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DESIGN AND DEVELOPMENT OF AN ANTI BIOFILM COATING FOR EFFECTIVE PREVENTION OF BACTERIAL ADHERENCE AND GROWTH ON POLYMERIC SURFACES

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Abstract

Bacterial biofilm is of great medical and industrial impact and raisesgreat concern as ultimately it not only affects human health andsocial life but equally distresses the performance and productivity ofindustrial set up. Moreover a number of medical device related infections are caused by them. Biofilm facilitates bacterial cell to adopt provisional lifestyle to survive even under adverse environmentalstate which makes it quite difficult to remove. The resistance towards the commonly used antibiotics and disinfectants also brings to us the very need to generate potent, economically viable and ecofriendly antimicrobials which can help us to completely eradicate contaminating pathogenic biofilms. In the present study anovel anti biofilm coating was synthesized, characterized andevaluated for its efficiency to prevent complex biofilm formation inpolymeric surfaces. A coating material consisting of a combination of phytochemicalssuch as the extracts of the *Syzygiumaromaticum*(clove) , *Kaempheriagalanja*(sand ginger) and copper nanoparticles was prepared and incorporated in PVA and crosslinked with glutaraldehyde. The combination effectively prevented attachment and growth of micro organisms such as*Escherichia coli, Staphylococcusaureus, Klebsiellapneumoniae, Enterococcus faecalis* and*Pseudomonas aeruginosa*. The biofilm depletion was assessed by crystal violet assay and adherence assay. The bacterial viability in biofilm was considerably decreased when measured by MTT and fluorescent staining methods. SEM analysis has shown significant reduction in bacterial accumulation following treatment with formulation. The results suggests potent application of anti biofilm formulation on coating of surfaces prone to bacterial growth.

Keywords: Biofilm, Copper nanoparticles, SEM, Polyvinyl alcohol