Jungbunzlauer

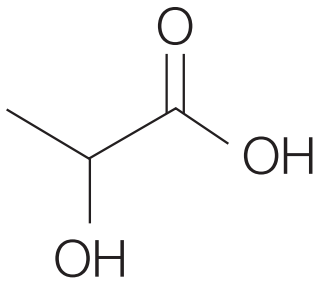
From nature to ingredients®

Lactics

Lactics

Safe and functional by nature

Lactic acid has been with humankind from the beginning. Not only is it part of the human metabolism, it also occurs naturally in a range of fermented foods that have been produced for thousands of years. Nowadays, lactic acid and its salts, the lactates, are used in a wide range of applications and industries, including but not limited to food, drinks, personal care, cleaning, and agriculture. Thus lactic acid is no longer just a minor, incidental component of certain traditional foods, it is intentionally produced for the benefit of peoples, markets and the environment.



The foundations for this development were laid down in the late 18th century and over the course of the 19th century. Lactic acid was first discovered and isolated from sour milk by the Swedish chemist C. W. Scheele in 1780. A few decades later, in 1856, Louis Pasteur discovered the bacteria genus Lactobacillus and explored the basic principles of lactic acid fermentation. This paved the way for the first industrial production at the end of the century.

Jungbunzlauer started lactic acid production at the end of 2011. Though on large industrial scale, the core process has not changed: bacterial fermentation of natural, non-GM raw materials. Our modern, back-integrated and state-of-the-art production in the heart of Europe is efficient, gypsum-free and yields high-quality products.

Product characteristics

Lactic acid exists in two optical forms: L(+) and D(-). As it is metabolised better by the human organism, Jungbunzlauer has chosen to produce pure L(+)-lactic acid through traditional fermentation of renewable carbohydrates by non-GM microorganisms.

The current lactics portfolio contains several grades and types of L(+)-lactic acid (LA), sodium L(+)-lactate (SL) and potassium L(+)-lactate (PL). In addition to these, buffered lactic acid (LABF) and blends of lactates with acetates and diacetates are offered.

Lactic acid, its sodium and potassium salts, as well as blends with acetates and diacetates are available as aqueous, colourless to yellowish solutions with a faint, characteristic odour. Lactic acid tastes mildly sour, its salts mildly salty.

These products are typically supplied in bulk (tank trucks, ISO tank containers) and in intermediate bulk containers (IBCs) on plastic pallets with a net content of 1200 kg for lactic acid and its blends, and 1300 kg for lactates and their blends. Also available are drums with a standard net weight of 250–270 kg depending on the products, as well as jerrycans with a net content of 25 kg. Drums and jerrycans are supplied on wooden pallets.

Main properties

Lactic acid is an acidity regulator with a mild, lingering, sour taste and flavour improving properties. Compared to citric acid, for example, lactic acid shows a less intense, but longer lasting sourness.
But the main property that differentiates Lactics from other common food acids and their salts is their antibacterial action. Different mechanisms are responsible for this.
In the case of lactic acid, the antibacterial action is based on its capacity to decrease the medium's pH and to move easily into the bacterial cell thanks to its small molecule size. Lactic acid can therefore significantly reduce the bacterial count of a medium, making it a highly effective bactericide. This property can be exploited either to ensure microbial stability of foodstuffs or to create efficient disinfecting cleaners.

Sodium and potassium lactates work differently. When present in a medium, they block a bacterium's ability to eliminate the lactate, which is a by-product of its metabolism. They also lower the water activity of the medium due to their high water-holding capacity. In this way, they inhibit the development of bacteria, i.e. have a bacteriostatic action. Thus lactates contribute to food safety and stability.
Moreover, their water-binding properties make them ideal candidates for moisturising applications in personal care.

Legal aspects and certifications

Lactic acid, sodium lactate and potassium lactate are generally permitted as "quantum satis" food additives in Europe and have been affirmed as GRAS (generally recognised as safe) substances for specific uses in the USA. Our food grade Lactics meet the purity requirements of the European Union and of the Food Chemicals Codex (FCC), and are Kosher and Halal certified.

