



Citric Acid

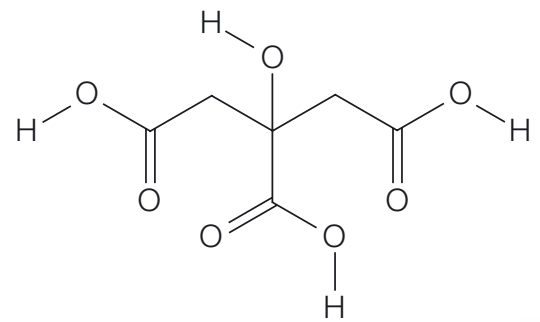
**Jungbunzlauer**

# Citric Acid

## *The citric part of life*

You cannot miss the fresh citric acid taste of many drinks, jams, cakes and sweets. It whets the appetite and teases the palate. That appealing tart character – typical of carbonated and fruit-flavoured soft drinks – satisfies the palate, refreshes us and offers a welcome respite to everyday stress. Citric acid actually offers us a multitude of benefits through the many products we consume or use in our daily life.

Citric acid has long been recognised as a universal constituent of plants and animals as well as the human body. Over the past century, it has become the organic acid of choice for industrial consumer products – in the food, pharmaceutical and cosmetic industries – as well as being used in a variety of technical applications ranging from textile finishing to waste water treatment. Citric acid is universally present in today's world, transcending cultural boundaries and serving multiple industries.



## Lemon Juice and Fermentation Technology

Citric acid is an inherently natural product. Almost all living cells produce it as an intermediate during the metabolic cycle. Most plant and animal tissues, as well as the serum of man, contain significant quantities of citric acid. It is also present in breast milk. Clearly nature provides this substance in abundance.

For many centuries scientists have been trying to emulate nature by synthesising citric acid. In 1784, Swedish chemist C. W. Scheele succeeded in isolating citric acid from lemons. Commercialisation, however, did not begin until the mid-1800s. The extraction process quickly became uneconomical as demand for citric acid grew.

In 1917, J. N. Currie experimented with the micro-organism *Aspergillus Niger* in a sucrose-and-salt solution. His work led to the development of an entirely new production technique which turned out to be viable on an industrial scale. As a result, surface (and later deep tank) fermentation technology gradually replaced earlier extraction processes. Fermentation techniques and production processes have become increasingly sophisticated, but the citric acid they produce still remains identical to that found in nature.

Jungbunzlauer started production of citric acid at its Pernhofen, Austria site in 1962. Following significant investment into research, state-of-the-art fermentation facilities and production technologies, citric acid soon became one of Jungbunzlauer's core products. Today, the Pernhofen plant is the largest production site for citric acid in the world.

## Quality from Procurement to Delivery

At Jungbunzlauer, quality control is an integral part of the entire production process from procurement and production to packaging and delivery. Our production sites in Pernhofen and Port Colborne are ISO 9001:2000 certified. Jungbunzlauer guarantees a high-quality product that conforms to all international ingredient and technical specifications for citric acid or its salts. We supply citric acid in accordance with all major pharmacopoeia and food regulations (USP, FCC, Ph.Eur., EC Directives, etc.) in their latest version.

As a supplier to the food industry, Jungbunzlauer meets the strict food and ingredient safety requirements specified by the Hazard Analysis Critical Control Points (HACCP) programme. This is a systematic procedure used to identify those process points where control is crucial to minimise risk factors. Jungbunzlauer has identified – and taken steps to counter – all potential hazards that exist in raw materials and during intermediate manufacturing stages. Application of HACCP standards to our production is the best way to ensure maximum product quality for our customers.

Jungbunzlauer is equally concerned with additional quality aspects that relate to customer needs. It is our guiding principle – as well as our goal – to deliver a combination of top product quality, prompt delivery and comprehensive service at the best total cost. Jungbunzlauer has established key performance indicators to support us in striving for quality, efficiency and continuous improvement of our processes.

The Jungbunzlauer business philosophy reflects a strong commitment to customer service. Our sales personnel, world-wide distribution network and highly trained technical service support staff are at your service.



# Renewable and Inexhaustible

Jungbunzlauer produces citric acid using a process of submerged microbial fermentation of carbohydrates. We follow the classic production process using spores from the *Aspergillus Niger* fungus. Our facilities allow the use of multiple carbohydrate sources to achieve maximum flexibility and reliability. Jungbunzlauer citric acid is environmentally friendly. All the raw materials used are renewable and virtually inexhaustible. We are constantly striving to improve the production process with regard to environmental concerns.

