

BEFRESH™

PROTECTIVE CULTURES



5

KEY BENEFITS

- Inhibit *Clostridium*, yeasts and molds
- Shelf-life extension
- Clean-label

BIO-PROTECTIVE CULTURES

Fungal spoilage of food represents a major cause of concern for food manufacturers. The use of active bioprotective cultures against microbial contaminants have been achieved at Handary.

Dairy products, including cheese and yoghurts, are also susceptible to microbial attack. Yoghurts have been primarily targeted as they are liable to yeast growth due to their low pH, storage at refrigeration temperature and the presence of fruits in certain products. Cheese are also susceptible to spoilage by psychrotolerant molds capable of withstanding low oxygen environments such as *P. roqueforti*, and "late blowing" caused by *Clostridia*. Befresh™ AF and Befresh™ LL have been proven effective against both yeasts and molds in fresh and fermented dairy products, while Befresh™ AC containing *Lactobacillus lactis* is added together with the starter culture to prevent "late blowing" and off-flavor caused by *Clostridia* in cheese.

OUR BRANDS

BEFRESH™ AF
Antifungal cultures



BEFRESH™ LL
Antifungal LAB cultures



BEFRESH™ AC
Anti-Clostridium cultures



BEFRESH™ Protective cultures

Fresh fermented milk and cheese products contain a high level of nutrients, making it a healthy food choice with many dietary benefits. However, these dairy products have a very short shelf-life due to their microbiological changes especially caused by yeasts and molds, which very often leads to large economic losses. Although traditional chemical preservatives - potassium sorbate has a good preservation

effect, but it has negative impacts on organoleptic qualities. Befresh™ AF and Befresh™ LL are especially produced to control the growth of yeast & mold in fresh fermented milk products and fresh cheese, while Befresh™ AC is a clean-label *Lactobacillus lactis* culture added together with the starter culture to prevent "late blowing" and off-flavor caused by *Clostridia* in cheese.

Table 1 Befresh™ Applications

Ingredient	Dairy	Applications	Benefits	Dosage
Befresh™ AF	Dairy	Yoghurt	Control the growth of yeast & mold	10-20 u/1,000L milk
		Sour cream		10-20 u/1,000L milk
Befresh™ LL		Semi-/hard cheese	Control the growth of yeast & mold	20-30 g/1,000L milk
Befresh™ AC		Fresh/white/yellow cheese	Growth control of <i>Clostridium</i>	20-30 u/1,000L milk

Yoghurt

Yoghurt made with and without Befresh™ AF were held for 60 days at 5°C. **Figure 1** shows the yeast spoilage was inhibited, which leads to "late-blowing", off-flavors and off-odors during the shelf-life of yoghurt.

Figure 2 shows that the mold such as *Penicillium* spp. was inhibited, which causes highly visible and pigmented growth in yoghurt.

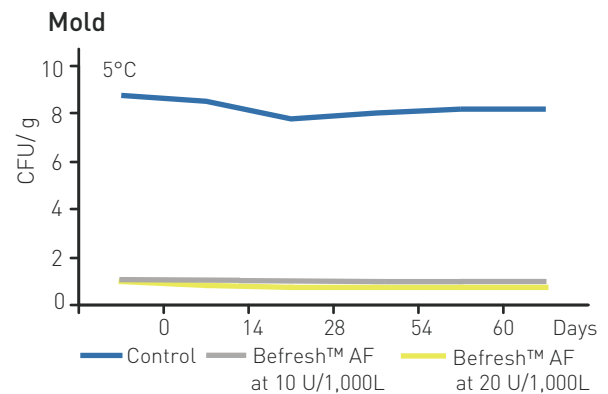
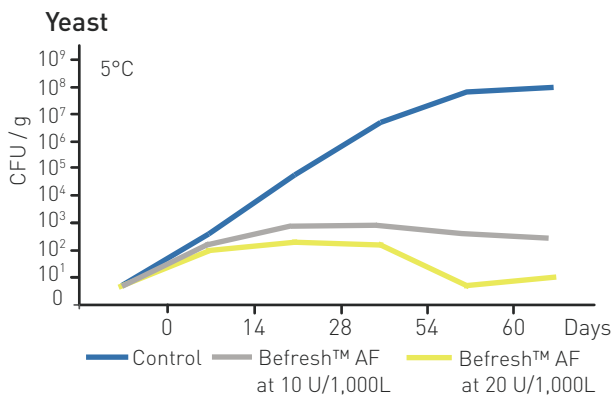
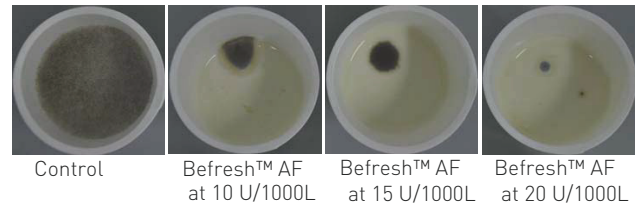


Figure 1 Yoghurt

Picture 1 shows the inhibiting effect of Befresh™ AF on molds in yoghurt (7 days at 25°C, inoculated 1-2 mold spores on the surface of each sample).

Figure 2 Yoghurt



Yellow cheese

Picture 2 shows the inhibiting effect of Befresh™ LL on molds on sliced yellow cheese. (16 days at 25°C).

Picture 1 Yoghurt



Figure 3 and **Picture 3** show that the *Clostridium* was inhibited, which causes 'late blowing' in yellow cheese.

Clostridium

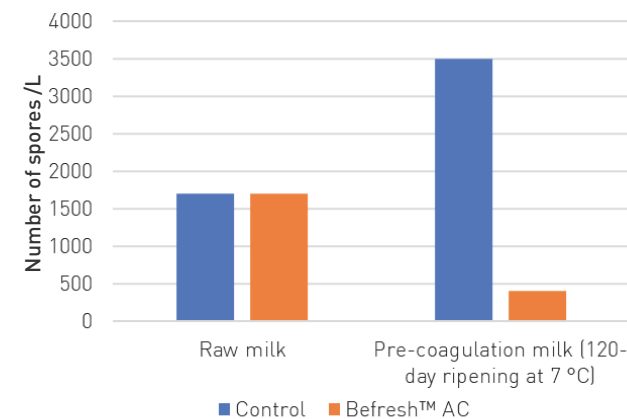
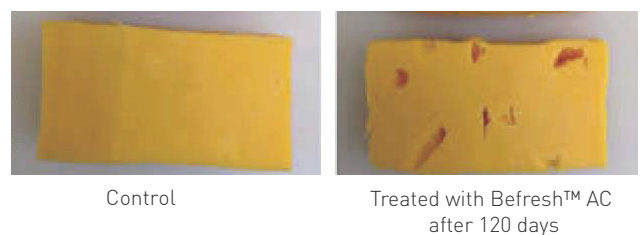


Figure 3 Yellow cheese

Picture 2 Yoghurt



Picture 3 Yellow cheese