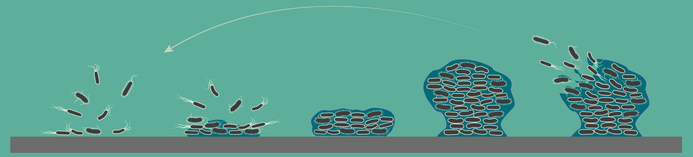
WHAT IS BIOFILM?

Biofilms are complex communities of microorganisms that adhere to surfaces and are surrounded by a matrix of extracellular polymeric substances (EPS). EPS plays a crucial role in the formation, stability, and protection of biofilms.

Depending on the environmental condition, biofilm can be made up of *Listeria monocytogenes*, *Bacillus cereus* and *mycoides*, *Salmonella* spp., *Campylobacter*, *Pseudomonas aeruginosa*, *Leuconostoc* or *Cronobacter* (*Enterobacter sakazakii*) building the biofilm matrix (organic polymers, polysaccharides, proteins, DNA, lipids etc.) and other (pathogen) microorganisms, phages, spoiling enzymes, spores, molds and yeast which are living inside the matrix.

Thanks to this structure, biofilms are much more resistant to biocidal substances compared to the same bacteria in a liquid medium. This complex construction ensures survival even in extreme conditions.



ADHESION / ATTACHMENT

In this stage, individual microorganisms first come into contact with a surface and start to adhere to it. This initial attachment is reversible and weak. The microorganisms may use flagella, pili, or other appendages to facilitate attachment. As more microorganisms accumulate and attach to the surface, they begin to produce extracellular polymeric substances (EPS), which form a protective matrix around the biofilm.

ACCUMULATION / MATURATION

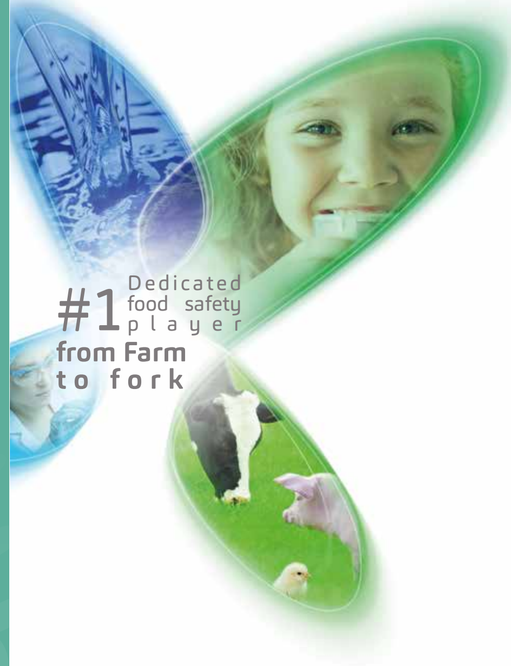
As the biofilm continues to develop, microorganisms within the biofilm community start to grow and multiply. The EPS matrix becomes more extensive and complex, providing structural stability to the biofilm. The microorganisms within the biofilm community start to communicate through a process called quorum sensing, where they release signaling molecules to coordinate their behavior. This communication helps regulate gene expression, leading to the formation of specialized microenvironments within the biofilm. The biofilm becomes highly resistant to antimicrobial agents and the host immune response during this stage.

DISPERSION

The dispersal stage, where microorganisms within the biofilm detach from the biofilm, can roughly be classified in active and passive dispersal. Passive dispersal occurs when parts of the biofilm naturally slough off due to physical forces or environmental conditions. In the active dispersal stage, some microorganisms within the biofilm undergo physiological changes and initiate the process of detachment from the biofilm. It involves the production of enzymes and surfactants that help release individual microorganisms or clusters of cells from the biofilm. Once dispersed, microorganisms can go on to colonize new surfaces and initiate the formation of new biofilms.

...and the cycle starts all over again!

kersia®
INVENTING A **FOOD SAFE WORLD**



FOOD YOU CAN **TRUST**

From farm to fork, food safety is today the #1 concern within the food sector. The challenges at every stage of the food supply chain are immense...

OUR VISION

Kersia was founded to meet these new challenges.
We are a pure player, 100% focussed on food safety. We will be your partner in order to meet the requirements of safer food processing with innovative solutions to improve safety for consumers and operators.
In Kersia, the agri-food sector has found a partner that is committed to food safety from processing to distribution.

INNOVATIVE SOLUTIONS

We are developing reliable cleaning solutions, innovative disinfectants and customised support services, based on our scientific expertise and our field knowledge.
Our biosafety solutions change constantly to adhere to the regulations and to guarantee a sustainable environmental approach.
We are focussed on tomorrow and support our customers in anticipating changes and help them to protect their companies' reputations whilst improving their environmental performance.

