Hygiene in a food processing plant

Task Reducing the introduction of germs into the process water system of a food processing plant

Hygiene system safeliQ:EA30

Application: Process water for food production
Water type: Public drinking water
Point of application: Entry to the house (point of entry)
Kind of water: Cold water
Flow rate: 0.5 m³/h
Consumption per day: approx. 2 m³

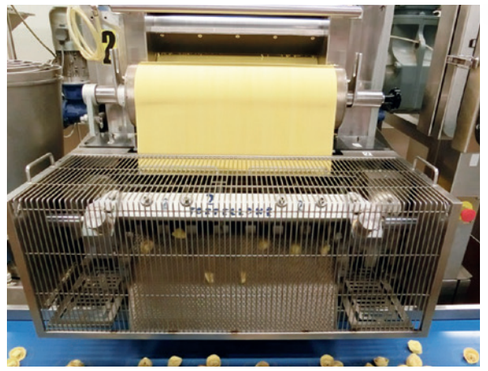
Hygiene Technology

Initial situation

A food processing plant regularly detects elevated colony counts at 22 °C and 36 °C at the inlet to the process water system and at tapping points in production. No abnormal values are measured with regard to E.coli, coliforms and enterococci.
The limit values are based on the German Drinking Water Ordinance, since according to § 3(1)(b), all water is defined as drinking water which is used in a food company for the production, treatment, preservation or placing on the market of products intended for human consumption.
Therefore, the process water system is examined microbiologically at regular intervals. In the event of non-compliance with the limit value for drinking water, measures as well as subsequent sampling are recommended. Chemical dosing of biocides, such as chlorine dioxide or sodium hypochlorite, is not possible as the process water is used for the production of food.
Various measures, such as changing the pipes and replacing them with stainless steel pipes (V2A), only led to a temporary improvement. After a few weeks, however, increased colony counts always reappeared. This indicates a continuous introduction of germs.
There are no stagnant pipes. In addition, the pipes are in regular use for production from Monday to Saturday and thus withdrawal at all three existing tapping points is guaranteed.

Goal/Approach

Installation of a hygiene system safeliQ:EA30 in order to permanently reduce the introduction of germs without the addition of chemicals and to ensure hygienically safe process water for the production of food.
Following the start-up, system disinfection of the drinking water system takes place.
Starting from the safeliQ:EA30, the pipe system is run through with 150 mg/l hydrogen peroxide for 48 h and then flushed with hygienically safe water from the safeliQ:EA30.



Measured values prior to the installation of the hygiene system safeliQ:EA30

	04/04/2016	26/04/2016
Sampling point	Tapping point 1 Production	Tapping point 1 Production
Water temperature on site [°C]	13.5	15.1
Colony count at 22 °C [CFU/ml]	**219**	5
Colony count at 36 °C [CFU/ml]	**101**	16

	05/07/2016	
Sampling point	Tapping point 1 Production	Tapping point 2 Production
Water temperature on site [°C]	21.4	21.4
Colony count at 22 °C [CFU/ml]	**118**	**123**
Colony count at 36 °C [CFU/ml]	**86**	**90**

Water analysis

Analysis parameters	Measured value/ Description
Aluminium [mg/l]	< 0.0100
Calcium hardness (as Ca) [°dH]	1.8
Total iron [mg/l]	< 0.0010
Total hardness [°dH]	2.2
Total phosphor [mg/l]	0.001
Total phosphor (as PO_4) [mg/l]	0.003
Total alkalinity [°dH]	2.2
Copper [mg/l]	0.003
Conductivity (25 °C) [µS/cm]	653
Manganese [mg/l]	< 0.0010
pH value (lab measurement)	7.39
Silica (as SiO_2) [mg/l]	13
Spaectral attenuation coefficient (254 nm) [1/m]	1.2
TOC [mg/l]	1.0
Turbidity [NTU]	0.08
UV transmission (at 253.7 nm/5 cm) [%]	86.9
Zinc [mg/l]	0.033

Result

1. In the months before the installation of the hygiene system safeliQ:EA30, the microbiologic values for 22 °C and 36 °C partly exceeded the limit value for drinking water.

2. Immediately after start-up, the colony counts for 22 °C and 36 °C upstream of the hygiene system safeliQ:EA30 were just below the limit value for drinking water. Directly downstream of the hygiene system safeliQ:EA30, these values were 0 CFU/1 ml in each case.

3. Immediately after the start-up of the hygiene system safeliQ:EA30, the tapping point in production showed values below the limit value for drinking water. After 2 weeks of operation with the hygiene system safeliQ:EA30, the values were 0 CFU/1 ml.

4. Following the treatment of a water volume of 200 m³, regular hygienic sampling at the relevant tapping point in production did not show any colony counts at 22 °C and 36 °C (measured value 0 CFU/1 ml).

5. A physical/chemical water analysis upstream and downstream of the hygiene system did not reveal any significant changes in the water quality within the measurement accuracy.

Hygiene Technology

Measured values after installation of hygiene system safeliQ:EA30 and system disinfection of the drinking water system:

	24/10/2016		
Sampling point	Sampling valve upstream of hygiene system	Sampling valve downstream of hygiene system	Tapping point 1 Production
Water temperature on site [°C]	–	–	–
Colony count at 22 °C [CFU/ml]	**3**	**0**	**54**
Colony count at 36 °C [CFU/ml]	**75**	**0**	**18**

Measured values after 2 weeks of operation of hygiene system safeliQ:EA30 and 38 m³ of treated water:

	09/11/2016		
Sampling point	Sampling valve upstream of hygiene system	Sampling valve downstream of hygiene system	Tapping point 1 Production
Water temperature on site [°C]	–	–	–
Colony count at 22 °C [CFU/ml]	**2**	**0**	**0**
Colony count at 36 °C [CFU/ml]	**55**	**0**	**0**

Measured values after 6 weeks of operation of hygiene system safeliQ:EA30 and 90 m³ of treated water:

	06/12/2016	
Sampling point	Tapping point 1 Production	Tapping point 2 Production
Water temperature on site [°C]	**13**	**11.8**
Colony count at 22 °C [CFU/ml]	**0**	**0**
Colony count at 36 °C [CFU/ml]	**0**	**0**

Measured values after 14 weeks of operation of hygiene system safeliQ:EA30 and 200 m³ of treated water:

	09/02/2017		
Sampling point	Sampling valve upstream of hygiene system	Sampling valve downstream of hygiene system	Tapping point 1 Production
Water temperature on site [°C]	–	–	–
Colony count at 22 °C [CFU/ml]	**0**	**0**	**0**
Colony count at 36 °C [CFU/ml]	**0**	**1**	**0**

Conclusion

The reference project shows that the hygiene system safeliQ:EA30 enables chemical-free germ reduction and thus creates hygienically safe conditions in accordance with the German Drinking Water Ordinance. The water can thus be used for the production of food.