

Pure air due to ultrafine drops

Dry cold-fogging ensures hygienic indoor air and germ-free surfaces in the meat industry – quickly, safely and lastingly. Martin Urbanek explains the procedure and how it works.

► **Mold and germs** can pose substantial quality risks in the industry. Although they are naturally found in the air and do not necessarily cause health problems in humans, such microorganisms can nevertheless cause significant problems under certain circumstances or in elevated concentrations. In the food industry, molds present a latent danger and risk for product safety. Due to increased hygiene requirements in the food industry, elimination of microorganisms such as bacteria, molds and viruses is increasingly important.

Cold dry-fogging is an effective method for disinfecting both air as well as surfaces in meat production facilities – even where mechanical cleaning is impossible or inadequate (cable trays, cracks and gaps, undersides of machines). This procedure minimizes product failure, increases quality, protects against diseases and can be used during the entire production process. It is also ideal for small-scale and industrial slaughtering and cutting plants as well as processing and storage rooms.

Anyone who has ever tried to fight mold knows how tenacious it is. Different methods are available to en-

sure that spores can't get a foothold in the first place. Fundamentally, mold can grow on all surfaces. Work surfaces, however, are hardly ever affected because they are cleaned daily and thus do not offer these microorganisms a suitable habitat. Ceilings, walls, joints, inaccessible surfaces behind equipment and machinery or hidden places such as cooling units, however, offer much better living conditions because they are not generally cleaned daily, or because they are difficult to clean completely. This enables molds to grow unnoticed and unhindered.

Preventive measures

As is so often the case, the best protection is prevention. Structural measures can be used to create a climate in which molds can't grow. These microorganisms always need water or moisture to live. If this element is missing, so is mold. Unfortunately, it can often be difficult to create a dry climate. In many areas of the food industry, condensation or water accumulation is a natural part of the production process. In such cases, even optimal structural conditions cannot prevent mold growth. This means that the microorganisms must be actively fought.

Active measures

■ **Chemical methods:** These can be used quickly and are relatively inexpensive. However, most chemical methods must be constantly repeated in order to permanently prevent mold growth. This causes regular costs. The disadvantages of these methods are the often long exposure times that must be observed. Rooms cannot be used during treatment and machines must remain idle. In addition, they are not uncontroversial due to the health risks they may create.

■ **Mold-prevention paints:** If only walls and ceilings are infested by mold, mold-prevention paints offer temporary protection. Classical mold-prevention paints incorporate fungicides, but over time, these biocides wash out so that the surfaces must often be repainted. In addition, some paints contain nanoscale silver. Results have shown, however, that the silver is also eliminated over time and no longer works.

■ **Epatherm board:** A further method for coating walls is using so-called "epatherm" sheets. Made of calcium silicate, these sheets absorb much moisture and prevent water films from developing on surfaces. A standard sheet absorbs circa 28 l of moisture per square meter and dissipates it slowly to the ambient air again.

■ **Coating:** The same effect is also achieved by BioRid coating, which is employed for example by Vallovapor GmbH (Berlin, Germany) to fight mold in



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the industrial, clinic, gastronomy and living sectors. This can also bind moisture and dissipate it again slowly, which ensures that moisture does not accumulate in the first place, or keeps the moisture level of the room low. Surfaces remain dry and there is no more breeding environment for microorganisms. The effect is the same as with epatherm sheets, but this coating is much less expensive. Optically, the coating is more inconspicuous than the sheets. Both procedures are able to physically change the room climate so as to prevent mold. In contrast to structural measures that must be considered during planning or renovation, wall sheets or coatings can be added at a later date. The advantage of these coatings is their sustainability. In addition, they function at the purely physical level due to the perlite mineral in them; nothing oxidizes into the ambient air. Substances can neither leach out nor be changed through water absorption or dissipation.

■ **Cold dry-fogging:** Another active measure for combating molds and germs is cold dry-fogging with a biocide that is classified as non-hazardous. It is applied with a special atomizer that spreads the finest possible droplets in the air – so fine that no moisture or humidity develops, but a fine aerosol. During this procedure, the aerosol moistens all surfaces and the biocide covers ceilings and walls as well as machines, vents and ventilation ducts, air conditioners or heat exchangers. Martin Urbanek, Managing Director of Vallovapor GmbH, ensures that this method enables 100 percent coverage because the aerosol does not immediately drop to the floor but remains in the air. It takes between a quarter and a half an hour to treat a room. Subsequently, the aerosol remains in the room for one to two hours. After this, it can be used again as normal.

