In Vitro Study of Photodynamic Inactivation of Staphylococcus Aureus and Pseudomonas Aeruginosa Biofilms

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Staphylococcus aureus is a gram-positive bacterium known for causing both superficial and deep infections. *Pseudomonas aeruginosa*, a gram-negative bacterium, accounts for 7% of hospital-acquired infections. The World Health Organization has classified *P. aeruginosa* as a critical pathogen, highlighting the urgent need for new antimicrobial strategies. Despite advancements in medicine and antibiotic therapies, infections caused by *P. aeruginosa* still result in high mortality rates, reaching up to 62% in certain patient groups. These bacteria are also adopt at forming biofilms, which make them more resistant to antibiotics compared to their free-floating, planktonic counterparts. Photodynamic Inactivation (PDI) is emerging as a promising method for controlling microbial growth. This technique involves exposing the pathogen to a photosensitizer (PS) and then illuminating it with a specific wavelength of light, which generates reactive oxygen species that are lethal to microorganisms. Various studies have aimed to enhance the effectiveness of PDI, including the addition of inorganic salts to the PS solution. The purpose of this study is to evaluate the *in vitro* efficacy of PDI against biofilms of *S. aureus* and *P. aeruginosa* by incorporating potassium iodide (KI) into the photosensitizer solution to enhance treatment effectiveness, using curcumin and methylene blue (MB). The results indicate that PDI with MB in the presence of KI effectively eradicates the biofilms of both *S. aureus* and *P. aeruginosa*. In conclusion, the most promising strategy to enhance PDI against biofilms involves using KI in combination with MB.