

GUEST COLUMNIST *CMN Exclusive!*

Perspective: Dairy Ingredients

Julien Gadbin-Dherbécourt holds a Ph.D. in biochemistry/microbiology of cheese and is a specialist in the dairy industry. With experience working in one of the leading cheese companies and as a former goat farmer/cheesemaker, he currently serves as the dairy culture and technology expert at Lallemand Specialty Cultures.

Bioprotective cultures help to inhibit spoilage, contamination

From inhibiting food spoilage to preventing harmful contamination, bioprotective cultures offer a natural solution to address a significant challenge in the agri-food sector. This challenge has arisen due to the growing limitations on the use of conventional microbiological barriers. Bioprotection refers to the improved food safety and extended shelf life of foods achieved using indigenous and/or intentionally added microflora. These microflorae compete with spoilage microorganisms and produce antimicrobial metabolites that help inhibit the growth of pathogens and spoilage microorganisms.

• Different types of spoilage in the dairy industry

There are two common causes of food and beverage spoilage. The first type is alteration flora, often consisting of fungi such as yeast and molds. These organisms impact the color, flavor and texture of the product, with limited health impact. They are widespread, rapidly colonize any area and have lower

nutritional requirements compared to bacteria. Fungi, including brown/dark molds that cover cheese, can enzymatically digest the product, leading to complete changes in organoleptic properties such as texture, color and taste, often resulting in repulsive flavors.

The second type of spoilage is related to the presence of pathogens such as *Listeria*, *E. coli*, *Salmonella* and certain molds. These pathogens can cause more serious food safety issues. They may produce toxins that can lead to severe illness or even death in humans and animals, with symptoms ranging from digestive disorders to allergic reactions.

• *Listeria monocytogenes*: A concern in cheese production

Recent food recalls and outbreaks have highlighted the pressing concern of *Listeria monocytogenes* contamination in cheese within the dairy industry. This contamination has substantial consequences, including production losses and food poisoning among consumers. *Listeria monocytogenes* is a

ubiquitous bacterium found in various environments, including food, and has a strong capacity to persist and survive. Cheeses made from unpasteurized or raw milk are estimated to be 50 to 160 times more likely to cause *Listeria monocytogenes* infection compared to those made from pasteurized milk. While pasteurization kills the bacteria, products made from pasteurized milk can still become contaminated through cross-contamination during production processes (storage, transportation or handling) or from the environment.

To prevent milk contamination, it is crucial to monitor the health of the herd and the feed ration at the farm level. Silage should be closely monitored, with acidification controlled and contamination from the soil limited. Sick animals must be isolated promptly, and strict hygiene rules, particularly regarding the risk of fecal contamination, must be followed. Milking hygiene, milking machine cleaning protocols and rapid cooling of the milk are essential practices. Since *Listeria monocytogenes* can contaminate various types of food, many people frequently ingest small quantities of the bacterium without experiencing any symptoms. However, in susceptible populations such as pregnant women or immunocompromised individuals, complications can range from neurological sequelae to lethality.

• Bioprotection and the use of bioprotective cultures

Over the past three decades, numerous university studies have demonstrated that certain microorganisms naturally found in raw milk participate in the fermentative fight against *Listeria monocytogenes*, molds and yeast in food products, particularly cheese. Bioprotective cultures are carefully selected and tested to ensure their safety

and efficacy. They typically consist of lactic acid bacteria (LAB), such as *Lactococcus lactis*, *Lactobacillus spp.* and *Streptococcus spp.*, which are naturally present in many fermented foods and considered safe for human consumption. These cultures compete with pathogens for nutrients and produce organic acids (e.g., lactic acid), hydrogen peroxide, bacteriocins and other antimicrobial substances that inhibit the growth of spoilage and pathogenic microorganisms.

The main challenge with bioprotection is that it does not involve concentrated antibiotics or highly concentrated chemical agents. The cultures must grow and remain active during the process and/or shelf life, with sufficient action at the appropriate times without altering the properties of the final products, such as color, pH, texture and taste. Developing efficient bioprotective cultures requires robust screening tools, laboratory cheese models and comprehensive knowledge.

To advance to the next level, a complete integration of risk management in the “food and beverage chain” is necessary. This entails considering risks and implementing new solutions at every stage, from raw material production and storage to production lines, plants, packaging, storage and shipping. This approach is particularly relevant for industries transitioning from chemical protection to bioprotection, as it requires taking preventive actions at all potential sources of food spoilage to keep spoilage agents far away from the products. **CMN**

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NEWS / BUSINESS

American Dairy Products Institute restores full public access to its Ingredient Standards

ELMHURST, Ill. — The American Dairy Products Institute (ADPI) has announced it is restoring full public access to its ADPI Ingredient Standards, an extensive and ever-expanding library that encompasses many of the dairy industry’s broad offerings of commodity and value-added products.

ADPI notes its current range of Ingredient Standards, developed by technical and marketing experts from its member organizations, not only define fundamental dairy ingredients such as milk powders, but also a number of established or emerging ingredients that are on the competitive edge of functionality and nutrition, such as protein concentrates, isolates and specific bioactive protein and lipid fractions.

The ADPI catalog consists of more than 30 standards representing an even greater number of individual dairy

ingredients, from alpha-lactalbumin to whole milk powder. Additionally, ADPI says it currently has two new documents pending approval by its Standards Committee, with two more related standards immediately following those and two more in the development queue.

ADPI’s member organizations and staff for decades have committed to defining the products they make. ADPI says not only has it worked throughout its history to ensure its standards evolve with the ever-expanding mix of products, but it is continuing to make sure that the language and content of its standards — both new and legacy — are aligned with industry best practices, food safety requirements and quality systems controls. Every one of its legacy standards has been reviewed to ensure that it remains on-brand,

contemporary and fit for purpose.

For more information on ADPI Standards, contact Andy Powers,

N.Y. DPO announces dairy funding support

ALBANY, N.Y. — The New York State Department of Agriculture and Markets recently announced that the Dairy Promotion Order (DPO) Advisory Board has issued a request for applications for dairy research and promotion projects as part of its \$15.5 million checkoff fund.

The invitation solicits proposals for projects that market, promote and research New York-produced fluid milk and dairy products with the goal of expanding the types of dairy products available and increasing consumer demand for and consumption of New York dairy products.

Eligible applicants include non-profit

ADPI vice president of technical services, at apowers@adpi.org, or visit www.adpi.org. **CMN**

entities, research institutions and private businesses that are not affiliated with the DPO Advisory Board. Project applications may not promote a specific brand or trade name.

Applications must be submitted by Aug. 25. Applications and more information can be found at <https://agriculture.ny.gov/dairy/dairy-promotion-order>.

Funding is made available directly from New York state dairy producers through the New York State Dairy Promotion Order Act and is intended to help dairy farmers and processors further their reach to both domestic and international markets. **CMN**