The aerosol moistens all surfaces and the biocide covers ceilings, walls as well as machines, vents and ventilation ducts, air conditioners or heat exchangers.

Mold spores and bacteria die

With the ValloFog disinfectant (a polymer electrolyte), a very thin, invisible film remains on all surfaces. This effect is desirable because the film creates a germ-free surface and also kills mold spores, bacteria, viruses and other microorganisms that come into contact with the film, achieving long-lasting results. Only surfaces that come into direct contact with foods must be rinsed with warm water. The film remains on all other surfaces such as pipes, air conditioners or machines.

The ValloFog disinfectant is a biocide based on the polymer poly-hexa-methylene guanidine hydrochloride (PHMGH). The active ingredient has a positively charged surface that blocks the ion channels on the surface of the microorganisms and causes their death. Its MOA (Mode of Action) is thus physical. As a cationic polymer, the active substance docks onto the anionically charged cell walls and membranes and destroys these, making the cells no longer viable. ValloFog is a developed cationic polymer that strongly binds to cell walls and membranes due to its positive particle charge. This then destroys the membrane function by opening the negatively charged part of the membrane and penetrating the cell. The cell then loses its osmosis-regulating and physiological functions. Hydrophilic pores develop; the cell's protein function is destroyed, which finally leads to cell disintegration. The cationic polymer is non-toxic for humans and animals and registered with BAUA and BfR in Germany.

In order for cold dry-fogging to achieve the desired effect, the room geometry and size must be taken into account; machines may need to be specially adjusted and the active ingredient individually dosed. This requires experienced experts. The fields of application in the industry range from disinfection of transport or refrigerated vehicles up to complete production halls including ventilation systems.

Effective for months

Urbanek's experiences show that dry-fogging is sufficient for achieving good results with air-borne microorganisms for months. To determine when cold-fogging must next be carried out, germ counts must be made. For this, Vallovapor offers spore sam-



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Info

During the cold-fogging process, all furnishings can remain in the room. This process is even harmless for electronic devices because no oxidation takes place and the protective film does not lead to short circuits.

Info

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Info

Vallovapor's cold-fogging procedure kills up to 99.9 percent of all microorganisms.

pling and evaluation through a microbiological institute.

As long as surfaces penetrated by the fog are not wiped off, they remain disinfected. Because as a rule, a company's quality assurance department is responsible for bacteriological controls, regular airborne germ measurements and contact samples make it easy to determine when general cleaning is necessary, which thus guarantees lasting mold and germ elimination.

Air circulation systems generally used today in production areas can easily contaminate the air with microbes. This quickly leads to expensive rejected batches or even recalls. To avoid these risks, increasing numbers of companies now sterilize their production room air or surfaces with cold fog.

Vallovapor's procedure can kill up to 99.9 percent of all microorganisms. In addition to disinfecting ambient air, this cleaning method leads to significant improvements in the hygiene standards of individual processing steps (e.g. conveyor belts of cutting machines) or packaging processes (conveyor belts, packaging films).

This method is highly effective and the entire disinfection process is finished in a short period of time. During cold-fogging, all furnishings can remain in the room. It is even harmless for electronic devices because no oxidation takes place and the protective film does not cause short circuits. In addition, an antibacterial preventive layer also develops due to a depot effect. After the aerosol has dissolved after the exposure time, the rooms are immediately ready for use again.

The author



Martin Urbanek is the Managing Director of Vallovapor GmbH, Berlin, a service-provider in the area of decontamination/disinfection of closed rooms through cold-fogging. This procedure is used for lasting mold elimination, generation of germ-free ambient air and surfaces as well as odor elimination and neutralization.

This is clearly an advantage compared to conventional decontamination measures that may prevent access to areas for several days or even weeks due to highly toxic chemicals, that not offer long-term protection and often have substantial side effects.

Other cold fog procedures use active ingredients such as hydrogen peroxide, hydrogen peroxide with nano-silver ions or peracetic acid. These substances, however, all have the disadvantage that they tend to cause heavy corrosion and unpleasant odors and affect surfaces and structures when used over longer periods. In addition, heavy metals should not be released into the environment. Conventional procedures are also highly unpopular with users because of their significant side effects such as irritation to mucous membranes, sometimes long after application.

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