

BIO_20 - Evaluation of *Stenotrophomonas maltophilia* biofilm tolerance to disinfectants used in a pharmaceutical industry

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Introduction: Biofilms are formed by microorganisms that grow in aggregate, usually attached to biotic and abiotic surfaces, forming a sessile community embedded in a self-produced extracellular polymeric matrix. Biofilm-producing microorganisms, such as the bacterium *Stenotrophomonas maltophilia*, acquire greater resistance to the action of physical and chemical agents, which may contribute to the prevalence of these pathogens in some environments. The exposure time, as well as the concentration of the disinfectant used, are important factors for the effective elimination of contaminants.

Objective: This study aimed to evaluate the biofilm tolerance formed by *S. maltophilia* strains against disinfectants used in the pharmaceutical industry, in order to determinate preventive and corrective measures to eliminate these bacteria.

Methodology: The biofilm formation assay was performed in 96-well polystyrene plates in two different temperatures (22.5 and 37.0°C). Three independent experiments were performed in triplicate for each strain (n=39). Strains classified as moderately and strongly adherent were selected to evaluate the biofilm tolerance against the following disinfectants: ethyl alcohol 70%/15 min, sodium hypochlorite 0.1%, 0.5%, 1.0%, 2.0% and 2.5%/15 min, quaternary ammonium 0.05% and 0.08%/ 20 min. Differences in the degree of biofilm formation were examined by Wilcoxon signed ranks test. *P*-values < 0.05 were considered significant.

Results: Thirty-six (92.3%) strains were classified as moderately or strongly adherent and no significant statistical difference between the temperatures of incubation was observed (*p* = 0.5271). Exposure to alcohol 70% (0/36) was not able to reduce the biofilm formed (*p* = 1.00). Quaternary ammonium (2/36, 5.5%) (*p* ≤ 0.0023), sodium hypochlorite at 0.1% and 0.5% were able to reduce the biofilm in 38.8% and 94.4% (*p* ≤ 1.32x10⁻⁶), respectively. In concentrations ≥ 1.0%, sodium hypochlorite eliminated 100% of biofilms.

Conclusion: In conclusion, sodium hypochlorite at concentrations ≥ 1.0 %/15 min seems to be the most effective disinfectant for *S. maltophilia* biofilm elimination. As sodium hypochlorite cannot be applied in certain surfaces due to its corrosive action, other studies are necessary in order to find alternative disinfectants.

Keywords: *Stenotrophomonas maltophilia*; Microbiological control; Biofilm elimination