

Industrial Solutions
Electrolysis & Polymers Technologies

Uhde High Pressure Technologies GmbH
Buschmuehlenstr. 20
58093 Hagen, Germany
P: +49 2331 967-0
F: +49 2331 967-370
www.uhde-hpt.com

Industrial Solutions

Fresh by
high pressure

Meat and sausages



thyssenkrupp



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High pressure processing (HPP) – Food preservation 2.0

The process – quick, safe and naturally sustainable

Advantages of high pressure processing (HPP)

The high pressure processing of meat and sausages denaturises pathogenetic germs and fungi. Nevertheless, that non-thermal process preserves vitamins, flavouring and colour pigments. As food is processed in the final packaging, that process meets maximum hygienic requirements, because a later contamination is excluded. Additives are not used; thus the product maintains its pure and biological state.

Application areas

A higher water activity is necessary for the HPP; therefore, meat products are especially appropriate. As the product is not heated up, taste and structure remain natural. The consumer receives a gently and - most of all - safely and durably made product.

Results

In case of raw meat the HPP influences the myoglobin which changes colour in compliance with pressure (Fig. 1). However, pressure does not influence the colour, structure and vitamins of processed meat like boiling, cooking or pickling products - properties remain unaltered. In addition, the microscopical tests show that the germs are reduced distinctly. (Example graphical diagram 1: fresh cold cuts and shelf-life tests at 5 °C). They meet the benchmarks issued by the German Society for Hygiene and Microbiology (DGHM).

Examples of products

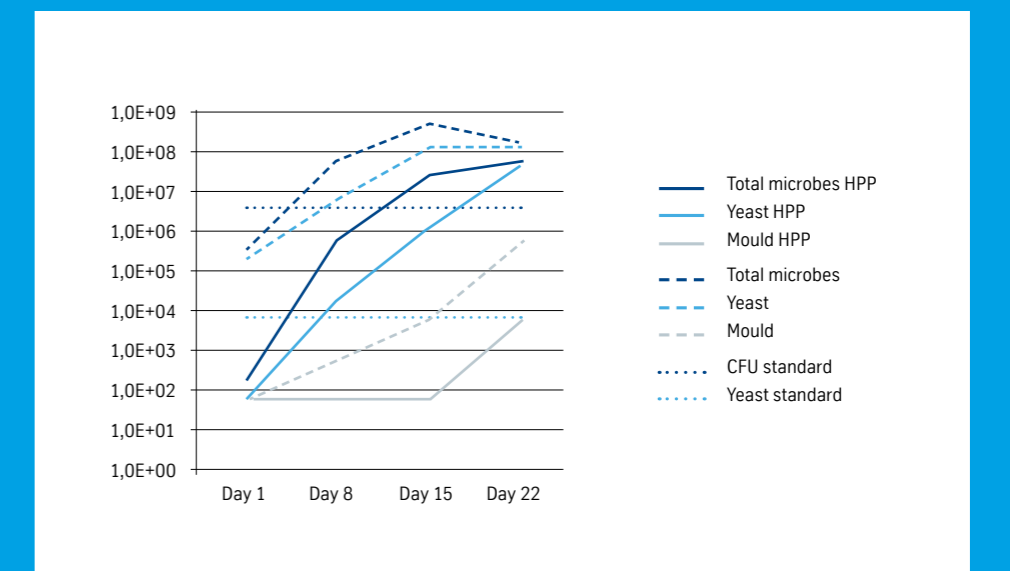
The HPP processing is optimally appropriate for the extension of shelf life of sausage and ham; thus, it is made sure that detrimental



Fig. 1: Effects of HPP on colour of raw meat

Top left: Salami unprocessed
Top right: Salami 6,000 bars/ 3 min
Middle left: Blood sausage unprocessed
Middle right: Blood sausage 6,000 bars / 3 min
Bottom left: Ham unprocessed
Bottom right: Ham 6,000 bars/ 3 min

Graphical illustration 1: Denaturisation of yeasts and moulds following the HPP processing of fresh, not industrially made Mortadella



germs are denaturised. This applies to both, cold cuts and piece goods. Even today many meat processors worldwide apply HPP to gently and safely process their products being worth several billions of Euros.

Packing materials

The product is compressed by approx. 15 % at a pressure of 6,000 bars; the same also applies to the packing material. Therefore, flexible vacuum or MAP packing materials on the basis of PE, PET or EVON are appropriate for that process. The portion of air within the packing material full compression is implemented during the processing, which has no influence on product or packing material.

The process

HPP offers the chance to process products in their final packing material. They are put in a basket for processing - either by a machine or manually. Attention has to be paid that the capacity of the basket is exploited optimally; if required, the packing design has to be adapted to the basket. Baskets are transported automatically into the HP vessel. Following that, it enters the plant and is filled with water to make the remaining air escape. Afterwards, the HP pumps start operations.

Pressure in the vessel is increased to 6,000 bars. That value approximately conforms to the weight force exerted by three Jumbo Jets on the surface of a smartphone. After a dwell time of approx. three minutes, which

is set product-specifically, the plant relieves the pressure exerted. The water in the vessel is drained and the vessel returns to its initial position. The subsequent cycle may begin.

Necessary supply

The HPP process demands water in potable water quality. That water can be reused after each cycle. Therefore, wastewater or waste products do not occur. The amount of electricity needed varies in dependence on the plant capacity.

