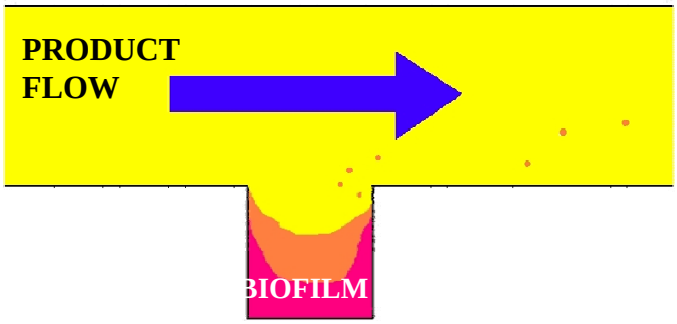
Worthwhile Operational Guidelines & Suggestions

BROILER PROCESSING TIMELY INFORMATION – JULY 2006

Fighting the biofilms

Biofilms are layers or sediments of bacteria that are formed on all surfaces (i.e., stainless, steel, plastic, copper, rubber, lead etc.) with a polysaccharide material that trap other bacteria, nutrients and debris. Biofilms formed on surfaces can promote corrosion, lower heat transfer, foul probes, clog filters, and cross-contaminate the final products, leading to premature spoilage or food borne illness. The first stage in biofilm formation is the initial and reversible attachment of bacteria to surface. This initial attachment, which only takes about 30 min, is weak and can be prevented and/or removed easily with proper cleaning and sanitation. Once the attachment occurs, the organisms produce a polysaccharide glue to cement and to trap other bacteria and debris. Biofilms can form on any surface that is exposed to non-sterile water and other liquids. In an environment where there are abundant nutrients (i.e., food processing facilities), biofilms can form readily into a stable and irreversible film within as early as 8 hours.



Biofilms are extremely difficult to eliminate once they become established, because they insulate the organisms within the organic matrix from cleaners and sanitizers and make them more heat resistant. Bacteria in biofilms may be 150-3000 times more resistant to chlorine than unattached cells. Attached colonies of *Listeria monocytogenes* has been shown to resist exposure to benzalkonium chloride from 12-20 min, where free cells were completely destroyed within 30 sec. Pathogenic bacteria, such as *Salmonella* and *Listeria* can be trapped in biofilms and continuously seed the product flowing by it.

The best way to fight biofilm problem is avoiding it in the first place. Sanitary faciliy and equipment design, proper process control, and effective cleaning and sanitation programs will minimize the potential for biofilm development in food processing plants.

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