

## The MESCH process in detail

Steam-Sterilizing means the reduction or killing of microorganisms. This decreases the risks posed by germs. We adhere to the guide values for microbial counts that are recommended in Germany by the German Society for Microbiology (DGHM).

Normal microbial count levels can be up to  $10^7$  KBE/g. A microbial count of up to  $10^3$  KBE/g is considered low in germs, up to  $10^4$  KBE/g as containing few germs. Steam-sterilized products should contain few germs, but should not be sterile. Sterile products lack aromas and flavour-giving properties.

The **MESCH germ reduction process** is done in hermetically sealed, perfectly hygienic chambers. The packaging as a potential host of further microbial contamination is also treated.

Our degermination process takes advantage of the **gentle and effective possibilities of physics** and the resulting natural reactions without adding something or taking something away. We only use the methods of the science in the form of temperature, pressure, water and vacuum – **no radiation or chemicals**.

The individual steps of the process are daisy-chained and can be flexibly controlled. Depending on the degree to which the numbers of germs are to be reduced we determine vacuum, temperature, saturated vapour and subsequent drying **for each product individually**.

- **Phase 1:** A vacuum is created, which means that no air is contained in the chamber and germ-containing air gaps in the product are eliminated.
- **Phase 2:** The rising temperature in the chamber and the heating of the product eliminates further germs.
- **Phase 3:** In this phase, saturated vapour between 80°C and 121°C is added, which transfers its heat onto the product; germs are killed and spores reduced. Both temperature and exposure time influence the result of the germ reduction process.
- **Phase 4:** Once the product has reached the defined temperature, it is dried again by means of pressure relief and the vacuum in the chamber. During this drying phase the aw value (water activity value) is lowered and potential further microbial growth after the process is prevented.
- **Phase 5:** At the end of the process the chamber is ventilated through a sterile filter and the temperature of the product is lowered.

Unlike continuous processes, product loss and cross-contamination with other products during the process are impossible – an important factor for cost calculators and analysts.

Our **results** are impressive (see the example “fennel”). Especially pathogenic germs such as salmonella and E. coli, coliform germs and mould **are no longer detectable**.

Spore formers such as Bacillus cereus and sulphite-reducing clostridia and other thermophile spore formers of a natural origin are reduced, but cannot be fully eliminated in all cases.

Fennel	Before germ reduction	After germ reduction
Microbial count	$1.1 \times 10^6$ KBE/g	$2.2 \times 10^3$ KBE/g
E.coli	$<10^2$ KBE/g	$<10$ KBE/g
Coliform germs	$5.2 \times 10^3$ KBE/g	$<10$ KBE/g
Staph aureus	$10^2$ KBE/g	$<10$ KBE/g
Bacillus cereus	10 KBE/g	$<10$ KBE/g
Salmonella	n.n./25 g	n.n./25 g
Mould	$3.6 \times 10^4$ KBE/g	$<10$ KBE/g
Moisture	10.9 %	11.8 %
Essential oil	1.8 ml/100 g	1.6 ml/100 g

(CFU/g = colony forming units per gram)