

# Spoiler alert

Spoilage is a persistent challenge in the F&B industry, often leading to economic losses and posing serious health risks. From oxygen and light exposure, temperature and moisture contact to enzymatic reactions and cross-contamination, the causative agents of spoilage are vast and varied. FoodBev's Phoebe Fraser takes a look at some of the innovative methods being used to reduce and prevent spoilage.

Spoilage is a metabolic process that results in the deterioration of a food or beverage product, making it unsuitable or unpleasant for consumption. Spoiled items may present a foul texture, flavour, aroma or appearance, and may also be dangerous or toxic to ingest.

Spoiled products may lead to the occurrence of foodborne illnesses, and bring about large-scale economic losses. The causes of food spoilage are varied. These include:

- The presence of microorganisms (including bacteria, yeast and mould)
- The presence of indigenous enzymes, such as catalase or proteinase
- Physical elements such as temperature, oxygen, moisture and pressure
- The presence of high protein, high fat and unhygienic handling

"As food and beverages are, for the most part, made from natural materials, degradation and spoilage are eventually inevitable," explained Chloe Downs, technical account manager at Prinova. "All natural materials have microorganisms inherently present, which, at low levels, are safe for human consumption. However, under certain conditions, they can multiply rapidly and make products unsafe to consume."

## Foodborne illnesses

The World Health Organization estimates that, globally, 600 million people (one in ten) fall ill from eating unsafe food each year, and that 420,000 die as a result.

"We have to be vigilant about the growth of pathogenic microorganisms, which cause disease to their hosts," Downs said. "The severity of the disease depends on the species and levels of the pathogen in question, but symptoms can range from bloating all the way through to fatality."

*Salmonella* from eggs and poultry, *Campylobacter* from raw milk and poultry, and *E.coli* from unpasteurised milk and undercooked meat are some of the most common foodborne pathogens and lead to symptoms such as fever, headache, nausea, vomiting, abdominal pain and diarrhoea.

*Listeria* – an infection caught through unpasteurised dairy products – can have severe and sometimes fatal consequences, particularly among infants,



children and the elderly, making it one of the most serious foodborne infections worldwide.

## Breaking the mould

"Moulds in particular are a good example as they may produce mycotoxins that can cause serious illness or even death in humans and animals," Julien Gadbin-Dherbécourt, dairy culture and technology expert at Lallemand, told FoodBev.

Gadbin-Dherbécourt highlights bioprotective cultures as an increasingly popular weapon in the war against food spoilage, providing a "natural answer" to this major challenge.

He explained: "Bioprotection refers to the enhanced food safety and shelf life of foods by indigenous and/or intentionally added microflora, with their microbiological competition and potential production of antimicrobial metabolites to help inhibit the growth of pathogens and spoilage microorganisms".

Lallemand, a global manufacturer of yeast, bacteria and other speciality ingredients, recently debuted its Lalcult Protect MC1 bioprotective culture to control yeast and the growth of mould in dairy products. The solution features the *Lactocaseibacillus paracasei* and *Lactiplantibacillus plantarum* culture strains – formerly classified as *Lactobacillus*.

Gadbin-Dherbécourt added: "In general, bioprotective *Lactobacilli* that control fungal growth derive their activities mainly from different acids that they are able to produce from sugars and proteins, such as lactic acid, acetic acid and phenyllactic acid. The spectrum and efficiency of action depend on the strain and the different compounds that it can produce under the specific technological conditions in each dairy product."

The result of years of studies, Lalcult Protect MC1 is favoured for its strong activity, ease of use and effectiveness in a range of applications, including in yogurt, sour cream, fresh cheese, ripened cheese, sliced and grated cheese, and plant-based analogues.