International Conference on Emerging Trends in Science and Technology (ETIST 2021)
Jointly Organized by Department of Biological Science, Physical Science and Computational Science
Nallamuthu Gounder Mahalingam College, Affiliated to Bharathiar University, Tamilnadu, India.
Published by NGMC - November 2021

Biocidal Efficiency of Inhibitors on Copper Alloy in Natural Aqueous Medium

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ABSTRACT: Corrosion in an open cooling water system is closely related to mineral scale formation, solid deposition and microbiological fouling. Cooling water systems are extremely vulnerable to microbial contamination. Microorganisms such as bacteria, fungi and algae can combine with organic compounds to form biofilms. The microbes in these films produce products of metabolism that are corrosive in nature. The result is pitting and corrosion of metal components. To eliminate the threat of such potential problems and achieve optimum system efficiency, microbiological activity within a system must be properly controlled. Hence, a comprehensive cooling water additive composition consists of anti-scaling agents, polymeric dispersants and biocides along with corrosion inhibitors, used to protect Fe, Cu, Al and their alloys. Surfactants are normally added to control microbial activity. This paper is concerned with the study of biocidal efficiencies of cetyl pyridinium chloride (CPC) in the presence of the inhibitor methyl benzotriazole (MBA) on brass corrosion in 3% NaCl solution. The inhibition efficiencies of MBT system has been assessed and its efficiency increased with increase in concentration. It is found to that the biocide which controls the growth of microbes in the solution. Corrosion inhibition occurs by virtue of adsorption of components of the extract on the brass surface and was found to follow Langmuir adsorption isotherm model.

Keywords: Brass, methyl benzotriazole (MBA), cetyl pyridinium chloride (CPC), SEM, EDAX, FTIR, Biocidial efficiency

1. INTRODUCTION

Due to their high thermal conductivity, workability, and low cost, copper and copper-based alloys are widely used in heat-exchange equipment. Brasses, which are alloys of copper and zinc, are relatively harder and stronger, but are prone to corrosion in aggressive environments. Apart from the uniform attack, the most common forms of brass corrosion are selective leaching (dezincification) [1], stress-corrosion cracking [2,3], pitting and microbiological fouling. Biological corrosion[4] is the deterioration of a metal by corrosion processes that occur directly or indirectly as a result of activity of living organisms. These organisms include microforms such as bacteria and macro types such as algae and barnacles. These organisms have been observed to live and reproduce in mediums with pH values between 0 and 11 and

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