Generally, lactic acid is classified as a dangerous good according to Regulation (EU) 1272/2008 (CLP). Jungbunzlauer's lactic acid and lactates are registered under REACH, the European chemicals regulation. Lactic acid, sodium lactate and potassium lactate have been granted Ecocert/COSMOS approval for use in natural cosmetics and green detergents.

Furthermore, Jungbunzlauer is an Art. 95 listed supplier of lactic acid for use as an active substance in biocidal products of product types (PT) 1, 2, 3, 4 and 6 according to the European Biocidal Products Regulation (BPR). In the US, Jungbunzlauer lactic acid has been approved as a manufacturing use product (MUP) by the Environmental Protection Agency (EPA).

Jungbunzlauer Lactics are produced in a state-of-the-art, ISO 9001 and FSSC 22000 certified factory in Marckolsheim, France.

Product	Grade	Concentration
L(+)-Lactic Acid	Food, Feed, Pharm. Starting Material, Personal Care, Biocidal, Technical	50%, 80%, 88%, 80% HS*, 88% HS*, 90% HS*
L(+)-Lactic Acid Buffered	Food	80% (60% LA, 20% SL)
Sodium L(+)-Lactate	Food, Personal Care	60%
Potassium L(+)-Lactate	Food, Personal Care	60%
Lactate Blends	Food	60% [56% Lactate, 4% (Di)Acetate]

*HS = heat-stable (colourless grades)

Sustainability

Sustainability is a keystone of Jungbunzlauer's strategy and value proposition. Jungbunzlauer ingredients are manufactured through natural fermentation from renewable raw materials. With a long history of calculating carbon footprints and implementing sustainability initiatives, Jungbunzlauer has set ambitious emission reduction targets and committed to SBTi in 2021. This includes measuring environmental parameters such as greenhouse gas emissions and water consumption, which are also disclosed in the annual sustainability report.

For Lactics, our portfolio consists only of highly concentrated products that are manufactured using processes where all by-products represent valuable raw materials for adjacent industries. As green biocide, our lactic acid is well suited to replace conventional, often harmful preservation agents in many applications. In food and personal care products, our lactates and lactate blends provide sustainable and safe preservation solutions that ensure a long shelf life and minimise spoilage.

Focus on applications in food

As lactic acid is naturally present in fermented foods such as cheese, yoghurt, sour dough and pickled vegetables, it is used in a wide range of food products where it serves mainly as a mild-tasting acidity regulator, as a preservative and as a flavouring agent. Buffered lactic acid is beneficial where an even milder acidification is needed. Sodium lactate is mainly used for preservation, buffering and water-holding purposes. Potassium lactate has similar properties and uses, but addresses the concerns of health organisations and consumers with regard to reducing sodium intake.

Beverages

Taste and nutrition. With its mild, lingering, acidic flavour, lactic acid helps to adjust the intensity and duration of the acid taste in beverages. It can be used alone or in combination with other food acids such as citric or gluconic acids to achieve the right balance. Again, as in other food applications, the antimicrobial properties of lactic acid help to ensure product stability. In the brewing process, lactic acid is used for flavour adjustment of bright beer and for pH correction of wort. Lactates can be added as electrolytes to health and sports drinks. Furthermore, Jungbunzlauer has developed their use as buffering salts to mask the liquorice off-taste in low-calorie beverages sweetened with steviol glycosides.

Meat

Antimicrobial wash. Thanks to its antibacterial properties, lactic acid is the ideal candidate for the decontamination of animal carcasses. By spraying an aqueous solution of lactic acid onto the surface of a carcass at an elevated temperature, a significant reduction of pathogenic microorganisms such as E. coli and salmonella is achieved. Thus, good hygienic slaughtering practices are supported. In many countries of the world, this treatment can be applied to all types of meat carcasses. In Europe, it has only been approved for use on beef carcasses so far.

