

Leading UK Food & Manufacturer

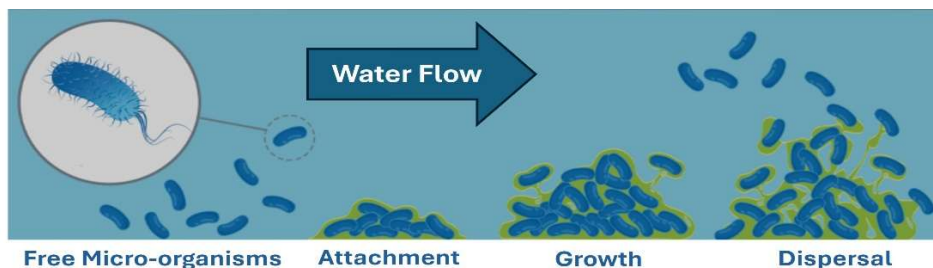
Summary

One of the UK's leading multinational food and drink manufacturers was grappling with two critical technical challenges affecting its operations and compliance. The first involved the detection of *Legionella* within the domestic water system supplying factory amenities such as staff washrooms, kitchens, and office facilities, which was posing significant health risks and regulatory concerns.

Simultaneously, the company's coffee processing plant was experiencing severe biofilm buildup within its industrial pipework, caused by the accumulation of coffee oils and residues. This microbial and organic fouling was compromising flow efficiency, increasing downtime, and demanding frequent, costly maintenance interventions. During the manufacture, processing and industrial brewing systems, coffee oils are released and adhere to internal surfaces of pipes, tanks, and other equipment. These oils provide an ideal environment for microbial growth, leading to the formation of biofilms. Biofilms are slimy, structured communities of bacteria and other microorganisms that stick to surfaces and are notoriously hard to remove.

Background

Biofilm formation follows a well-characterised cycle consisting of free-swimming (planktonic) microbial cells, initial attachment to surfaces, and subsequent growth and maturation into a structured, protective matrix composed of extracellular polymeric substances (EPS).



This EPS matrix acts as a defensive barrier, shielding microbial colonies from biocides, antibiotics, and mechanical cleaning, making mature biofilms particularly resistant to conventional treatment.

Hypochlorous acid (HOCl) exhibits a unique mechanism of action that enables it to effectively penetrate and disrupt this matrix. Due to its neutral charge and molecular similarity to water, hypochlorous acid is not readily recognised as a threat by the biofilm. This allows it to diffuse through the EPS layer without triggering a defensive response, unlike traditional charged or aggressive oxidants that may be repelled or neutralised at the surface.

Once inside the biofilm structure, hypochlorous acid acts as a potent oxidising agent, denaturing proteins, disrupting microbial membranes, and oxidising key intracellular components, leading to the cell breaking apart and releasing its internal contents (such as DNA, proteins, and enzymes) into the surrounding environment. Simultaneously, it breaks down the structural integrity of the EPS matrix, facilitating the detachment and dispersion of biofilm fragments. In the coffee manufacturing plant, this mechanism enabled hypochlorous acid to effectively dismantle and flush out the biofilm composed of coffee oil residues and microbial colonies, restoring pipework function while maintaining compliance with food-safe sanitation standards.

Testing

Total Viable Count (TVC) analysis is a microbiological test used to estimate the number of live, culturable microorganisms in a sample (typically bacteria, yeast, or mould). In the context of biofilm monitoring, TVC provides a quantitative measure of microbial activity by assessing how many viable (living and capable of growth) microorganisms are present in a water or surface sample. TVC analysis was used to assess overall microbial levels in all areas and the manufacturing site suffered continual positive TVC results.

SPT Hypochlorous Acid

Supra Perfecta Technologies (SPT) staff conducted a fully documented technical trial using its Abulox Hypochlorous Acid (HOCl) as an infection control and water treatment technology. SPT is the only company with a scalable, proprietary process for producing high-purity, stable HOCl at commercial volumes. Unlike traditional chemicals which pose health risks and may contribute to microbial resistance, SPT's Abulox HOCl is a non-toxic, effective, and environmentally safe alternative. Its broad-spectrum antimicrobial action makes it ideal for water treatment across human, animal, agricultural, and industrial applications.



SUPRA PERFECTA TECHNOLOGIES LIMITED
Effective • Environmentally Friendly • Infection Control



SPT Hypochlorous Acid Trial

SPT HOCl Abulox was delivered into the system initially at a high level (shock-dosing) for an initial period of 24 hours and then decreased to a maintenance dose value of less than 1ppm. This treatment proved completely successful: Abulox quickly achieved the total eradication of all pathogens and delivered non-detectable readings of *Legionella* at all system outlets within 6 days. The application of Abulox proved highly effective in treating the biofilm buildup within the industrial pipework of the coffee manufacturing plant.

