The variety of mineral and spring waters out there is mind-boggling! Each mineral or spring water has its own geological origin and therefore its own unique mineralization.

This series, compiled in cooperation with Doemens Academy, aims to give the interested reader from the beverage trade, catering industry or source company an overview of the diverse nutritional effects, tastes and nutritional value of mineral and spring water as a companion to food and drinks.

Wasser SOMMELIER Doemens

Mineral waters rich in hydrogen carbonates

Geology

The occurrence of hydrogen carbonate (also called "bicarbonate," HCO_3^-) is closely linked to the presence of CO_2. High concentrations of CO_2 in deep rock strata are usually caused by the slow cooling of volcanic rock in which CO_2 is set free. If this CO_2 encounters water at depth, carbonic acid is formed, which in turn can dissociate in bicarbonate, depending on pH value. Mineral or spring waters with high bicarbonate concentrations thus come almost exclusively from volcanic areas.

Nutritional-physiological significance

From 600 mg/l, mineral water may be labeled "bicarbonated" according to the European Mineral Water Directive 2009/54/EC.

For maintaining optimal metabolic processes in our body, the blood must maintain an acid-base balance within a specific range. An unhealthy diet, too little exercise and too much stress promote hyperacidity in the blood.

In the human body, bicarbonate is a key component of the bloodstream and, due to its acid-neutralizing ability, is responsible for keeping the blood count at a consistent base level.

To a lesser extent, our body can produce this substance itself, but in certain situations it becomes difficult for the body to compensate for hyperacidity on its own. Therefore, it is advisable to supply the body with additional bicarbonate in a natural way:

- When the body is active, HCO_3^- binds the resulting acids – such as lactic acid – so that the muscle is not acidified and its function is not impaired.
- As a neutralizer of "heartburn," which manifests itself as sour regurgitation and a burning sensation in the throat, bicarbonate-containing mineral and spring waters are ideally suited because the excess stomach acid is bound. Studies show that such waters work just as well as acid-binding drugs (antacids).
- With increasing age, bicarbonate becomes more important, as the body is less effective in its ability to excrete acids. Diet-related persistent acidity can lead to muscle damage and impaired bodily functions.

Sensory assessment

Waters with a higher bicarbonate content provide a harmonious, round and rich taste sensation. However, taste is determined primarily by the presence of a counter ion. Water with a high level of calcium hydrogen carbonate tastes somewhat velvety, whereas water containing magnesium hydrogen carbonate tastes somewhat bittersweet.

Sodium bicarbonate, a common ingredient in mineral waters, tastes somewhat salty at higher concentrations. The $NaHCO_3$-containing waters are usually enhanced with carbon dioxide because a high sodium bicarbonate concentration in still water may trigger a soapy taste.

Recommendations

When paired with lighter dishes such as fish or salads, bicarbonate-containing waters are the top choice for pairing. They are more neutral in taste than sulphate or chloride waters.

Caffeine is a diuretic, which means it withdraws liquid from tissue, so it's always a good idea to drink water with your coffee. Hydrogen carbonate in mineral or spring water neutralizes the tannic acid in coffee or tea and has a soothing effect on the stomach. Consequently, hydrogen carbonate-rich water with little or no carbonic acid is the optimal recommendation to pair with coffee.

Hydrogen carbonate-containing waters, in principle, have an acid-neutralizing effect. This effect is evident, for example, when paired with wine. If one accompanies a fresh, somewhat acidic, fruity white wine (Grüner Veltliner, for example) with hydrogenated, high-carbonate water, the acid in the wine is effectively neutralized. The accompanying mineral or spring water

Market overview (not guaranteed to be exhaustive)

Mineral and spring waters with a high concentration of hydrogen carbonates	HCO_3^- [mg/l]	Country of origin
Rogaska Donat Mg	7800	Slowenia
Vincentka	4910	Czech, Republic
Borjomi	3000 – 4250	Georgia
Sicheldorfer	3410	Austria
Dauner Mineralquelle	3302	Germany
Vichy Celestins	2989	France
Nürburg Quelle	2451	Germany
Preblauer	2376	Austria
Jamnika	2205	Croatia
Pedras Salgadas	2125	Portugal

may or may not alter the wine's overall character, though sometimes acid-neutralization may do just that.

For example, if you're with your partner in a restaurant, and he or she loves a wine high in acid, you might decide to share a good bottle of Riesling or Grüner Veltliner. You can soften the tartaric acid with a specific mineral or spring water containing hydrogen carbonate, while your partner can order a light mineral or spring water and enjoy the full effects of his/her favorite wine.

The acid-reducing influence of hydrogen carbonate becomes clear when making a spritzer. Numerous beverage manufacturers already offer mild spritzers in addition to their fruity-sour apple spritzer. Of course, you can also prepare these spritzer variants yourself at home by choosing a water with a hydrogen carbonate content of over 1000 mg/l. You will notice that the taste is much milder and softer than with a lighter water, low in hydrogen carbonate. □

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