Food safety and shelf life extension. Lactates and (di)acetates efficiently inhibit the growth of microorganisms such as listeria. They are therefore widely used as preservatives in order to meet today's quality requirements in terms of food safety and stability.

Combinations of lactates with (di)acetates even show synergistic effects allowing for usage levels of less than 2%, but without impairing antimicrobial performance. Including lactates or their blends prolongs the product's shelf life, resulting in reduced food waste.

Confectionery

Taste and stability. In analogy with its function in beverages, lactic acid serves as a mild acidulant in soft candies. Additionally, the use of lactic acid and, particularly, the use of buffered lactic acid helps to prevent the candy from losing gel strength: gelatine degradation is significantly reduced using lactic acid compared with citric acid. Sodium lactate is added for buffering in hard and chew candies. Furthermore, its presence reduces sugar inversion and candies retain their haptic and sensory properties for longer: stickiness, cold flow and sugar crystallisation are minimised.

Feed and pet food

Shelf life and digestibility. Since the European Union banned the use of antibiotics to promote livestock growth in 2006, lactic acid has become highly important in animal nutrition. Its antibacterial activity preserves feed material (including drinking water), prevents the development of pathogens and helps to reduce the population of coliform bacteria in the intestinal tract. Furthermore, digestibility of nutrients and thus animal well-being are improved, supporting healthy growth. The same applies to pet food, where the use of lactic acid helps to combat microorganisms such as salmonella, which present a health hazard not only to the pet itself but also to the people handling pet food preparations.

Focus on non-food applications

Lactics are well-known for their use in food. However, the very first use of lactic acid in commercial production was for technical applications, for the preparation of leather and for textile dyeing and printing. Nowadays, more than one hundred years later, and thanks to scientific progress, lactic acid and lactates are present in a broad range of non-food industries, ranging from cosmetics and detergents to electronics and biopolymers.

For technical applications, lactic acid is exploited primarily for its acid moiety and antibacterial properties. The major advantage of lactates lies in their water-binding capacity.

Personal care

Moisturising. Lactates are components of the natural moisturising factor (NMF). This is the specific mixture of salts and proteins in human skin cells that keeps our skin well-hydrated. It has been demonstrated that the presence of sodium lactate and, even more notably, of potassium lactate in test formulations increases the moisture content of the treated skin.

Therefore, lactates are the ideal moisturising ingredients for both rinse-off and leave-on personal care products, being safe, effective and inspired by nature. In addition, lactates leave a pleasant, smooth, non-sticky skin feel in contrast to established moisturisers such as glycerine.

Exfoliation and product stability. Due to its acidity, lactic acid can be used to adjust the pH of personal care products. At higher concentrations, it is an efficient but gentle exfoliant. The antimicrobial activity of lactic acid aids in the preservation of cosmetic formulations and contributes to making these products more safe, skin-friendly and natural.

Cleaners and detergents

Biocide. Lactic acid is the right choice for safe and green antimicrobial cleaners. Being an acid, it already helps to combat harmful germs by simply lowering the pH. But more importantly, it actively works as a biocide and effectively reduces bacterial contamination. Combining lactic acid with suitable surfactants such as SLS, SLES or APG produces an even more potent antimicrobial performance due to synergistic effects.
The application spectrum of this gentle, biodegradable biocide ranges from antibacterial hand soaps, surface cleaners and teat dips to in-can preservation. It is a valuable ingredient for household as well as industrial and institutional formulations.

Descaling. Compared with other food acids, lactic acid demonstrates the best lime-dissolving properties. It is particularly effective as a descaler when used at elevated temperatures. Lactic acid is therefore the perfect ingredient for environmentally friendly surface cleaners, and given that it is an outstanding soap scum removal agent as well, this is all the more true. Additionally, it meets consumer expectations in terms of safe product handling and sustainability.

Derivatives

L(+)-lactic acid is a raw material used for making a broad range of other substances. Mineral lactates, such as calcium, magnesium or zinc lactates, can be used for nutritional purposes. Lactic acid short chain esters are green solvents and lactylates (long chain esters) can be used as emulsifiers in food and personal care products. Polylactic acid (PLA) is a promising biodegradable polymer. Last but not least, lactic acid is also used for the synthesis of chiral agrochemicals and pharmaceutical starting materials.

