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Carbonated water

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Variants

"Club soda" redirects here. For the music venue in Montreal, see [Club Soda \(Montreal\)](#).

Carbonated water (also known as **club soda**, **soda water**, **sparkling water**, **seltzer water** (and **Selters**), or **fizzy water**) is [water](#) into which [carbon dioxide](#) gas under pressure has been

dissolved. Some of these have additives such as [sodium](#) (seltzer water is almost always composed of water and carbon dioxide with no other additives). This process, known as [carbonation](#), is a process that causes the water to become [effervescent](#). For people who enjoy drinking soft drinks, carbonated water can provide a calorie and sugar-free substitute. The vast majority of carbonated water is sold in ready to drink bottles like [mineral water](#) or carbonated beverages such as [soft drinks](#), but it is easy to prepare at home with soda makers.

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A glass of sparkling water

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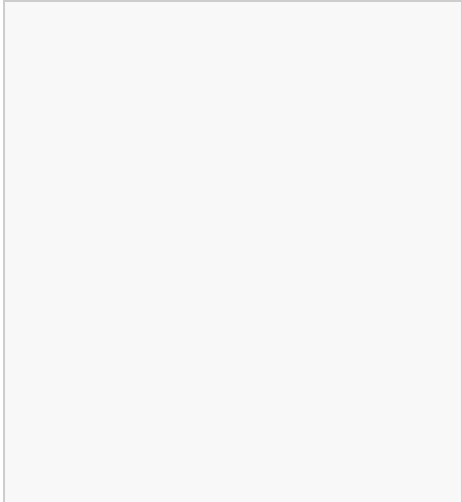
Simple English
 Carbonation [edit]

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Main article: Carbonation

Whether homemade or store-bought, soda water may be identical to plain carbonated water or it may contain a small amount of [table salt](#), [sodium citrate](#), [sodium bicarbonate](#), [potassium bicarbonate](#), [potassium citrate](#), [potassium sulfate](#), or [disodium phosphate](#), depending on the bottler. These additives are included to emulate the slightly salty taste of store-bought soda water. This process also occurs naturally to produce naturally carbonated mineral water, such as in [Mihalkovo](#) in the Bulgarian [Rhodope Mountains](#), in [Medžitlija](#) in [Macedonia](#), or most notably in [Selters](#) in the German [Taunus](#) mountains.

Home [edit]

Recycled canisters [edit]



Devices known as soda makers, or soda carbonators, are either made of bought carbonating systems based on larger, refillable carbon dioxide canisters rather than small, disposable cartridges good for only one liter which might be expensive for long-term use. Soda makers reach the "gassy", fully carbonated level of commercial waters, for at-home enthusiasts. Detailed and simple plans to build small in-home carbonating systems are freely available on the internet^{[2][3]} and can produce a liter of carbonated water for less than 5 US cents. This is despite the higher cost related to the



A typical all-in-one soda maker for home use found in supermarkets. A full canister that can be refilled, and a bottle, are often but not always included.

manufacturer-specific returnable pressurized carbon dioxide canisters (around 400 to 800 grams, enough for 40 to 80 liters of carbonated water). The commercial units are often sold with concentrated syrup flavoring for making flavored soda.

Disposable canisters [edit]

Carbonated water can be made at home by use of a readily available 1 L (1.1 US qt) soda siphon ([seltzer bottle](#)), recharged with disposable carbon dioxide cartridges. One recipe is to chill filtered tap water in the fridge, optionally add one quarter to one half a level teaspoon of sodium bicarbonate (baking soda) to the soda siphon, add the chilled water and add the carbon dioxide under pressure. A pH testing kit can be used to gauge the amount of sodium bicarbonate used to achieve the desired acidity. The siphon should be kept in the refrigerator to preserve carbonation of the contents. Many soda siphons are decorative in nature and are kept out for viewing on the drinks tray. Soda water made in this way tends not to be as 'gassy' as commercial soda water because water from the refrigerator is not chilled as much as possible, and the pressure of carbon dioxide is limited to that available from the cartridge rather than being at a higher pressure created by pumps in a commercial carbonation plant.

Commercial [edit]

The process of dissolving carbon dioxide in water is called [carbonation](#). Commercial soda water in siphons is made by chilling filtered plain water to 8 °C (46 °F) or below, optionally adding a [sodium](#) or [potassium](#) based alkaline compound such as [sodium bicarbonate](#) to reduce acidity, and then pressurizing the water with carbon dioxide. The gas dissolves in the water, and a top-off fill of carbon dioxide is added to pressurize the siphon to approximately 120 pounds per square inch (830 kPa), some 30–40 psi (210–280 kPa) higher than is present in fermenting [champagne](#) bottles.



