

# Dairy

FUNCTIONAL INGREDIENTS BY CORBION



# Functional ingredients by Corbion



## Acidification

Lactic acid is the acidifier of choice for low pH dairy products – just like nature intended. Whether it's through classical fermentation techniques, or by means of direct acidification, low pH dairy products benefit from the addition of lactic acid due to its significant contribution to the flavor profile. How can you achieve a more efficient, cost-effective production process and superior product quality through acidification? This is where Corbion can help.

### Direct acidification

Achieving the desired flavor profile, viscosity, mouthfeel, and protein stability requires a deep understanding of how acid addition impacts products and processes. The PURAC® lactic acid portfolio provides an optimal solution, both in terms of flavor and functionality. Lactic acid is ideal for a well-controlled pH decrease.

### Combined acidification

Using live cultures in your dairy products, but want to optimize output and increase capacity? Combining fermentation with acid addition is the way forward. The best way to achieve this depends on the product, process, culture, and more. Corbion can help you identify the ideal combination.

### Preservation

The addition of lactic acid inhibits the growth of micro-organisms by decreasing the pH of the food application. However, a drop in pH is not the only benefit of lactic acid. It also contributes to a reduction in water activity (aw). Alongside these classic hurdles, a lower pH affects the heat sensitivity of bacteria, enhancing the efficacy of heat treatments.

## Corbion in dairy



Acidification



Reduced sodium



Fortification



Optimization



Taste



Shelf life



Safety



Label-friendly



## Reduced sodium

### Putting salt on hold

PuraQ® Arome NA4 is a label-friendly natural flavor for reduced sodium applications that complements cheese flavors extremely well. This award-winning technology reduces sodium levels up to 30% in processed cheese. Cheese is a main contributor to sodium intake within the dairy category, and so far, salt reduction has proven to be a multi-dimensional topic, as it influences structure, taste and shelf life. PuraQ Arome NA4 will also contribute to the preservation system, minimizing the negative impact of salt reduction. [Figure 1](#) indicates the potential of PuraQ Arome NA4 in a typical processed cheese.

### Salt reduction in full-fat processed cheese

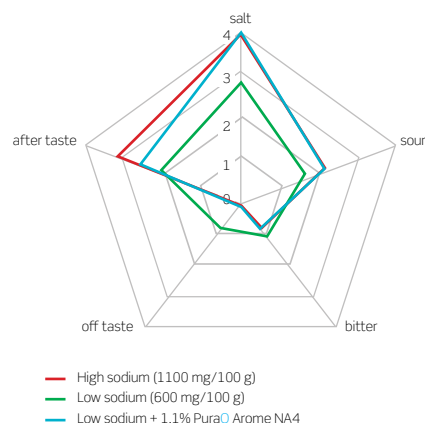


Figure 1



## Fortification

### Mineral fortification

Delivering high concentrations of bioavailable minerals, while limiting the impact on taste and mouthfeel, is crucial when fortifying dairy products. The lactate and gluconate-based minerals that Corbion supplies offer high bioavailability, high solubility and a neutral taste, enabling formulators to reach high mineral contents. PURACAL® QStable is specially developed for calcium fortification of neutral pH beverages containing proteins like milk, soy milk and other dairy alternatives. This innovative calcium source allows producers to fortify this type of beverages with solid stability and a smooth mouthfeel.

Growing demand for smaller serving sizes of fortified yogurt and acidified dairy drinks increases the need for highly soluble minerals that can meet nutritional profiles. In addition, fortification of dairy products is often implemented at fruit preparation stage, where (due to high brix levels) fortification ingredients must be highly soluble. Corbion offers a wide range of highly soluble minerals based on lactate and gluconate, such as PURACAL®, GLUCONAL® and PURAMEX®. A comparison in solubility of mineral salts (e.g. calcium salts) is shown in [Figure 2](#).

### Vitamin and mineral premixes

Corbion offers North American dairy producers vitamin and mineral blends under the Nutrivan® brand name. Tailored to meet unique needs, Nutrivan® helps fortify dairy products while benefitting from reduced time, cost and inconvenience in production.

