the weight of soft drink containers by an average of 30 percent since 1972. Nearly 78 percent of soft drinks are packaged, while the remaining 22 percent are dispensed from fountains. In 1995, 62.6 billion soft drinks were packaged in cans, 16.8 billion were packaged in PET bottles, and 3.6 billion were packaged in glass bottles.

The Industry

In 1995, the retail sale of soft drinks totaled more than \$52 billion. In 1995, Americans consumed over 51 gallons of soft drinks per capita, a total of more than 13 billion gallons. Soft drinks account for more than 27 percent of Americans' beverage consumption. Ninety-five percent of Americans regularly consume soft drinks. The U.S. market includes nearly 450 different soft drinks. Vending machine crime costs the soft drink industry an estimated \$100 million annually.

Production

Approximately 500 bottlers operate across the United States. Modern bottling plants can produce more than 2,000 soft drinks per minute on each line of operation. The soft drink industry uses more than 10 billion gallons of water in soft drinks every year.