Strain Mutagenesis of *Stenotrophomonas maltophilia* for Higher Exopolysaccharide Production

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ABSTRACT

Introduction: *Stenotrophomonas maltophilia* is an environmental global emerging Gram-negative Multi drug resistant organism (MDRO). *S. maltophilia* is an environmental bacterium found in aqueous habitats, including plant rhizospheres, animals, foods, and water sources. Though infections of *S. maltophilia* can occur in a range of organs and tissues; however, the organism is mainly associated with respiratory tract infections in humans. Exopolysaccharide (EPS) of *S. maltophilia* has been associated with pathogenesis as it helps in attachment of microorganism with host and serves as food reserve. The EPS of *S. maltophilia* has not been studied in detail up till now.

Current study is about the locally isolated strain of *S. maltophilia* which was subjected to random mutagenesis for production of higher amount of Exopolysaccharide (EPS). Two conventional techniques of mutagenesis, chemical and physical were employed. Results obtained were correlated with the bacterium mode of pathogenesis and disease progression in host.

Objectives: The current research is a part of a large study in which *S. maltophilia* have been isolated from various infected plants of family Brassicacea and its exopolysaccharide content has been studied in detail for higher production, purification and characterization. In this present study, an isolate of *S. maltophilia* was studied in terms of strain improvement for higher EPS production using random mutagenesis.

Methodology: The strain was subjected to two different mutation techniques to increase the EPS production. Ultraviolet radiations are known to be causing random mutation in the microbial genome resulting in a number of possible results. Similarly, Ethidium Bromide (EB) has been known to be an effective and irreversible mutagen. Both mutagenic agents were used to alter genetic makeup of *S. maltophilia*. Protocols for physical and chemical mutagenesis were designed and strain was first subjected to mutation and then screening of mutants for higher polymer yield

Results: It was observed that Ethidium Bromide was found to be more effective in producing high EPS secreting *S. maltophilia* strains. The mutant strain X2 was found to be producing 10X higher EPS as compared to wild. On the other hand, UV rays (254 nm) didn't affect the growth of microorganism let alone alter its genome for high polysaccharide. The result indicates that UV rays are unable to penetrate cell and alter the genome due to the presence of EPS. The study is novel of its kind and suggest further exploration of the properties of EPS in order to design the effective killing methodology of the pathogen.

Keywords: *Stenotrophomonas maltophilia*, Multi drug resistant organism, Exopolysaccharide, random mutagenesis, Ultraviolet radiations, Ethidium bromide.

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