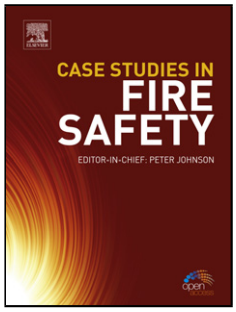

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<AT>Influence of multispecies biofilms of *Pseudomonas aeruginosa* and *Desulfovibrio vulgaris* on the corrosion of cast iron

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<ABS-Head><ABS-HEAD>Graphical abstract
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<ABS-HEAD>Highlights► Influence of biofilm morphology and bacterial solutions of *Desulfovibrio vulgaris* (a sulfate reducing bacteria, SRB) and *Pseudomonas aeruginosa* PAO1 on corrosion of cast iron is investigated. ► Mixed culture bacteria solution was less corrosive than that of SRB alone. ► Surface coverage by *Pseudomonas aeruginosa* biofilms is lower than that of SRB. ► Corrosion rate of cast iron soared up in NaCl when covered with PAO1 biofilm. ► Scanty surface coverage by PAO1 biofilms compared to SRB biofilm leads to increase in corrosion rate of cast iron in NaCl.

<ABS-HEAD>Abstract

The impact of biofilm formation and bacterial solutions of *Desulfovibrio vulgaris* (a sulfate reducing bacteria, SRB) and *Pseudomonas aeruginosa* (PAO1, denitrifying bacteria) on the corrosion of cast iron was assessed and compared in this study. Corrosion experiments were separately conducted in respective culture media (in-situ) and in 3.5% NaCl (ex-situ, pH 4). The extent of cast iron corrosion diminishes in the co-presence of PAO1 and SRB compared to SRB alone. However, patchy and scanty biofilms of PAO1 did not protect the surface in 3.5% NaCl solution compared to SRB biofilms.

Introduction

Biocorrosion is the result of synergistic interactions of different species of microorganisms that coexist in mixed consortia [1, 2]. In all aquatic environments including engineered systems such as sewage and drinking water distribution systems (DWS), biological activity in general and biofilms (microorganisms embedded in extracellular polymeric substances (EPS)) specifically, have an inexorable effect on interfacial behavior of metals in their respective electrolyte. When the water leaves a treatment plant and enters mostly-metallic water