A modern bar "soda gun".

In many modern [restaurants](#) and [drinking establishments](#), soda water is manufactured on-site using devices known as carbonators. Carbonators use mechanical pumps to pump water into a pressurized chamber where it is combined with CO₂ from pressurized tanks at approximately 100 psi (690 kPa). The pressurized, carbonated water then flows to taps or to mixing heads where it is mixed with flavorings as it is dispensed.

Metabolism and excretion [edit]

See also: *[Blood alcohol content § Metabolism and excretion](#)*

Alcohol in carbonated beverages is absorbed faster than alcohol in non-carbonated drinks.^[4] Another study also confirmed this, conducted at the [University of Surrey](#) in the United Kingdom gave subjects equal amounts of flat and sparkling Champagne which contained the same [levels of alcohol](#). After 5 minutes following consumption, the group that had the sparkling wine had 54 milligrams of alcohol in their blood while the group that had the same sparkling wine, only flat, had 39 milligrams.^[5]

Health effects [edit]

Intake of carbonated beverages has not been associated with increased bone fracture risk in observational studies, and the net effect of carbonated beverage constituents on the amount of calcium in the body is negligible.^[6]

Benefits [edit]

Higher water intake [edit]

See also: *[Weight loss effects of water](#)*

One study states that consumers of carbonated water prepared at home had significantly higher mean drinking water intake (tap + bottled + carbonated water) in percentage of total water intake than non-consumers, and lower mean intakes of milk, bottled water and tap water, respectively;^[7] carbonated water may be the defining ingredient in [diet sodas](#) that contribute to weight loss.

Home remedy for symptoms of indigestion [edit]

Carbonated water eases the symptoms of indigestion ([dyspepsia](#)).^{[8][9]}

Reduction of Cholesterol and cardiovascular risks [edit]

A 2004 article in the *[Journal of Nutrition](#)* found that fizzy waters with higher sodium levels reduced cholesterol levels and the risk of cardiovascular problems in [postmenopausal](#) women.^[10]

Disadvantages [edit]

Worsening IBS [edit]

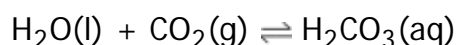
Carbonated water may increase [irritable bowel syndrome](#) symptoms of bloating and gas due to the release of carbon dioxide in the digestive tract.^[11]

Dental Decay [edit]

Similar to carbonated soft drinks, the acidity of carbonated water lies close to 3.0^[12] and as such may lead to erosion of [tooth enamel](#).

Chemistry and physics [edit]

[Carbon dioxide](#) gas dissolved in water at a low concentration (0.2–1.0%) creates [carbonic acid](#) (H₂CO₃)^[13] according to the following reaction:



This causes the water to have a slightly sour taste with a [pH](#) between 3 and 4.^[14] This makes it fall somewhere in the range of apple and orange juice but is much less acidic than the stomach. The human body maintains pH equilibrium via its [acid–base homeostasis](#) and will not be affected by carbonated water consumption.^[11] However, an [alkaline salt](#), such as [sodium bicarbonate](#), may be added to soda water to reduce its [acidity](#).

The amount of a gas like carbon dioxide that can be dissolved in water is described by [Henry's Law](#). Water is chilled, optimally to just above freezing, in order to permit the maximum amount of carbon dioxide to dissolve in it. Higher gas pressure and lower temperature cause more gas to dissolve in the liquid. When the temperature is raised or the pressure is reduced (as happens when a container of carbonated water is opened), carbon dioxide comes out of solution, in the form of bubbles. This is known as [effervescence](#).

History [edit]

In 1767, [Joseph Priestley](#) discovered a method of infusing water with carbon dioxide when he suspended a bowl of water above a beer vat at a local brewery in [Leeds](#), England.^[15] The air blanketing the fermenting beer—called 'fixed air'—was known to kill mice suspended in it. Priestley found water thus treated had a pleasant taste, and he offered it to friends as a cool, refreshing drink. In 1772, Priestley published a paper entitled "Impregnating Water with Fixed Air" in which he describes dripping "oil of vitriol" ([sulfuric acid](#)) onto [chalk](#) to produce carbon dioxide gas, and encouraging the gas to dissolve into an agitated bowl of water.^[16]



In 1771, [chemistry](#) professor [Torbern Bergman](#) independently invented a similar process to make carbonated water. In poor health and frugal, he was trying to reproduce naturally-[effervescent](#) spring waters thought at the time to be beneficial to health.^[citation needed]

Carbonated water was introduced in the latter part of the 18th century, and reached [Kolkata](#)

(formerly known as Calcutta), India in 1822.

