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Conidia Adhesion to Surfaces, Aggregation and Biofilm
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Quorum Quenching Effect of Triclosan on *Aspergillus fumigatus* Conidia Adhesion to Surfaces, Aggregation and Biofilm Formation

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Quorum sensing is a signalling system that can lead to alteration in expression of a wide array of genes and phenotypes, and behaviours, such as biofilm development. Deleterious effects of biofilm formation on medical devices such as indwelling catheters, prosthetic joints, heart valves, and contact lenses has been studied. Triclosan, an antiseptic present in many household products, has anti-biofilm effect against both gram positive and gram negative, as well as yeast strains. In this study, for the first time, triclosan effect against *Aspergillus fumigatus* biofilm formation and its conidia adhesion to the surfaces were analysed as a single agent, as well as in combination with amphotericin B (AMB). Hydrophobicity measurements using microbial adhesion to hydrocarbons assay (MATH) showed *A. fumigatus* conidia, which are markedly hydrophobic show less attachment to hydrophobic surfaces (high density polyethylene (HDPE), un-plasticized poly (vinyl chloride) (UPVC), acrylic and silicone elastomer) and hydrophilic surfaces (glass and Nylon 6) when they are treated with triclosan minimum inhibitory concentration (MIC). Confocal laser scanning fluorescence microscopy images of FUN-1-stained *A. fumigatus* biofilm from flowcell reactor were obtained following Bradford assay. The data reveal *A. fumigatus* biofilm with significant extracellular polymeric substance (EPS) structure and, the number of hyphae and EPS- related proteins diminish on triclosan- treated surfaces compared to non-treated control after 24 and 48 hrs of incubation. The confocal images, also, demonstrate that triclosan has better effect than AMB, at the applied dose, on reducing the depth of biofilm. FT-IR spectrometry shows triclosan- treated samples contain more galactomannan, which is one of the exopolysaccharides in EPS, than that in the control groups. In conclusion, triclosan is effective against conidia attachment and biofilm formation of *A. fumigatus* strain. Compusyn software analysis showed that when *A. fumigatus* cells were treated with triclosan-AMB combination continuously (first triclosan then AMB), the MIC dose for AMB was reduced (0.5 µg/ml) to half of its MIC dose when it was added as a single agent (1 µg/ml).