UNIVERSITI TEKNOLOGI MARA

INHIBITION OF *Salmonella typhimurium* BIOFILM BY COMMERCIAL DISINFECTANTS

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ABSTRACT

Salmonellosis is a foodborne disease caused by *Salmonella typhimurium*; a Gram-negative bacterium that can form biofilm in infected hosts. The effectiveness of existing commercial disinfectants against *Salmonella* biofilm especially on biomass, viability and biochemical composition of *S. typhimurium* biofilm needs to be further investigated for biofilm control. The objective of this study was to evaluate the effects of commercial disinfectants against biomass, viability and biochemical composition of *S. typhimurium* biofilm. *S. typhimurium* ATCC14028 biofilm was developed in the absence and presence of commercial disinfectants. Sodium hypochlorite, sodium dodecyl-benzene sulfonate, benzalkonium chloride and chloroxylenol-based disinfectants were evaluated in the range between 0.78% and 25%. Biofilm biomass, biofilm viability and biofilm biochemical composition were determined using crystal violet assay, resazurin assay and FTIR-ATR spectroscopy respectively. Results demonstrated that all commercial disinfectants effectively inhibited *S. typhimurium* biofilm. Treatment with chloroxylenol-based disinfectant significantly ($p<0.05$) reduced biofilm biomass and biofilm viability at all tested concentrations. Correlation between biofilm biomass and biofilm viability in the presence of chloroxylenol-based disinfectant was also found to be significant with $r=0.857$ and its half-maximal biofilm inhibitory concentration (BIC_{50}) showed the lowest values of 5.06%. Biochemical composition of *S. typhimurium* biofilm treated with chloroxylenol-based disinfectant showed changes in FTIR spectral peaks in lipid (1460 cm^{-1},1400 cm^{-1}) and protein (1550 cm^{-1},1460 cm^{-1},1400 cm^{-1}). The findings of the present study suggest that the most efficient agent against *S. typhimurium* biofilm is a chloroxylenol-based disinfectant.

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