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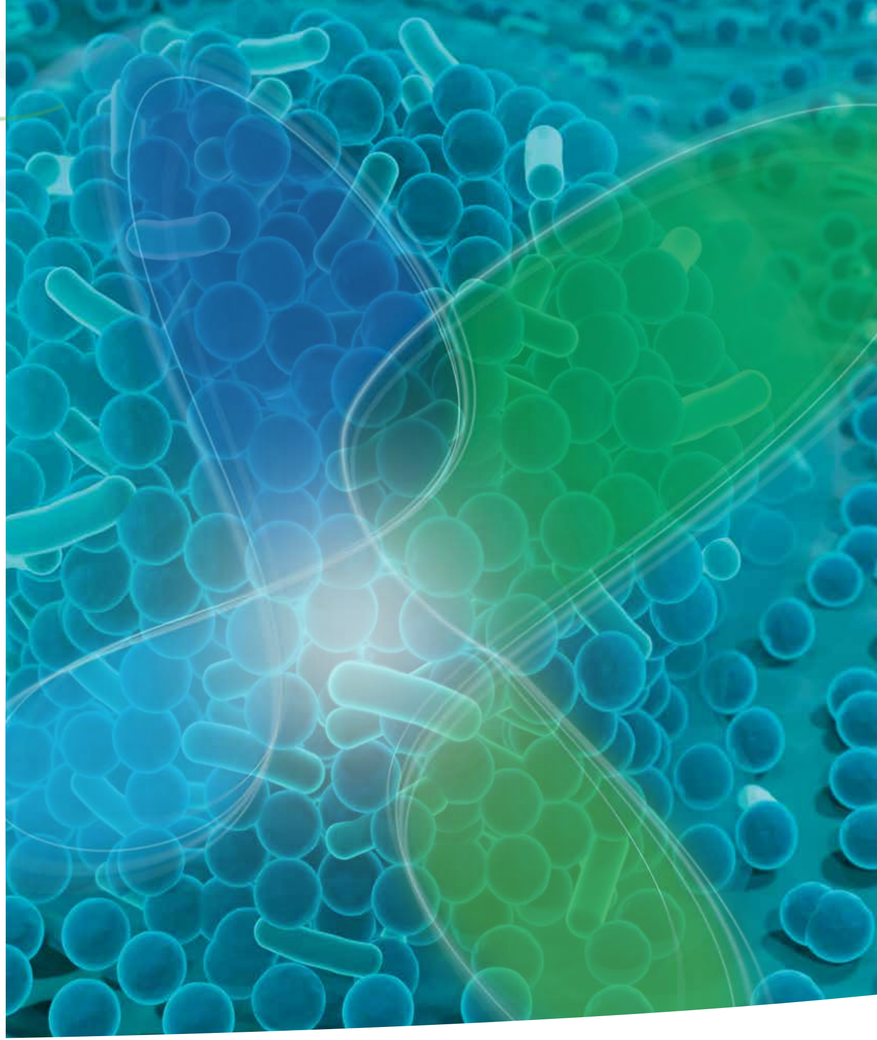
55, Boulevard Jules Verger
35803 DINARD – France
Phone: +33 (0)2 99 16 50 00
www.kersia-group.com



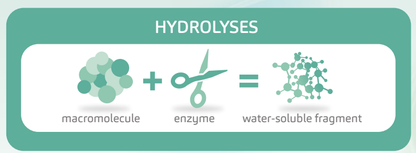
Enzymatic range & Biofilm solutions
in Food & Beverage Industries

kersia®
INVENTING A **FOOD SAFE WORLD**

ENZYMATIC ACTIVITY

WHAT ARE ENZYMES?

- Enzymes are proteins with specific activities. Enzymes hydrolyse the subrates very quickly and efficiently to convert them into small water-soluble residues.
- Their 3D structure and their activity can be irreversibly altered under extreme conditions of pH, temperature, etc.



Different types of enzymes:

- Protease (for proteins in milk, meat, blood, egg...)
- Amylase (for starch in potatoes, pasta, sugar...)
- Lipase (for lipids in grease, oil...)
- Cellulase (for fibers in vegetables, fruits...)

CLEANING WITH ENZYMES

TARGETED SOLUTIONS

The enzymatic cleaning guarantees a very deep cleaning. Enzymes are renewable raw materials.

PH NEUTRAL SOLUTIONS

pH neutral

The enzymatic detergents are pH neutral, and can be used at ambiant temperature, ensuring more safety and protecting production equipment from corrosion. They are a good complement to standard alkaline detergents.

DEGRADES EPS MATRIX OF BIOFILMS

Some specific enzymes have the capacity to degrade the EPS matrix of biofilm and therefore release bacteria previously encased and protected, that are now accessible to the disinfectant.

ENZYMATIC CLEANERS

FOR MEMBRANE CLEANING

FILTERZYM WM

- Concentrated enzymatic detergent for the removal of lipids and proteins
- Cleaning of membrane systems and circuits

FILTERZYM 305

- Premium enzymatic detergent dedicated to the removal of membrane fouling with a high protein content

DETECTION OF ENZYMATIC ACTIVITY

ACTIZYM DETECT

- Detection of active protease to validate the enzymatic activity of the enzymatic product and check enzyme deactivation or removal by rinsing at the end of an enzymatic hygiene protocol

BIOFILM DETECTION

DETECTION IN CLOSED SYSTEMS

- In pipes where visual detection is almost impossible, Kersia proposes a specific biofilm audit for closed systems.

DETECTION ON SURFACES

Biofilm Detection Audit

- Detection of Biofilm on surfaces thanks to a specific protocol
- This propocol makes EPS visible and allow us to detect the presence of Biofilm

SOLUTIONS FOR BIOFILM REMOVAL

IN CIP SYSTEMS

CLEANZYM CIP

- Tri-Enzymatic Detergent for CIP, closed washing tunnels and equipment cleaning by soaking
- 99,8% of total ingredients are of natural origin
- For routine cleaning and biofilm prevention

DETZYM TREAT

- Prevents blockages in non food contact pipelines (e.g. drains)
- Hydrolyses and liquefies organic residues responsible for unpleasant odours

ADDZYM CIP CT & DETZYM CIP CT

- Use the mix of the 2 products to degrade the EPS matrix of biofilm and prevent blockages in pipelines.

Dangerous. Respect precautions of use. Use biocides safely. Always read the label and product information before use.

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