# Optimising food safety in a targeted way

## Monitor hygiene in meat product manufacturing and develop it sustainably

Fig. 1: For automatic disinfection, the ready-to-use solution is evenly atomised by a dual-component nozzle technology, which is mounted directly oningredient canister.
*Photo: Just in Air GmbH*

**By examining the individual process areas in meat production and establishing hygiene and environmental limits based on product requirements (process steps, shelf life, sensitivity, etc.), the actual conditions can be assessed in real time using a targeted hygiene and environmental analysis based on the Just in Air method.**

**By Ralf Ohlmann**

On the one hand, there is contact and smear contamination. Here, smear contamination and the spread of germs can occur through contact between the product and equipment (e.g., transport carts, cutting tools, conveyor belts, packaging materials, etc.) and facilities, as well as through personnel and intersections in material flow.

On the other hand, the medium of air (also influenced by the prevailing climate) plays a significant role in the potential contamination chain. The hygienic risk to food safety and shelf life depends directly on the product being manufactured. It is also necessary to take into account the individual manufacturing processes, which identify at which processing stage the highest potential hygiene risks arise. To this end, the processing areas defined in this way are divided into individual hygiene zones, and the process steps are classified into risk levels.

The respective products are assigned an RTE (Ready To Eat) factor based on their hygiene sensitivity according to RTE criteria. The RTE factor is the point at which the food product faces no further barriers to hygienic-microbiological stabilization until consumption.

### Sustainable hygiene optimization

To ensure hygienic process safety, new, natural based, sustainable hygiene technologies are being used. These can be automated through the simple application of fogging via proven dual-fluid nozzle technology, which ensures uniform distribution throughout the room—a significant economic advantage meat plants.

A sustainable hygiene technology is based on naturally occurring ingredients (e.g., lactic acid), which are also present in meat post-mortem due to the breakdown of muscle tissue, ensuring a high level of food safety compliance. Thus, the ingredients in sustainable hygiene technologies are predominantly nature-identical and derived from renewable raw materials, making the hygiene process exempt from labeling requirements.

Another advantage of sustainable hygiene technologies is that, unlike chemical disinfectants, they do not require rinsing, which helps prevent condensation from forming in the room. In this way, the company also makes a significant contribution to active water management by conserving drinking water and making effective use of wastewater.

## Using of fine fogging hygiene technology in the production

The process of fine fogging sustainable hygiene technologies is a physical one that relies on compressed air as the medium for drawing in and distributing the liquid active ingredient. The sanitation process using sustainable hygiene technology can be carried out in two separate steps or as a continuous process.

- Application as whole-room disinfection / shock disinfection, after cleaning, when no staff are present. Also serves as an alternative to environmentally harmful disinfectants.
- Targeted use for continuous maintenance hygiene / de-germination, also during production

Shock disinfection after cleaning, the application nozzles are positioned throughout the room in such a way that the room is completely disinfected after a short time. In the application for natural disinfection using sustainable hygiene technology in the cutting/ standardization room (12 x 9 x 4 m) with an enclosed volume of 432 m³, the environmentally friendly active ingredient food-safe was applied in the form of a fog. For sanitization the recirculation unit continued to operate, thereby ensuring that it, too, was thoroughly decontaminated. The room and the machines were cleaned using

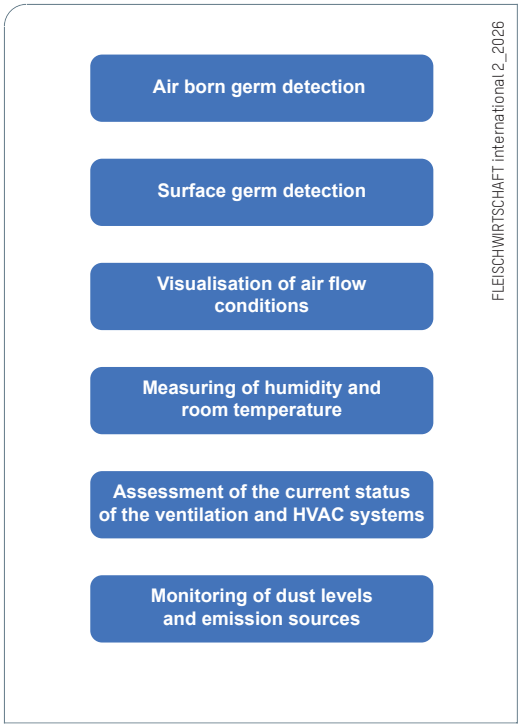


Fig. 2: Analytical methods for conducting a hygiene and climate analysis of the process environment .
*Source: Just in Air GmbH*

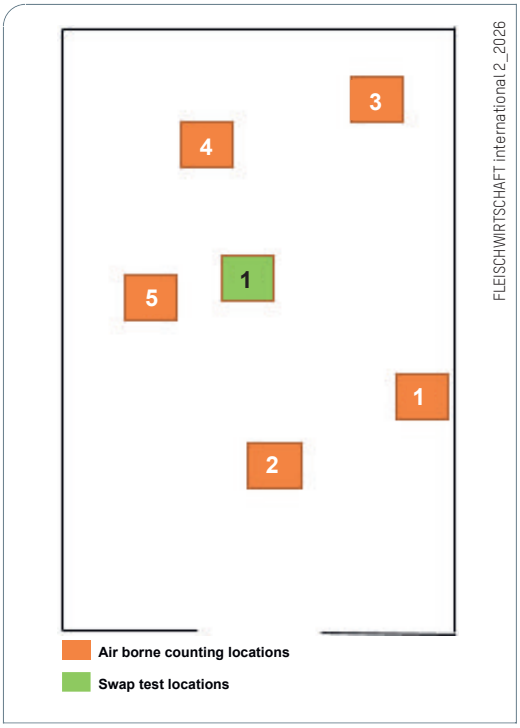


Fig. 3: Measurement points for airborne counting and swap tests locations.
*Source: Just in Air GmbH*