### Solubility comparison of calcium salts

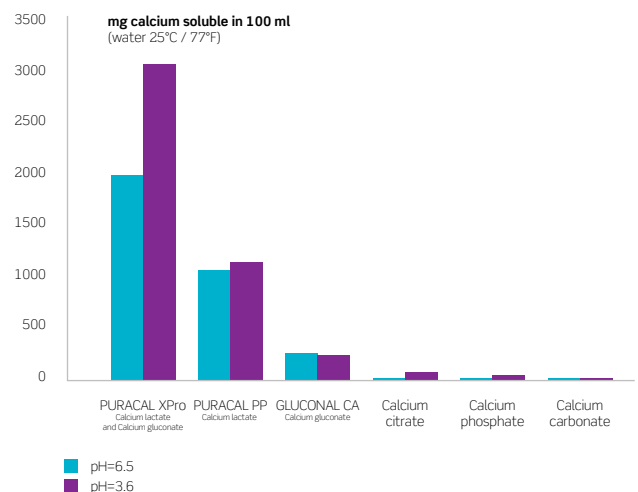


Figure 2

## Product and process optimization

In the current dairy market, speed, quality and cost efficiency are essential for success. Corbion products deliver the highest quality more efficiently.

### Control acidification

Traditionally, fermentation through cultures is used to set the pH of many dairy products. For applications, such as fresh cheese, direct acidification offers great benefits in terms of efficiency and consistency. PURAC lactic acid has the highest quality to ensure optimum production. In fact, these benefits are so significant that even in traditional cultured products, such as yogurt or hard cheeses, hybrid processes are used to combine the benefits of fermentation and direct acidification by PURAC lactic acid.

### Firming texture

Calcium interacts with both proteins and hydrocolloids. In some cases, using a highly soluble calcium lactate to interact with the hydrocolloids (pectin) present in fruit preparations, can generate significant cost savings. In yogurt, where both

calcium and lactic acid are present, using PURACAL calcium lactate is a more effective and natural solution than other calcium sources.

### Powdered dairy blends

PURAC Powder can be used to enhance dairy flavor in dry, dairy-based products. For example, cheese flavors, which are often costly, can be partially replaced with PURAC Powder to maintain a rich dairy flavor. It also allows dairy blenders to set specific flavor and pH profiles. PURAC Powder - a lactic acid on a calcium lactate carrier - has a clean, characteristic lactic acid flavor.

### Flavor enhancement







Lactic acid is naturally present in dairy products and is therefore a perfect fit. In low-fat varieties of dairy products, where the rich dairy flavor and microbiological stability often decreases due to the low fat content, PURAC can be added to compensate for the flavor loss, resulting in a healthy dairy product, full of flavor.

## Food safety and shelf life

Corbion's portfolio is designed to incorporate optimal hurdles to make foods, like dairy products, safe and shelf-stable. In addition to being an effective acidulant, PURAC (lactic acid) and PURASAL® (sodium lactate/potassium lactate) also offer important antimicrobial properties. Our *OptiForm*® range of optimized blends of organic acids/salts, is effective against a wide range of bacteria, including *Listeria monocytogenes* and *Pseudomonas*. Corbion has also developed a natural, clean label portfolio with multifunctional ingredients, Verdad®, that can help in keeping food fresh for longer.

Specifically to support our customers with the challenges of *Listeria* control, Corbion has developed a predictive model, in addition to our dedicated range of products to control the growth of *Listeria* - the *Listeria* Control Model. By filling in the product parameters (aw, pH, added salt, etc.), the model gives a good indication of pathogen growth, with or without a Corbion solution.

Interested in predictive micro-modeling? Contact us and find out how you can get access to the online version of the *Listeria* Control Model.

	 Acidification and pH regulation	 Reduced sodium	 Fortification	 Optimization	 Taste	 Safety and Shelf life
PURAC® / PURASAL®	✓			✓	✓	✓
PURACAL®			✓	✓		
Gluconal®/ Puramex®			✓			
PuraQ® Arome		✓			✓	
OptiForm®						✓
Verdad®						✓





## Flavor enhancement in dairy

Dairy products, in all forms, are growing in popularity throughout the world. From fresh liquid yoghurt to long-ripened cheeses and ice cream, dairy products are as diverse as they are delicious. However, with the undeniable eating pleasure of dairy products come some challenges also, such as issues relating to transportation and storage, freshness, shelf life and flavor adaptation to meet local taste preferences. Spray drying dairy components and dry blending technologies are just some of the options to help overcome these difficulties. With Corbion, you can now add another dimension to this solution: Lactic acid powder – a natural flavor enhancer with a neutral acidic dairy taste profile, delivered in a stable, pure powder form to help you unleash the power of powder in dairy.