Jungbunzlauer has established a waste-water treatment plant in cooperation with the regional authorities and the communities concerned. The biodegradable by-products generated by citric acid production are used either as fertiliser, animal feed or in the construction industry.

In response to customer demands, our European facilities follow a non-GMO policy. We work exclusively with raw material suppliers who do not use genetically-modified raw materials, and we do not use genetically-modified production strains during citric acid production.

Finally, our production facilities comply with strict safety, health and environmental criteria.

Our plants in Pernhofen, Austria and Port Colborne, Canada both have a certified commitment to the worldwide Responsible Care initiative.



## Citric's Unique Properties

Citric acid is used in numerous consumer products, from foods to pharmaceuticals and detergents. Commanding over 70% of the world market for fruit acids, citric acid offers formulators a unique combination of benefits:

- In the food and beverage industry, citric acid is the preferred acidulant due to its high solubility, pleasant tart taste and excellent flavour-blending characteristics.
- Thanks to its ability to form complexes with trace metals, citric acid is used as an antioxidant synergist. It stabilises colour, taste, flavour and vitamins in various food products including processed fruit, potatoes, vegetables, fish and meat products.
- As a buffering agent, citric acid and its salts help formulators to maintain optimum pH for maximum stability of active ingredients.
- Citric acid shows the widest buffering capacity (pH 2.5-6.5) of all organic acids, and therefore can give the food, personal care and pharmaceutical industries the flexibility needed to formulate optimal end products.
- Citric acid, as well as its sodium and potassium salts, is readily biodegradable and safe for both industry and consumers. These properties underline its utility as a food and pharmaceutical ingredient.

Citric acid's unique properties can also be applied over a broad range of industrial applications. The cleaning, construction, textile and paper industries have taken advantage of citric acid's outstanding chelating ability, as well as its non-toxicity, to pioneer new uses for citric acid and citrates. Be it metal plating, the desulphurisation of flue gas, oil recovery or the decontamination of radioactive nuclear reactor materials – citric acid is likely to be involved.



## From the Heart of Europe to the World Market

Jungbunzlauer's roots date back to 1867, when Ignatz Lederer established a molasses distillery in the Bohemian village of Jung Bunzlau, at the time a part of the Austro-Hungarian empire. By the turn of the century, the Jungbunzlauer Spiritus- und Chemische Fabrik had become a large enterprise with five production sites trading spirits and related products across the European continent. In 1900, Jungbunzlauer acquired a distillery in Pernhofen, Lower Austria. It was on this site that, after two world wars, Jungbunzlauer's citric acid production began in 1962. Today, Pernhofen epitomises the company's citric success.

In 1988, Jungbunzlauer acquired production facilities for organic acids in Ladenburg, Germany, to achieve a step-change in its citric acid production. This acquisition enabled Jungbunzlauer to add a range of citrates and specialties to its citric portfolio.

In 1999, responding to increasing customer demand for citric acid worldwide, Jungbunzlauer decided to build another citric acid plant to supply the North and Latin American markets. The new Port Colborne facility in Ontario, Canada went on stream in April 2002.

Over the past 40 years, Jungbunzlauer has gained a solid reputation as a key global supplier of citric acid, citrates and citric acid esters. From a distillery to the world's largest citric acid plant, from the heart of Europe to the world market – Jungbunzlauer has written history in citric acid.

# Thinking Ahead

A fundamental change has taken place in consumer life style and attitudes over the past three decades. Many new food products are addressing this change and food industry demand for citric acid is growing continuously. Citric acid's growth within the beverage market, for instance, has exceeded the industry's total growth numbers for several years. Many convenience food products such as home meal replacements and snack foods rely on citric acid. As "fresh" and "natural" labels rank among the most desirable food claims today, citric acid and its salts are coming to the forefront as ingredients of choice in the health and organic food markets.

Citric acid also has long-term potential in the cosmetics and pharmaceutical industries. In the 1970s, its chemical properties attracted the interest of the cleaning industry. Today, citric-acid-based formulations play a key role in both household detergents and industrial cleaning systems. Citric acid and sodium citrate are receiving increasing attention as biodegradable chelating agents that can replace polyphosphates and EDTA in a number of technical applications. This trend is likely to continue due to increasing environmental awareness.



The continuing increase in our production capacity at our Austrian plant and the investment in a new facility in North America testify to our responsiveness to increasing market demand. They also reflect our aim to serve both multinational customers globally as well as smaller customers locally.

Jungbunzlauer offers sustainable products in combination with operational excellence. We are confident that in the future we will continue to live up to your expectations. We will be there for you – with the right product at the right time.

[www.jungbunzlauer.com](http://www.jungbunzlauer.com)

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