

Survey of lead resistance in environmental *Pseudomonas aeruginosa* isolates

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ABSTRACT

With the expansion of urbanization and the development of industries, the pollution of the environment into heavy metals has become a global problem. The aim of this research is to identify and detect Pseudomonas aeruginosa resistant to lead in surface waters of Mashhad. In this study, 200 water samples from Urban sewage of Mashhad and 200 water samples from Mashhad-rivers were prepared in 2018 (September-March). Biochemical tests were used to determine the identity of isolated bacteria and PCR colony was used to trace the 16s rRNA gene for confirmation the results of tests. Resistance of isolates to heavy-metals was investigated with MIC and MBC methods. Based on biochemical tests, 22 isolates (11%) of Pseudomonas aeruginosa from 200 urban sewage samples and 45 isolates (22.5%) from 200 river water samples were isolated. The results of the PCR colony for 16S rRNA confirmed the identity of Pseudomonas aeruginosa isolates. The highest amount of lead MIC for isolates found from urban sewage and rivers was 500 and 250 mg/l respectively. The results of this study showed that Pseudomonas aeruginosa bacteria are found in urban sewage of Mashhad and its rivers. The resistance of Pseudomonas aeruginosa isolated from urban sewage to lead is significantly more than the resistance of this bacterium to lead in river water isolates. Therefore, the role of Pseudomonas aeruginosa in eliminating heavy metals from water can not be ignored.

Keywords: *Pseudomonas aeruginosa*, 16s rRNA, resistance, lead, MIC, MBC, surface waters

1. INTRODUCTION

With the expansion of urbanization and the development of industries, the pollution of the environment into heavy metals has become a global problem (1, 2). Since heavy metals, such as organic pollutants, can not be decomposed and accumulate in different parts of the food chain, they pose a significant threat to the environment for human health and health (3, 4). High amounts of heavy metals in water lead to its unusable use (5). Lead is known as one of the most harmful heavy metals among environmental pollutants. Lead in the human body has unwanted effects, including biosynthesis of blood disorders, hemoglobin and anemia, increased blood pressure, kidney damage, abortion and neonatal abnormalities, neurodegenerative disorders,