**Abstract**

Efficiency of *Pseudomonas aeruginosa* to solubilize insoluble form of zinc to soluble form was studied under various cultural parameters such as carbon (Glucose, Fructose, Sucrose, Maltose and Lactose), nitrogen (Ammonium sulphate, Sodium nitrate, Potassium nitrate and Urea), pH (5.0, 7.0 and 9.0) and temperature (20°C, 30°C and 40°C). The experimental study was carried out by both qualitative (Plate assay) and quantitative (Broth assay) method. The Zn solubilizing efficiency of the isolate was found more when glucose was added as C-source in both plate (150%) and broth assay (16.62mg/l) and the efficiency was less in the medium amended with sucrose as carbon source in both qualitative (105.8%) and quantitative estimation (2.56mg/l). Among the four nitrogen sources *Pseudomonas aeruginosa* showed best solubilizing efficiency (262.5%) and solubilization of Zn (29.91mg/l) in the presence of Ammonium sulphate and recorded least solubilization efficiency in the presence of Sodium nitrate as nitrogen source in both plate (181.82%) and broth assay (21.92mg/l). It showed highest solubilization of zinc from ZnO at the incubation temperature of 30°C and the activity was less at the temperature of 40°C. pH 7 was the most favorable pH for solubilization and the efficacy was least when the pH reached its alkalinity. Thus the study confirmed the efficiency of *Pseudomonas aeruginosa* to solubilize insoluble form zinc and can be used as a source of bioinoculants to eradicate zinc deficiency in plants.