

## **Cleaning 2.0 – we need a revolution**

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Cleaning and disinfection are crucial for obtaining a high level of food safety, and food safety is “licence to produce”. And yet, today, cleaning in the food industry is performed as it has been done for many decades. This is quite interesting, considering the significant development other areas within the food industry have gone through, just think about automation on the production line.

Every year, huge sums of money are lost due to cleaning mistakes, e.g. equipment is ruined due to the use of wrong chemicals, equipment is not properly cleaned, which results in delays in the upstart of production etc. We need to do better!

### **Cleaning is under pressure**

The production hours increase – we talk about 24/7 production, leaving less and less time for cleaning. The environmental footprint from meat production – including cleaning – must decrease, which causes cleaning to be completed with the use of less chemistry and less water but ensuring the same high level of food safety as before. This constitutes a huge challenge. Therefore, the entire value chain including producers of cleaning formulations, producers of production line equipment, food producers, cleaning companies, the cleaning assistant on the floor during night hours and many more must join forces to solve this challenge.

### **Old school cleaning and disinfection**

Cleaning in the food industry is generally following the same framework: 1) preparing equipment for cleaning, 2) initial rinsing/scrubbing, 3) lay out foam (soap), 4) rinse, 5) lay out disinfection (may be as foam), 6) rinse and 7) drying. The level of cleanliness follows a simple equation:

Cleanliness = chemistry (cleaning formulations) + temperature + time + mechanical actions

So, if one of the four parameters is decreased, e.g. time, then one or more of the others must be increased to obtain the same level of cleanliness. This clearly underlines the challenge at hand.

## **Ideas for cleaning 2.0**

### **Cleaning during production**

This is not really a new idea, and cleaning during production is already seen in parts of the meat industry. However, it could be applied more broadly. It requires “green chemistry”, which does not add hazards to the products. Therefore, this approach must be carefully developed in a joint venture between food producers, producers of equipment and cleaning companies. The main task is to be able to remove unwanted organic residues thus avoiding bacteria to proliferate in hidden segments (niche) and from there contaminate the products with either spoilage bacteria or bacteria causing illness.

### **Frequency cleaning**

The idea of frequency cleaning is to perform a predefined cleaning procedure with predefined intervals. The frequency cleaning is to be less comprehensive compared to the daily cleaning and may in some cases replace the daily cleaning. The more comprehensive cleaning can be performed

e.g. every second or third day if the frequency cleaning keeps the production line at an acceptable level of cleanliness.

### **Water reduction through reuse**

DMRI has ongoing research within reuse of water in the slaughterhouses. Rinsing water from one area is analysed for the level of microorganisms, different water cleaning technologies are applied, the effect is documented, and finally a risk assessment is performed to evaluate whether the produced water quality matches the requirements of e.g. rinsing water for use in another area. In this way, the total water consumption of a slaughterhouse can be reduced.

### **Different production areas – different requirements**

Different areas in a meat production company have different requirements for cleaning and disinfection. Taking the slaughterhouse as an example, the slaughter line and the deboning/cutting areas are cleaned every day at the end of production. The chill room is cleaned less frequently, which makes perfectly good sense. Could the idea of different requirements be taken to the next level?

### **Objective inspection of cleaning**

A visual inspection is performed during the time from the cleaning is completed and before the start-up of production. It is mandatory and typically performed by the quality department. Even though the inspection is thorough and as objective as can be, it is still “people-reliant”. Adding a “system-reliant” objective measure will not only increase the documentation of the performed cleaning inspection, but it will also add valuable data for proactive improvement of the cleaning performed. DMRI are now looking into the use of hyper spectral vision for cleaning inspection focussing on the measurement of fat residues on equipment.

### **When is clean – clean enough?**

This is the fundamental question and the basis of all alterations to be developed related to what we know as traditional cleaning today. Changes are inevitable and must be well tested to obtain a high level of food safety. The food producers also need to ensure that the cleanliness comply with customer demands and guidelines given by authorities.