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Biocorrosion – Presentation of a new test system to identify microbial influenced corrosion (MIC) in an early stage

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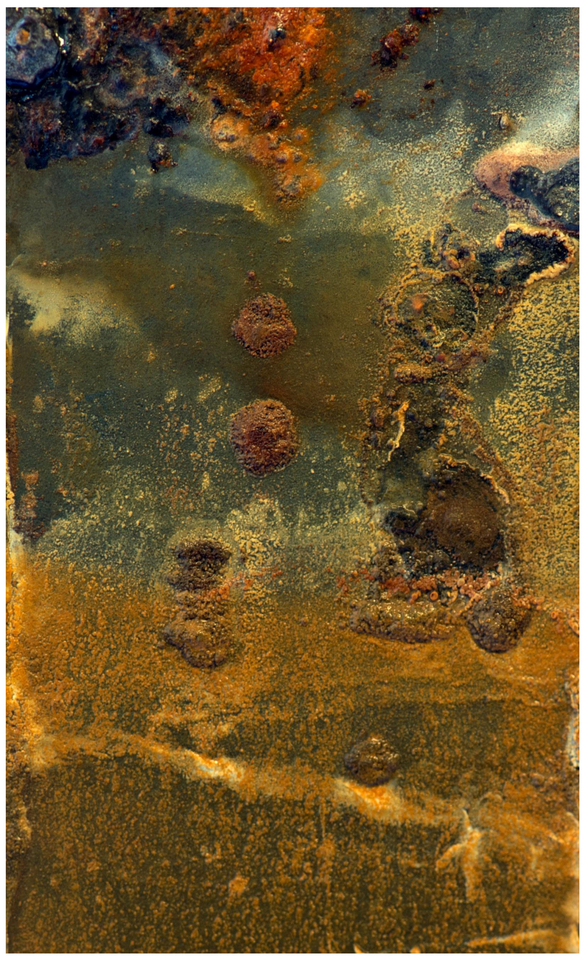
Introduction

Corrosion is a serious problem for hydraulic steel structures. Microbial influenced/induced corrosion or biocorrosion is defined as corrosion caused or promoted by microorganisms.
Typical microorganisms involved in MIC are sulphat-reducing bacteria (SRB), sulphur-oxidizing bacteria (SOB), iron-oxidizing bacteria (IOB) and manganese-oxidizing bacteria (MOB). MIC changes the kinetic of corrosion causing an earlier component failure if no countermeasures are initiated. Due to the fact that MIC is not linked to a single species, it is essential to document the activity of all involved bacteria to confirm MIC.



Novelty

1. Proof of MIC-activity
2. Fast high-troughput test
3. Automated analysis and reliable results after 24h

Advantages

- Cost savings due to the extension of operation time
- Knowledge about the mechanisms / interactions of MIC (in conjunction with corrosion prevention)
- Monitoring and estimation of the corrosion process
- Development of maintenance strategies for corrosion protection

One of several indicators:

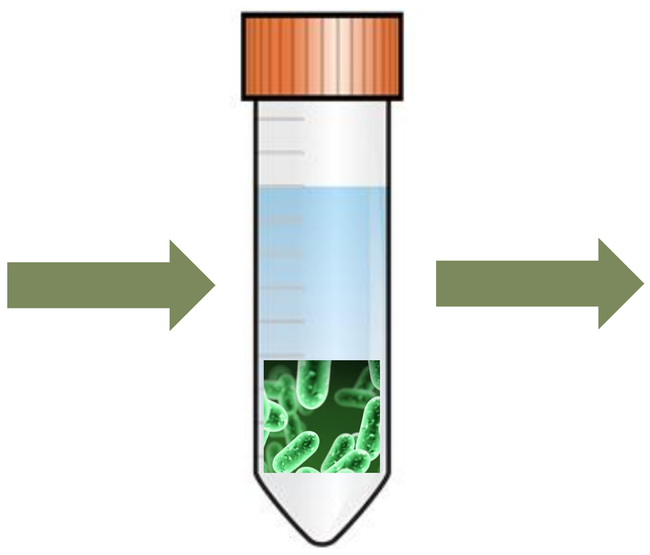
p-Nitrophenol-Verbindung (colorless) → (Arylsulfatase, H_2O) → *p*-Nitrophenol (yellow) + $OH{=}S(=O)_2{-}OK$

Application

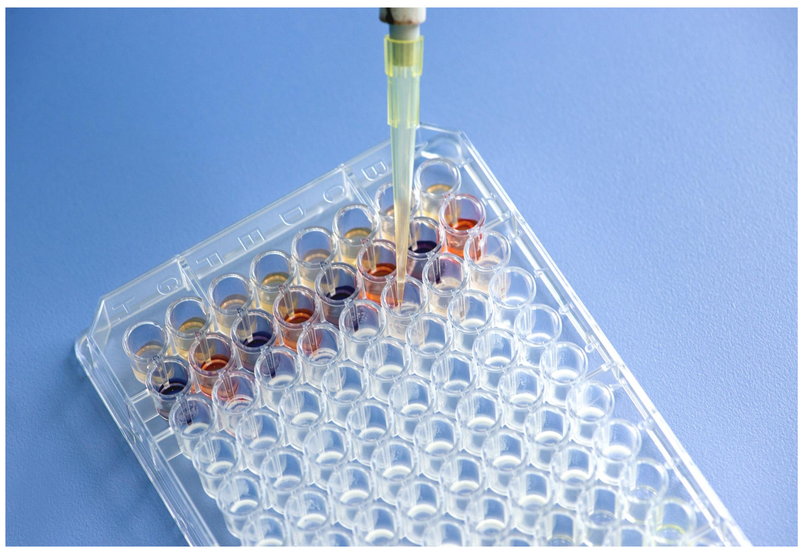
Our test-system based on a biochemical multi well assay for the timely detection of microbiologically influenced/induced corrosion (MIC). ***Microbial enzymatic and metabolic profiles*** were used as an indicator of the status of corrosion. The reaction processes of specific products and catalases are ***synthetically deposited in the new test system***. From the totality of stored responses, a test result can be derived. The test principle is based on ***a user-friendly, high-throughput screening test***. It allows the customer to independently take samples along a technical manual. Number and location of samples can determine on site by the customer. The test or sampling are ***not invasive or destructive*** and beyond yet ***less expensive than elaborate molecular biological analysis techniques***. An early detection of corrosive microorganisms offers the possibility to initiate appropriate countermeasures before damage occurs.

non-destructive sampling

laboratory-processing



high-troughput test



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