Due to its strong oxidising properties and broad-spectrum antimicrobial activity, Abulox was able to penetrate and disrupt the protective extracellular matrix of the biofilm, breaking down the coffee oil residues and eliminating the embedded microbial colonies. Unlike traditional harsh chemicals, hypochlorous acid achieved this without corroding equipment or leaving harmful residues, making it ideal for use in a food-grade environment. Post-treatment TVC analysis confirmed a significant reduction in microbial activity, and flow rates within the system were restored to optimal levels, demonstrating the effectiveness of SPT Abulox as both a biofilm remover and a preventative treatment for future buildup.

Third Party Test Results - UKAS Accredited Laboratory

Major UK food factory: Legionella eradication



TVC 's	Day 1	Day 4	Day 5	Day 6	Day 8	Day 13	Day 15	Day 19
Sample Point	TVC 30oC 2 days	TVC 30oC 2 days	TVC 30oC 2 days	TVC 30oC 1 days	TVC 30oC 1 days	TVC 30oC 2 days	TVC 30oC 2 days	TVC 30oC 2 days
Mens A	377	2	3	0	0	0	0	0
Ladies A	59800	7	0	0	0	0	0	0
Ladies C	22	5	0	0	1	0	0	0
Cloakroom	299	18	0	0	5	0	0	1
Ladies B	120000	36	0	0	0	0	0	0

Pseudomonas spp	Day 1	Day 4	Day 5	Day 6	Day 8	Day 13	Day 15	Day 19
Sample Point	Pseudomonas spp	Pseudomonas spp	Pseudomonas spp	Pseudomonas spp	Pseudomonas spp	Pseudomonas spp	Pseudomonas spp	Pseudomonas spp
Mens A	1300	0	21	0	0	0	0	0
Ladies A	300	0	1	0	0	0	0	0
Ladies C	0	0	0	0	0	0	0	0
Cloakroom	0	0	0	0	1	0	0	0
Ladies B	0	0	18	0	1	0	0	0

Legionella spp	Day 1	Day 4	Day 5	Day 6	Day 8	Day 13	Day 15	Day 19
Sample Point	Legionella	Legionella	Legionella	Legionella	Legionella	Legionella	Legionella	Legionella
Mens A	2441 (2 - 14)	ND	ND	ND	ND	ND	ND	ND
Ladies A	1094 (2 - 14) 13594 (spp)	234 (2 - 14)	26616 (2 - 14)	ND	ND	ND	ND	ND
Ladies C	378 (sg1) 13594 (spp)	ND	78 (spp)	ND	ND	ND	ND	ND
Cloakroom	225 (2 - 14) 4270 (spp)	ND	ND	ND	ND	ND	ND	ND
Ladies B	76 (spp)	54475 (spp)	16260 (spp)	ND	ND	ND	ND	ND

Conclusion

The use of SPT Abulox provided a highly effective and food-safe solution to the dual microbial challenges faced by the UK food and drink manufacturer. Following targeted dosing and system flushing, *Legionella*, initially detected in the domestic water system serving factory amenities, was reduced to undetectable levels within just six days, as confirmed by Total Viable Count (TVC) and Legionella-specific testing. This rapid elimination was made possible by SPT Abulox's ability to penetrate biofilms ensuring a comprehensive disinfection rather than merely suppressing free-floating bacteria.

Simultaneously, in the coffee production facility, hypochlorous acid successfully disrupted and dispersed the stubborn biofilm buildup within industrial pipework caused by the accumulation of coffee oils and microbial colonies. By mimicking water and diffusing through the biofilm's extracellular matrix without triggering defensive resistance, it was able to reach and oxidise embedded microorganisms, causing cell lysis and breaking down the EPS structure. This not only restored the internal diameter and flow efficiency of the pipework but also reduced microbial load, helping prevent future blockages and contamination.

In conclusion, hypochlorous acid proved to be a highly effective, non-corrosive, and food-safe biocide capable of addressing complex microbial contamination challenges in both water systems and process equipment. Its successful application resulted in full Legionella remediation and complete removal of biofilm from process lines, supporting compliance, operational efficiency, and a safer working environment. The outcomes demonstrate the value of advanced, targeted biocidal strategies in modern food and beverage manufacturing environments.

SPT HOCl manufactured solutions are high purity and stable with the following benefits:

- kills all known pathogens such as bacteria, viruses, spores and fungi
- is non-hazardous for use on humans and animals and safe for the environment
- SPT HOCl is accredited to the following standards: EN1276, EN17387, EN17126, EN13727, EN13624