

Biofilms – Development, Challenges and Control in The Food Processing Environment

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Abstract

The food processing environment has a wide variety of microorganisms that are capable of growing and multiplying on different food types and surfaces. As a result of this growth, biofilms are formed, which are aggregations of microorganisms that are attached to surfaces in three dimensions. In a biofilm, microorganisms form a protective matrix around one another. It is important to recognize that biofilms are a serious threat to human health and the economy. They can cause pathogen contamination of products, changes in the organoleptic properties of products, and damage to food-production equipment.

The focus of this discussion will be on bacteria of importance that form biofilms in the food industry, along with their product and process specificities, the types of surfaces and conditions conducive to their formation, and methods for detecting and controlling these microorganisms.

Several food handling organizations utilize traditional cost-effective chemical treatments such as the application of sanitizers, and physical methods like hot water steaming on food and non-food contact surfaces in the food processing environment. When these methods do not prove effective, more complex approaches, such as enzyme disruption, steel surface modification, etc., may be necessary to control biofilms.

Innovative and ground-breaking biofilm control technologies like bacteriophages have been developed over the years albeit restricted, with some only having sector-specific authorization for application from health regulators in some countries. Several other technologies, such as high hydrostatic pressure, are still being developed and promise to be functional and effective in the food industry.