

Investigation of biocorrosion caused by *Arthrobacter sulfureus* in brass

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Abstract

Copper and its alloys are commonly used in water distribution lines. *Arthrobacter sulfureus* is an aerobic bacteria commonly found in soil. These are found to be responsible for blue green water problem and increased copper concentration in water [1,2]. An attempt to study the brass corrosion by *Arthrobacter sulfureus* in neutral medium was made. Maximum corrosion rate of 0.33 mm/y was observed in brass for a period of 28 days of exposure to the *Arthrobacter sulfureus* as against the corrosion rate of 0.2 mm/y for the control. Maximum corrosion rate of 0.35 mm/y was observed at second week of immersion in the presence of *Arthrobacter sulfureus*. The optical density studies for the bacterial culture was found to show attainment of stationary phase in 48 h. Scanning electron microscopy analysis of the samples shows the presence of pitting corrosion. The energy dispersive X-ray analysis of the samples showed increased oxygen and phosphorus content in the sample due to bacterial activity. The EDAX studies also showed a drop in the copper content and increase in the oxygen content. Blue green deposits indicated the formation of malachite as a result of the bacterial activity. Growth test for *Arthrobacter sulfureus* in the presence of neem leaf extract showed better control over bacterial population.

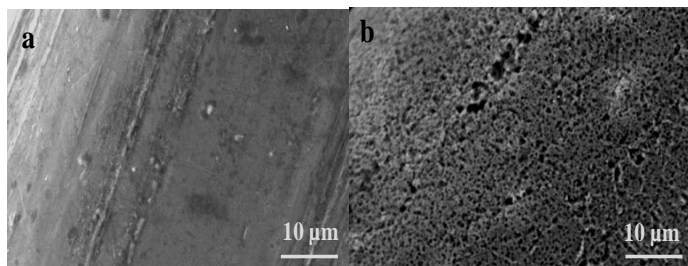


Fig. 1 Scanning electron microscopy images of brass coupon a) before immersion into the bacterial medium b) after immersion for three weeks in bacterial medium.

References:

1. J. Duan, S. Wu, X. Zhang, G. Huang, M. Du and B. Hou, *Electrochim. Acta*, 54, 2008, 22-28.
2. A. M. El-Shamy, T. Y. Soror, H. A. El-Dahan, E. A. Ghazy and A.F. Eweas, *Mater. Chem. Phys.*, 114, 2009, 156-159.