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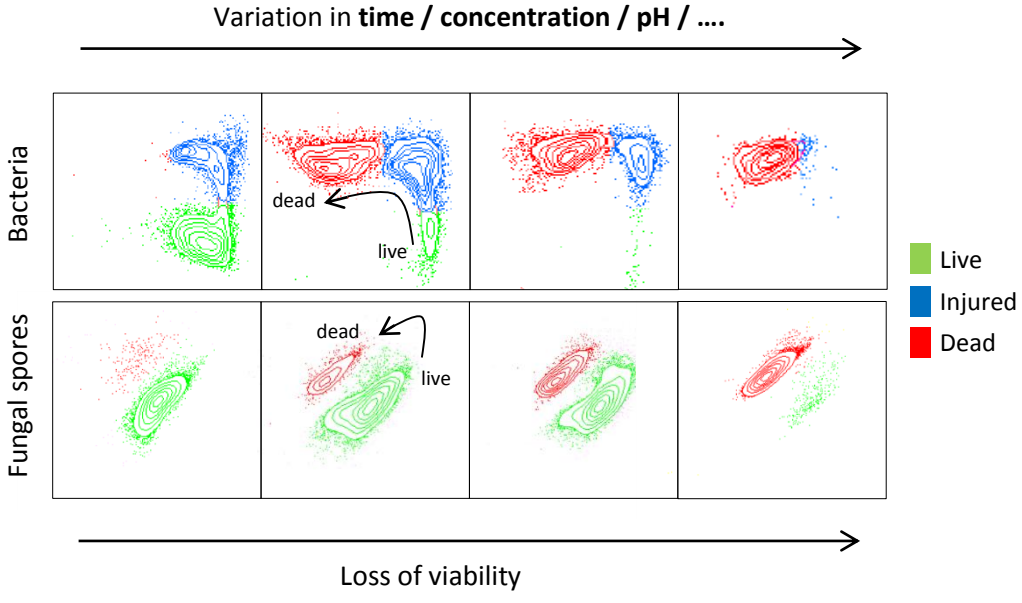
Real-time Microbial Viability Assessment in Water-Based Systems

Laboratory of Biochemistry is seeking partners interested in real-time microbial viability assessment in water-based systems susceptible to microbial growth.

Introduction

All water-based industrial fluid formulations share the common problem of susceptibility to microbial contamination. This imposes a challenge on both formulators and facility operators to minimize the adverse economic and health impact of uncontrolled microbial contamination in industrial operations. Two types of microorganisms contaminate water-based systems: bacteria and fungi. Traditionally, culture-based methods are used in the determination of presence and concentration of these microorganisms. However this is not sufficient as a sole parameter to evaluate the "biostability" (ability of a fluid to resist degradation by microorganisms) and potential health risks of these fluids as they provide no real-time information on the microbial viability of both bacteria and fungi.

Figure



Identification of different bacterial and fungal viability states based on flow cytometric analysis, allowing a detailed assessment of the biostability properties of water-based systems. Cellular damage can be monitored in great detail with variations in exposure time, compound composition and concentration, pH and more.

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Technology

Researchers at Ghent University, Laboratory of Biochemistry (DI02) have validated a concept of microbial **viability** assessment **in water-based systems** based on **real-time** non-culture-based techniques.

Applications

- Screening of formulations for biostability
- Support of quality control procedures
- Antimicrobial efficacy studies
- Monitoring of microbial contamination

Advantages

- Single cell analysis, allowing the identification of the exact physiological state of a microbial cell.
- Non-culture-based techniques allowing a rapid assessment of the viability states present in a microbial population.
- Real-time assessment, allowing immediate (max. 1-2 hours) evaluation.
- Broad application potential, allowing the implementation of a wide range of microbial species and incubation conditions.
- Short analysis time, allowing high sample through-put.

Status of development

This technology has been successfully used in the laboratory of biochemistry to identify the antimicrobial potential and working mechanism of a wide range of test compounds in the context of metalworking fluids as well as feed additives. A complementary set of flow cytometric, spectrophotometric and luminescent techniques have been optimized for varying microbial species and incubation conditions.

Partnership

We would like to offer the advantages of this fast and reliable viability assessment protocol for screening the biostability properties of potential and existing fluid formulations, as well as specific biocides/biostatics. We have demonstrated that the use of a set of complementary techniques allows to profoundly determinate the efficacy of novel and existing strategies and provides a critical insight in interesting modes of action.

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Keywords

Water-based systems - Microbial viability - Screening - Flow cytometry

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