### Flavor enhancement

The flavorings industry has already discovered the potential of PURAC® powder (as a carrier for its cheese flavors). Now it's time for the dairy sector to unlock the full potential of taste creation with lactic acid. Various components, such as salt, are known to boost flavor perception. Using lactic acid, you can create creamier, more pronounced, fuller taste profiles in instant dairy applications that range from fruit-flavored milkshakes, ice-cream and cheese dips to yoghurt drinks and more.

### Cost-effective

Compared to other organic acids, the natural match in flavor profile between lactic acid and dairy is evident. Consumers often dislike the more pungent acidity and specific fruitiness that come with other organic components, such as citric- or malic acids. Lactic acid's mild taste profile perfectly complements subtle milky, buttery and creamy dairy notes. This flavor enhancement solution opens up opportunities for both new product development and cost optimization. In some formulations, 10% of cheese content can be replaced with just 0.5% PURAC powder.



### The power of powder

As pure lactic acid is often manufactured in liquid form, it must be crystallized before it can be used in powder applications. These crystals are often highly unstable, but Corbion's proprietary technology enables the production of an extremely pure and stable powdered lactic acid. Properties like hygroscopicity, particle size distribution and microbiological quality are all maintained to meet the stringent criteria of the dairy industry.

Dry blending PURAC Powder is simple and requires no special skills or equipment. It is, however, important to control overall hygroscopicity, as moisture migration from other components may cause lumping. Our powder experts are here to help if any issues arise.

### Enabling acidic dairy powdered mixes

No matter what the application, from neutral-mildly sour tastes to strong acid flavors, PURAC Powder will help you overcome the biggest hurdles in building your ideal flavor profile. PURAC Powder offers an ideal platform for boosting sweet and savory dairy tastes in dry blends, improving consumer experience at the same time as controlling costs.