## Results

**Tab. 1: Air born counting**

| | | Before fogging | | After fogging | |
|---|---|---|---|---|---|
| **Measuring** | Measuring point | Total count [CFU/m³] | Yeast & Mold [CFU/m³] | Total count [CFU/m³] | Yeast & Mold [CFU/m³] |
| 1 | Room center | 85 | 60 | 0 | 5 |

Source: Just in Air GmbH

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## Results

**Tab. 2: Surface hygiene**

| | | Before fogging | | After fogging | |
|---|---|---|---|---|---|
| **Measuring** | Meassuring point | Total count [CFU/25cm²] | Yeast & Mold [CFU/25cm²] | Total count [CFU/25cm²] | Yeast & Mold [CFU/25cm²] |
| 1 | Fins in the recircu-lating air cooler | 44 | 37 | 0 | 4 |
| 2 | Mixing tank | 32 | 24 | 0 | 0 |
| 3 | Product conveyor belt | 25 | 19 | 0 | 0 |
| 4 | Box conveyor belt | 78 | 33 | 0 | 2 |
| 5 | Floor (center) | 271 | 78 | 9 | 6 |

Source: Just in Air GmbH

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Abb. 4: All surfaces within the process area, ranging from product-contact components to installed peripheral equipment, are disinfected simultaneously.
*Photo: Just in Air GmbH*

traditional wet cleaning methods prior to fogging, leaving residual moisture on the surfaces—a condition that, due to the dilution effect, poses a particular challenge to the effectiveness of disinfectants.

After manual cleaning, the sustainable Just in Air hygiene technology „food-safe“ was fogged in the room for 20 minutes, and after an additional 20-minute decay period, the room was put back into production after a total of only 40 minutes without any further effort. Unlike traditional foam-based disinfection methods, which only have a localized effect, the fogging process used in sustainable hygiene technologies reaches all surfaces as well as the air in the room, ensuring complete hygiene coverage of all surfaces present in the room. For automatic disinfection, the ready-to-use „food-safe“ solution was evenly fogged throughout the room via a dual-fluid nozzle attached directly to the supply container.

With the fogging application, the air throughout the entire room was uniformly saturated with the natural active ingredient mist within just a few minutes, and all surfaces were evenly and finely coated, thereby reducing the required application time for disinfection to a minimum.

In addition to the process surfaces that come into contact with the product, such as conveyor belts, transport containers, etc., all built-in peripheral surfaces, such as cable trays, piping, recirculation units, etc., were also reached and sanitized at the same time.

The exhaust air ducts are also sanitized when the ventilation is switched on and the active ingredient mist is extracted.

## Results of disinfection using sustainable technology

After just 40 minutes of disinfection, the room was once again fully usable, and the samples were retested at the previously recorded locations for comparison and analysis.

Since the room does not need to be rinsed after natural disinfection, production can resume immediately after treatment without any additional effort. This also results in significantly lower internal moisture loads during disinfection, which is particularly evident in refrigerated areas due to reduced condensation. Another advantage of using this sustainable hygiene technology is ist non corrosivity, which prevents chemical wear on seals and sensitive materials in the room. To maintain consistently high hygiene standards in areas that are not constantly occupied by personnel, such as cold storage rooms, material storage areas, raw material storage areas, etc., continuous use in these areas is also possible.

Targeted use for continuous maintenance hygiene / de-germination in areas that are not constantly occupied by personnel (e.g., cooling rooms). Routine sanitization: Targeted application in process rooms without permanent staff presence to ensure long-term hygiene. Application rate relative to the supply air of approx. 0.2 ml/m³/h. Maintenance sanitization / de-germination can be performed via separately installed application nozzles in the room or centrally via the ventilation system. Continuous maintenance de-germination via the ventilation system ensures that the indoor air, the surfaces in the treated area, and the entire ventilation ductwork remain in a consistently hygienic condition.

## Summary

Through a targeted hygiene and climate assessment / survey of the process environment using the Just in Air method, existing hygienic and climatic risk factors can be transparently identified and reliably evaluated.

Based on the results, safe and cost-effective optimization measures can then be derived that are also aligned with internal requirements and limit values. The necessary hygiene zones and process steps are defined and, if necessary, optimized, taking into account the applicable RTE factor.

As a complementary measure in hygiene management, the use of sustainable hygiene technology in the form of fogging can simplify and automate disinfection processes while significantly enhancing hygiene safety for products. Disinfection using sustainable hygiene technology „food-safe“ can be performed semi-automatically via the use of ceiling nozzles, or fully automatically integrated into or onto the ventilation system, for every application and room size. Due to the very low dosage of sustainable hygiene technology „food-safe“ via fogging approximately 20 ml per cubic meter of enclosed space—and the automated application (without personnel), there is also an overall economic advantage compared to chemical foam disinfection.

Sustainable approaches to conserving drinking water and reducing the chemical disinfectant load in wastewater are also available in water and environmental management. The use of manual disinfection methods involving chemical disinfectants can easily be replaced with sustainable hygiene technology based on fogging.

Thus, every plant can achieve targeted optimization of food safety while simultaneously reducing process costs through transparent monitoring and the use of innovative hygiene technologies, all with manageable effort.

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