Corrosion Behavior of Q235 Carbon Steel in Presence of H₂S Producing *Bacillus* sp. and a Consortium of Microbes Isolated from Inner Rust Layer

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In this work, a pure *Bacillus* sp. and a consortium of microbes were isolated from inner rust layer of carbon steel from marine environment. Corrosion behavior of Q235 carbon steel was investigated in the presence and in the absence of *Bacillus* sp. and with consortium of microbes separately. Weight loss, electrochemical impedance spectroscopy (EIS), scanning electron microscopy (SEM) and energy dispersive spectrum (EDS) tests were conducted to observe the influence on corrosion behavior of carbon steel in the presence and in the absence of bacteria. The results showed that corrosion potential (E_{corr}) decreased and the corrosion current density increased in the presence of bacteria, in contrast with the sterile medium with the same exposure time interval. The weight loss was observed and micrometer-scale pitting further confirmed by SEM on the carbon steel surface in the presence of bacteria especially with the *Bacillus* sp. Most importantly in the present work *Bacillus* sp. behaved like sulfate reducing bacteria (SRB). Further, it was confirmed that in natural environment *Bacillus* sp. could also act like sulfate-reducing bacteria and deteriorating carbon steel, especially in the form of localized pitting/corrosion.

Keywords: Carbon steel; SRB; Corrosion; Rust layer

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