



“Gheorghe Asachi” Technical University of Iasi, Romania



INHIBITION OF CALCIUM CARBONATE BY THREE MIXTURES: GALLIC ACID+QUERCETIN, QUERCETIN+ALGINATE AND GALLIC ACID+ALGINATE

Manel Boumagoura¹, Samira Ghizellaoui^{1*}, H el ene Cheap-Charpentier^{2,3}

¹Department of Chemistry, University Fr eres Mentouri, Road Ain El Bey 25000, Algeria

²EPF – Engineering school, 55 avenue du president Wilson, 94230 Cachan, France

³Sorbonne Universit es, UPMC Univ Paris 06, CNRS, UMR 8235, LISE, F-75005, Paris, France

Abstract

The Hamma groundwater provides water to Constantine, a city in eastern Algeria. The high concentration of calcium ions (136 mg/L) and hydrogen carbonate (442 mg/L) accounts for the strong scaling power of the water. This study is the first attempt to mix green inhibitors randomly to determine which is the most effective. The use of three new mixtures gallic acid+quercetin, quercetin+alginate, and gallic acid+alginate) to decrease or to prevent calcium carbonate formation is the main topic of this research. Due to their low environmental impact, these mixtures have proven to be effective green scale inhibitors. The inhibition efficiency occurs at extremely low concentrations: gallic acid+quercetin (6mg/L), quercetin+alginate (60mg/L), and gallic acid+alginate (3mg/L). The inhibition effects of these mixtures are evaluated using electrochemical techniques (chronoamperometry and impedancemetry). The results showed that the most efficient scaling inhibitor is gallic acid+alginate since it produced positive results at a lower dosage (3mg/L) than the other mixtures.

Key words: chronoamperometry, green inhibitor, impedancemetry, mixtures, scale inhibition

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* Author to whom all correspondence should be addressed: e-mail: sghizellaoui@yahoo.com