In the late eighteenth century, **J. J. Schweppe** (1740–1821) developed a process to manufacture carbonated **mineral water**, based on the process discovered by **Joseph Priestley**, founding the **Schweppes** Company in Geneva in 1783. In 1792 he moved to London to develop the business there. In 1799 Augustine Thwaites founded Thwaites' Soda Water in Dublin. A London Globe article claims that this company was the first to patent and sell "Soda Water" under that name.^[17]

Modern carbonated water is made by passing pressurized carbon dioxide through water. The pressure increases the **solubility** and allows more carbon dioxide to **dissolve** than would be possible under **standard atmospheric pressure**. When the bottle is opened, the pressure is released, allowing the gas to come out of the solution, forming the characteristic bubbles.

Etymology ^[edit]

In the United States, carbonated water was known as *soda water* until World War II, due to the sodium salts it contained. These were added as flavoring and acidity regulators with the intent of mimicking the taste of natural **mineral water**. During the **Great Depression**, it was sometimes called "two cents plain", a reference to its being the cheapest drink at **soda fountains** (i.e. without the addition of three cents-worth of flavored syrup).

In the 1950s, terms such as *sparkling water* and *seltzer water* gained favor. The term *seltzer water* is a **genericized trademark** that derives from the German town *Selters*, which is renowned for its **mineral springs**.^[18] Naturally carbonated water has been commercially bottled and shipped from this town since the 18th century or earlier. Generally, *seltzer water* has no added sodium salts, while *club soda* still retains some of the sodium salts that once were used. The term "Seltzer water" is virtually unknown in Britain and most Commonwealth countries, although Australians of a certain age remember Selza Saline powder in metal tins with lids which had to be opened for each use with the back of a spoon, sold during the 1950s.^[19]

In many parts of the US, *soda* has come to mean any type of sweetened, carbonated soft drink.

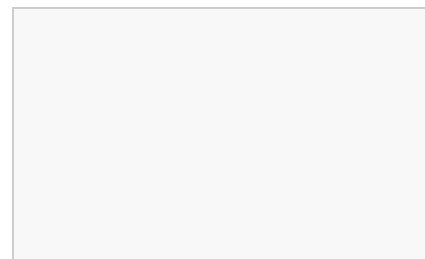
In the United Kingdom and Canada today, **drink mixers** sold as *soda water* or *club soda* contain **bicarbonate of soda**, which gives them a specific flavour and differentiates them from carbonated water. It is popularly used for drinks such as **whisky and soda** and **Campari** soda.

Products ^[edit]

Soda siphons ^[edit]

Main article: Soda syphon

The **soda siphon**, or siphon — a glass or metal pressure vessel with a release valve and spout for dispensing pressurized soda water — was a common sight in **bars** and in early- to mid-20th century homes where it became a symbol of middle-class



affluence.

The gas pressure in a siphon drives soda water up through a tube inside the siphon when a valve lever at the top is depressed.

Gasogene [edit]

The **gasogene** (or gazogene, or seltzogene) is a late **Victorian** device for producing carbonated water. It consists of two linked glass globes: the lower contained water or other drink to be made sparkling, the upper a mixture of **tartaric acid** and **sodium bicarbonate** that reacts to produce **carbon dioxide**. The produced gas pushes the liquid in the lower container up a tube and out of the device. The globes are surrounded by a **wicker** or wire protective mesh, as they have a tendency to explode.^[20]

Codd-neck bottles [edit]



The **Codd-neck bottle**'s special shape is designed to contain a marble which seals in the carbonation.

In 1872, **British soft drink maker Hiram Codd** of **Camberwell**, London, designed and patented the **Codd-neck bottle**, designed specifically for **carbonated** drinks. The *Codd-neck bottle* encloses a **marble** and a **rubber washer/gasket** in the neck. The bottles were filled upside down, and pressure of the **gas** in the bottle forced the marble against the washer, sealing in the carbonation. The bottle was pinched into a special shape to provide a chamber into which the marble was pushed to open the bottle. This prevented the marble from blocking the neck as the drink was poured

Soon after its introduction, the bottle became extremely popular with the soft drink and **brewing** industries mainly in **Europe**, **Asia** and **Australasia**, though some **alcohol** drinkers disdained the use of the bottle. One **etymology** of the term *codswallop* originates from beer sold in Codd bottles, though this is generally dismissed as a **folk etymology**.^[21]

The bottles were regularly produced for many decades, but gradually declined in usage. Since children smashed the bottles to retrieve the marbles, they are relatively rare and



A soda siphon circa 1922.