Lactics applications at a glance

	Application	Product	Function
Beverages	Alcoholic beverages	LA	Acidification of wort, wine and cider, flavour adjustment in bright beer and cider
	Non-alcoholic beverages	LA	Mild lingering acid flavour, taste improvement and shelf life extension in juice drinks and light beverages
		SL, PL	Electrolytes in health and sports drinks, off-taste masking of high intensity sweeteners
Food	Bakery	LA	Acidification and flavour improvement of sour dough
		SL, PL	Water binding in bread and cakes
	Confectionery	LA, LABF	Mild lingering acid flavour and reduction of gelatine degradation in soft candies
		SL, LABF	Buffering and reduction of sugar inversion in hard and soft candies
	Dairy	LA	Coagulation of Ricotta cheese, mild-tasting pH regulation in fresh cheese, yoghurt, butter and margarine
	Fruits, vegetables	LA	Enhancement of olive fermentation, mild-tasting pH regulation and shelf life extension of pickles, decontamination of fresh cut fruits/vegetables, acidification and flavour improvement of jams
	Meat, seafood	LA	Decontamination of casings and carcasses
		SL, PL, Blends	Pathogen control and shelf life extension of processed meat, poultry and seafood
	Ready meals	LA, LABF	Mild-tasting pH regulation and shelf life extension
		SL	Water binding and shelf life extension in noodles and rice
	Sauces, dressings, seasonings	LA, LABF, SL, Blends	Mild-tasting pH regulation and shelf life extension
	Snacks	LA, SL	Flavour support and pH adjustment
Feed & Pet Food	Feed	LA	Preservation, pathogen control, enhanced digestibility
	Pet food	LA, LABF	Preservation, acidification
		SL, PL, Blends	Preservation, pH adjustment, water binding
Non-Food	Chemicals	LA	Neutralisation in the ethoxylation process of surfactants
	Cleaners and detergents	LA	Disinfection, preservation, descaling
		SL, PL	Moisturisation in hand dishwashing liquids, buffering
	Derivatives	LA	Raw material for mineral lactates, esters and PLA
	Environmental remediation	SL	Hydrogen donation for the decontamination of soils and groundwater
	Metal surface treatment	LA	Sequestration
	Oil drilling	LA	Scale dissolution in oil well acidising
	Personal care	LA	Exfoliation, pH adjustment, preservation support
		SL, PL	Humectancy, moisturisation in rinse-off and leave-on products
	Pest control	LA	Attractant in mosquito traps
	Textile, leather	LA	pH adjustment, deliming in leather tanning
	Tobacco	LA	Acidification, taste enhancement

Jungbunzlauer Group

Jungbunzlauer is represented in all major markets. Our global network of sales companies and distributors covers more than 130 countries.

North America

Europe
(incl. Africa and Middle East)

Latin America

Asia & Pacific

- SALES OFFICE
- PRODUCTION SITE
- PRODUCTION SITE / SALES OFFICE
- APPLICATION TECHNOLOGY CENTER

Jungbunzlauer is a world leading producer of biodegradable ingredients of natural origin. The Swiss-based, international company's roots date back to 1867. Today, Jungbunzlauer specialises in citric acid, biogums, gluconates, lactics, specialties, special salts and sweeteners for the food, beverage, pharmaceutical and cosmetic industry as well as for various other industrial applications.

Jungbunzlauer's products are manufactured using natural fermentation processes, based on renewable raw materials.

All our products can be used, transported and disposed of in a secure and ecologically safe way. The Group operates manufacturing plants in Austria, Canada, France and Germany.

A worldwide network of sales companies and distributors with a thorough understanding of target markets and client requirements underlies Jungbunzlauer's strong market and customer focus. Committed to its rigorous quality standards, Jungbunzlauer guarantees for the excellence and sustainability of its products and services.

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