

The Evaluation of Antibacterial Activity of TiO₂ Nanoparticles on *Pseudomonas Aeroginusa* Biofilm with Crystalviolet and MTT Assay

Mina Saadat*¹; Shahla Roudbarmohammadi²

1-Department of Biology, Faculty of Basic Sciences, Science and Research Branch, Islamic Azad University, Tehran, Iran

2-Department of Medical Mycology, Tarbiat Modares University Medical Science, Tehran, Iran

minasaadat2518@yahoo.com

Background & Objectives: Nosocomial infections are responsible for significant morbidity and mortality in today's healthcare environment. Bacterial biofilms are thought to be responsible for 65% of nosocomial infection. One of the most medically important biofilm forming species is *Pseudomonas aeroginusa*. Because of increasing antibiotic resistance, it is necessary to find suitable agent to limit contamination of surfaces and medical devices.

Methods: TiO₂ nanoparticles were synthesized in sol-gel way. Then the minimum inhibitory concentrations (MIC) of these nanoparticles were evaluated on *Pseudomonas aeroginusa* released from catheter. Then the biofilm of this bacterium was made and the influences of TiO₂ nanoparticles (in 2×MIC concentration) were evaluated on it by MTT assay and crystal violet.

Results: MIC of TiO₂ nanoparticles was 2.48 µg/ml. Our results (crystal violet and MTT assay) showed that TiO₂ nanoparticles can inhibit biofilm formation with significant difference (p<0.05). Regarding an important role of bacterial biofilm in causing nosocomial infections and high resistance of these communities and because of the results of this study we can say that TiO₂ nanoparticles are suitable antibacterial agents to reduce biofilm formation of this pathogenic bacteria from the surfaces and medical devices.

Keywords: *Pseudomonas aeroginusa* Biofilm; MTT Assay; Nanoparticles

