



... A WAY TO NATURALLY PRESERVE YOUR CHEESE

DAIRY SAFE™ CONCEPT



DAIRY SAFE™ CONCEPT

... A WAY TO NATURALLY PRESERVE YOUR CHEESE

Marketing information

Life style and eating habits

Nowadays consumers are concerned about the way their food is being produced. The negative effects of the bio-industry and animal diseases enforce the trend of increased consciousness among consumers. Health and wellness concerns have led to a growing number of consumers who embrace natural and organic foods without E-numbers or additives.

Due to increased concern about over-processed foods, which contains excessive artificial ingredients, a strong focus on product naturalness can be perceived. More and more consumers are concerned about the environmental sustainability and therefore support fair-trade, ethically and locally sourced products.

Within the cheese industry this trend has resulted in a strong demand towards the production of natural and organic cheeses, which are free from additives and preservatives. Cheese is already seen as a naturally produced product. And therefore cheese is especially suitable to be positioned as organic. Natural, organic cheese is associated with healthy cheese. As consumers are not interested to sacrifice high quality taste for health purposes, natural and organic cheese needs to have a good taste, smell and colour.

When looking at the organic milk production in Europe, a strong growth has been observed. In particular in Germany, Denmark, Austria and the UK. In figure 1 the production and growth percentage of organic milk within the EU is shown.

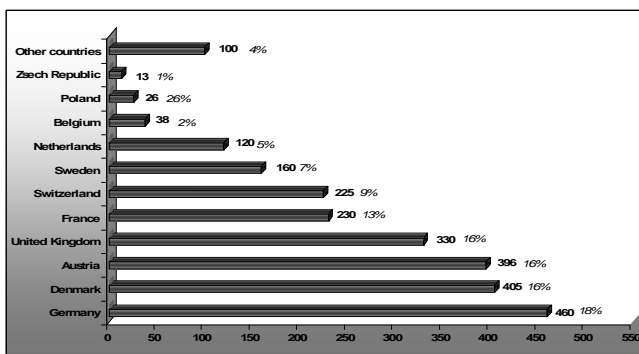


Figure 1. Production of organic milk in the EU (ZMP/Bioland)

Target group

The Dairy Safe™ cultures are especially developed for the group of consumers who is paying great value to traditionally made organic products without artificial chemical additives. Besides health- and environment conscious adults, infants are also becoming an important target group. To produce infant formulas nitrate-free whey is needed. For producing cheese without nitrate Dairy Safe™ cultures are developed.

Proposition Dairy Safe™ cultures

The Dairy Safe™ cultures enable the production of cheese without the addition of preservative additives. When a nitrate-free preservative is desired for the development of an organic cheese Dairy Safe™ cultures are very suitable. Furthermore, Dairy Safe™ cultures are used for the production of local farmer's or goat cheeses and for improving the quality of cheese which is made with milk of varying quality. Finally, the health trend towards cheese with lower salt content makes the use of additional preservatives necessary to prevent taste and texture deviations. In all cases the cheese produced with Dairy Safe™ cultures result in good taste and texture characteristics.

Advantages Dairy Safe™ cultures

Various aspects are responsible for the success of Dairy Safe™ cultures:

- natural preservation: no additives like nitrate or lysozyme are necessary to prevent against late blowing defect (*Cl. Tyrobutyricum*);
- good taste and texture;
- cost effective;
- easily applied system;
- less risk of product losses;
- applicable to farmer's cheese production;
- for all types off milk (cow, goat, sheep etc.);
- robust system with different taste profiles for your specific situation.

DAIRY SAFE™ CONCEPT

... A WAY TO NATURALLY PRESERVE YOUR CHEESE

Technological information

Working mechanism of Dairy Safe™ cultures

To protect cheeses from late blowing defects, CSK developed together with NIZO food research a number of cultures with bio protective functions. Currently this is commonly used as alternative to the addition of NaNO₃ or lysozyme. These Dairy Safe™ cultures have protective properties and are particularly effective against Gram-positive bacteria and bacterial spores. They are very suitable for production of cheeses where growth of *Clostridium tyrobutyricum* must be inhibited in order to prevent butyric acid fermentation. The working mechanism of several inhibitors of butyric acid fermentation is different for vegetative cells and spores of bacteria. In case of vegetative cells, the cell membrane is affected. This results in the lysis of the gram-positive bacteria. In the case of spores, it appears that these cultures affect the outgrowth of the spore form into a vegetative cell.

Figure 2 shows schematically which stage of the spore germination is affected by Dairy Safe™ cultures.

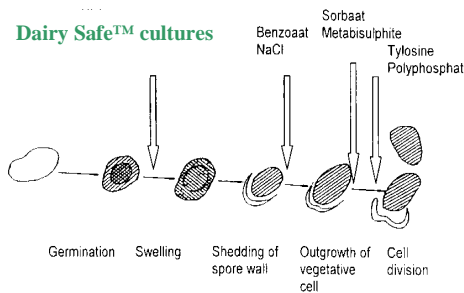


Figure 2. Stages of spore germination of *Cl. tyrobutyricum*

The growth inhibiting activity of micro organisms is usually expressed in an MIC value (minimal inhibitory concentration). It represents the minimal concentration of the active substance that has a growth inhibiting effect on a specific micro organism. In table 1 the MIC value of the active substance is shown for some of the micro organisms that occur frequently in the dairy industry. It shows that the lactic acid bacteria that are usually used, such as *Streptococcus thermophilus* and *Lactococcus lactis* ssp. *lactis* are very sensitive to the active substance. Apart from these, *Cl. tyrobutyricum*, *B. cereus* and *Listeria*, among others, also have a similar sensitivity to the active substance. Gram-negative micro organisms such as *Enterobacteriaceae*, including *Salmonellae* are, however, not inhibited. In the case of lactobacilli and propionic acid bacteria, the inhibition is very much dependent on the specific strains.

Micro organism	MIC (ug/Litre)
<i>Micrococcus flavus</i>	15
<i>Streptococcus thermophilus</i>	30
<i>Lactococcus lactis</i>	50
<i>Clostridium tyrobutyricum</i>	50-200
<i>Bacillus cereus</i>	100-300
<i>Listeria monocytogenes</i>	300-1000
<i>Staphylococcus aureus</i>	1000

Table 1. MIC value

DAIRY SAFE™ CONCEPT

... A WAY TO NATURALLY PRESERVE YOUR CHEESE

Dairy Safe™ culture range

Beside defined mesophilic cultures, which are responsible for bio protection, acidification and eye formation, most of the cultures are combined with a thermophilic debittering strain or a mesophilic debittering strain. In the table below the different cultures with their main characteristics are described.

Dairy Safe™ range	Debit-tering	Acidifi-cation	Gas formation
D 110		fast	fast
D 509		fast	fast
D 730		fast	medium/fast
D 117	T*	fast	fast
D 507	T*	fast	fast
D 737	T*	fast	medium/fast
D 502	M	fast	fast

T: thermophilic debittering strain; M: mesophilic debittering strain

Table 2. Characteristics of Dairy Safe™ cultures

Consultancy

Our experts can provide you with further advice on the use of the Dairy Safe™ cultures to develop your desired cheese concept. In close collaboration they will give the optimal support to create new products or improve you existing product range.

*This publication is solely intended for information purposes.
CSK food enrichment cannot be held liable for the contents.
This specifically applies in cases where its products are used in violation with prevailing legislation and rules and/or licenses*