Late Victorian seltzogene made by British Syphon

have become [collector items](#); particularly in the UK. They could be found at retail shops and restaurants in many parts of the world until recently. Due to the risk of explosion and injuries from fragmented glass pieces, use of this type of bottle is no longer encouraged in most countries. The Codd-neck design is still used for the [Japanese](#) soft drink [Ramune](#) and in the [Indian](#) drink called [Banta](#).

SodaStream [\[edit\]](#)

[SodaStream](#) is sold worldwide to this date. The SodaStream machines were popular during the 1970s and 1980s in the UK, and are associated with nostalgia for that period.^{[22][23]} Their slogan, "Get busy with the fizzy", started as an advertising [jingle](#) in 1979 and proved so popular that they added it to their logo. The slogan was initially dropped in 1996 after 17 years,^[24] but was reinstated in 2010 along with a new marketing campaign in the UK.^[25]

Social popularity, decline, and renaissance [\[edit\]](#)

Carbonated water changed the way people drank. Instead of drinking liquor straight/neat (without a mixer), soda water and carbonated soft drinks helped dilute alcohol, and made having a drink more socially acceptable. Popping into a friend's house for a "dash and a splash" — a whisky and soda — before going out to a social event was part of everyday life in Britain as late as 1965.^[*citation needed*] Whisky and sodas can be seen in many British TV series and films from the 1960s and earlier and the soda siphon is ubiquitous in many movies made before 1970.

Social drinking changed with the counter-culture movement of the 1970s and the arrival of new bottled and canned beverages in the 1980s, and soda water has declined in popularity. Soda siphons are still bought by the more traditional bar trade and are available at the bar in many upmarket establishments, but in the UK there are now only two wholesalers of soda-water in traditional glass siphons, and an estimated market of around 120,000 siphons per year (2009). Worldwide, preferences are for beverages in recyclable plastic containers.

Home soda siphons and soda water are enjoying a renaissance in the 21st century as [retro](#) items become fashionable. Contemporary soda siphons are commonly made of [aluminum](#), although [glass](#) and [stainless steel](#) siphons are available. The valve-heads of today are made of plastic, with metal valves, and replaceable [o-ring](#) seals. Older siphons are in demand on on-line auction sites. Carbonated water, without the acidity regulating addition of soda, is currently seen as fashionable although home production (see above) is mainly eschewed in favor of commercial products.

Combined usage [\[edit\]](#)

Carbonated beverages [\[edit\]](#)



Main article: [Soft drink § Health concerns](#)

Plain carbonated water is often consumed as an alternative to soft drinks. However, a [soft drink](#) is a [beverage](#) that typically contains carbonated water, a [sweetener](#) and a [flavoring](#). Flavored carbonated water is also commercially available like [cola](#). Carbonated water is often [consumed](#) mixed with [fruit juice](#). It differs from sodas in that it contains flavors (usually sour fruit flavors such as [lemon](#), [lime](#), [cherry](#), [orange](#), or [raspberry](#)) and usually a sweetener.

Health concerns [\[edit\]](#)

All of the [flavoured] waters demonstrated erosive potential (89-143%) similar to or greater than that of pure orange juice ... Flavoured sparkling waters should be considered as potentially erosive, and preventive advice on their consumption should recognize them as potentially acidic drinks rather than water with flavouring. ^[26]

Alcoholic beverages [\[edit\]](#)

Carbonated water is a [diluent](#) mixed with [alcoholic beverages](#) where it is used to top-off the drink and provide a degree of 'fizz'.

Adding soda water to 'short' drinks such as spirits dilutes them and makes them 'long' not to be confused with [long drinks](#) such as those made with [vermouth](#). Carbonated water also works well in short drinks made with [whiskey](#), [brandy](#), and Campari. Soda water may be used to dilute drinks based on cordials such as orange squash. Soda water is a necessary ingredient in many cocktails, such as [whisky](#) and soda or [Campari](#) and soda.

Carbonated water in cooking [\[edit\]](#)

Carbonated water have been increasingly popular in food cooking.^[*citation needed*] Some cooks^[*who?*] believe that substituting sparkling water for regular water in recipes will provide a lighter texture.

See also [\[edit\]](#)

- [Premix and postmix](#)
- [Soda jerk](#)
- [Sodium carbonate](#)
- [SodaStream](#)
- [Tonic water](#)

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External links [edit]



The Priestley Society

- [Priestley's paper *Impregnating Water with Fixed Air* 1772](#) 
- [Interview with one of New York City's last seltzer delivery men](#) 



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