### Taste profiles of strawberry-flavored milkshakes with different acids

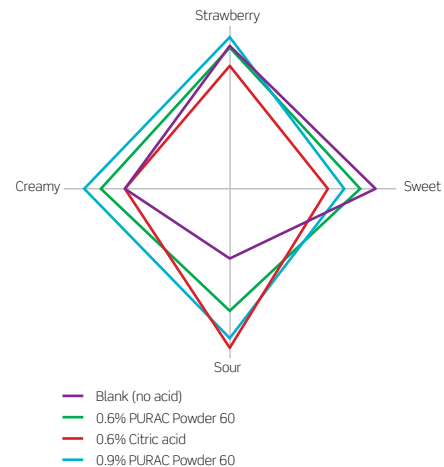
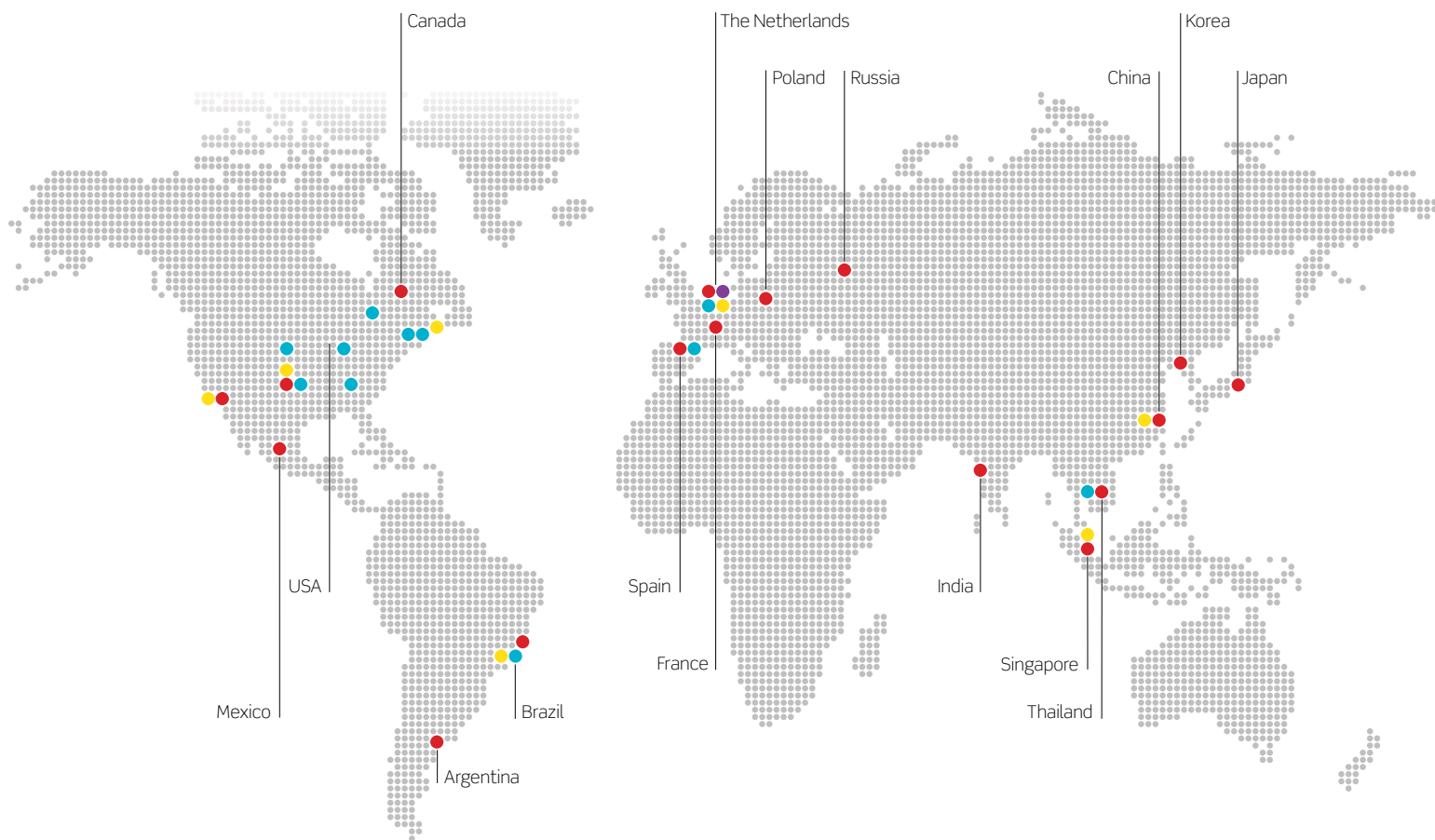


Figure 3

source: Corbion

# Global presence

● Corbion Headquarters ● Corbion Production Location ● Corbion Sales Office ● Corbion Innovation Center



[www.corbion.com/contact](http://www.corbion.com/contact)

## Corbion in Food

Corbion inspires manufacturers to craft foods that start flavorful, stay fresh and remain safe from production to consumption. Using sustainable solutions, we work side-by-side and empower customers to grow and create delicious foods, that consumers love and can safely enjoy with friends and family, just as we enjoy with ours.

## Corbion: designed by science, powered by nature, and delivered through dedication.

Corbion is the global market leader in lactic acid, lactic acid derivatives, and a leading company in emulsifiers, functional enzyme blends, minerals, vitamins and algae ingredients. We develop sustainable ingredient solutions to improve the quality of life for people today and for future generations. For over 100 years, we have been uncompromising in our commitment to safety, quality, innovation and performance. Drawing on our deep application and product knowledge, we work side-by-side with customers to make our cutting edge technologies work for them. Our solutions help differentiate products in markets such as food, home & personal care, animal nutrition, pharmaceuticals, medical devices, and bioplastics. In 2016, Corbion generated annual sales of € 911.3 million and had a workforce of 1,684 FTE. Corbion is listed on Euronext Amsterdam.

For more information: [www.corbion.com](http://www.corbion.com)



Interested in our solutions? [Go to corbion.com/dairy](http://Go to corbion.com/dairy)



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