

# 3 Easy Steps For:

## The Rapid Detection and Elimination of Biofilms in the Dairy Industry

*Within the last 20 years, studies have overwhelmingly shown that the association of micro-organisms with surfaces is the prevailing microbial life style. Most bacteria including milk-borne pathogens and milk spoilage bacteria are capable of forming biofilms on surfaces in the milking parlour and dairy which are difficult to remove by traditional chemical detergents and disinfectants. Here Paul Browning provides 3 Easy Steps to ensure that your premises are biofilm free thus providing the highest standards of dairy hygiene.*

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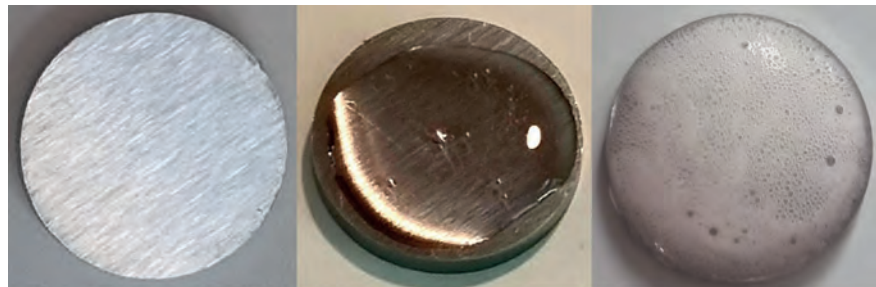
Biofilm formation by milk-borne spoilage and pathogenic bacteria on food contact surfaces, floors and drains etc. can lead to contamination of milk and manufactured dairy products during processing, which lowers product shelf life or results in human foodborne illness, both of which bring about economic losses to the business. Once biofilms have formed on dairy processing surfaces or in the environment, they are difficult to remove by conventional chemistry often resulting in persistent and endemic populations. All of this raises three very important questions.

1. How do I identify the presence of biofilms in the dairy?
2. How can I eliminate them quickly?
3. What preventative measures can I integrate into my hygiene programme to prevent biofilms returning?

### STEP ONE BIOFILM DETECTION

Biofilms contain the enzyme catalase and products are now available that rapidly detect catalase and tell us where the biofilm is located.

One such product is called Biotector. When the product is sprayed onto a surface contaminated with a biofilm it generates a mass of microbubbles of oxygen and changes colour. All within less than 10 seconds.



Invisible biofilm on metal disc

Biotector applied

Positive biofilm reaction in less than 10 seconds



Floor area after conventional caustic hypo clean



Within 5 seconds of application of Biotector biofilm is revealed in the damaged area of floor

### STEP TWO BIOFILM ELIMINATION

Areas where biofilms are shown to be present require a shock treatment programme for its effective elimination. An enzyme detergent containing a powerful cocktail of the enzymes protease, amylase, lipase, and

a high foaming surfactant is prepared and applied to the affected areas by a foam generator or by hand after a conventional chemical clean.

The structure or the scaffolding of any biofilm is protein, carbohydrates, and lipids, and the enzyme detergent is capable of dissolving the biofilm by hydrolysis within just a few minutes.

The enzyme detergent is then rinsed off and a terminal disinfectant applied to kill bacteria released from the biofilm.



Biotector was applied to the floor and substantial biofilms were found to be present after caustic hypo foam clean.



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### STEP THREE BIOFILM PREVENTION

After having eliminated the biofilms using a shock treatment as described in Step Two, integrating a preventative treatment to your hygiene programme on a regular basis is recommended.

Use the enzyme preventative treatment at least once a week in place of the usual conventional chemical cleaner.

Or you may prefer to use the enzyme detergent for regular cleaning of the plant. In any case the following procedure is recommended.

- » Remove gross debris from floors, drains, walls and equipment.
- » Pre-rinse with cold water.
- » Make up a solution of enzyme detergent at ambient temperature and apply via a foam generator or manually.
- » Pad or brush treated areas.
- » Allow the detergent to stand for 15 – 20 minutes.
- » Rinse with water.
- » Apply a terminal disinfectant immediately.

Here is a summary of the benefits of integrating enzymes into your hygiene programme:

1. **Improved soil removal**  
Faster decomposition and removal of milk, cream and cheese fats derived from the manufacturing process.
2. **Faster cleaning times**  
Of up to 50% compared to conventional chemistry. Less padding or scrubbing required.
3. **Eliminates the 6 main food allergens**  
On open surfaces, CIP and tray washing.
4. **Improved biofilm removal**  
The biofilm matrix contains lipids, proteins and carbohydrates and the enzyme formulation will improve the speed at which the biofilm is denatured.

5. **Listeria control**  
Enzymes continue to work at removing biofilms on floors and drains helping to reduce the presence of *Listeria* spp.

6. **Improved Microbial Status of Surfaces**  
With improved soil removal and improved biofilm removal, terminal disinfection will be optimised which will be reflected in subsequent micro results.

7. **Eco-friendly**  
Supports waste water treatment functionality.

And finally, I'd like to leave you with this quotation to ponder on.

**“In the food industry, aggressive chemicals such as sodium hydroxide and sodium hypochlorite are not always affective for biofilm control (Heirles et al. 2016). Enzymatic cleaning should be considered in combination with conventional sanitising methods to improve plant hygiene.”**

Source: *Frontiers in Microbiology*  
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