

Effect of commercial enzymes on Extracellular Polymeric Substances of *Pseudomonas fluorescens* biofilms

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Removal of biofilms is difficult. Several strategies to remove biofilms exist including the use of biocides and dispersants. Microbial resistance to biocides and their negative environmental impact are two of the main reasons for finding alternative biofilm control strategies. Enzymes may offer such an alternative. The study aims to determine the effect of commercially protease and amylase enzymes on Extra cellular Polymeric Substances produced by *Pseudomonas fluorescens*. *Pseudomonas fluorescens* was sub cultured onto Nutrient agar plates for 24hrs at 26^oC. Bacterial suspension was adjusted to McFarland standard 1 turbidity and 1ml of the adjusted bacterial suspension was inoculated in flasks containing 100ml of Nutrient broth and 2g of glass wool used as surface attachment for biofilm growth. Flasks were incubated for seven days at 26^oC at speed of 100rpm. After incubation, glass wool was transferred into 100ml of distilled water and vortexed for two minutes. A volume of 20ml of the aliquots was used for EPS extraction. EPS characterization was done by Bradford and Anthrone assays for protein and carbohydrate components respectively. Enzyme assay was done by adding 1ml of dissolved EPS in tubes containing enzyme solutions. The mixture was incubated at 26^oC for 90 minutes and samples were taken every 15 minutes interval. Micro titter assay was employed to evaluate the effect of enzymes on biofilms. Enzyme activity was also evaluated by Scanning Electron Microscopy. Results showed that Protease enzymes (Everlase and Savinase) rendered better treatment than the Amylase enzymes. In conclusion, in industrial settings, both the inactivation and removal of biofilm cells are of huge concern. If only disinfection without the removal of detached biofilm cells on any surface occur, the inactivated biofilms cells may provide an ideal environment for further adhesion and growth resulting in a complex matrix.

Key words: *Pseudomonas fluorescens*, Extracellular Polymeric Substances, biofilms