

Physiological Response of *Pseudomonas Fluorescens* to the Dodecyldimethylamine Oxide in the Presence of a Washing Formulation

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Abstract - Quaternary ammonium compounds (QAC) are unique surfactants, which are widely used as biocides for numerous industrial purposes. An efficiency of disinfectant is highly dependent on the physicochemical properties of environment. The aim of this study was to evaluate the antibacterial effect of the widely used QACs, i.e. *N,N*-dimethyldodecan-1-amine oxide (DDAO) in mixture with the commercially available surface washing formulation (WF). *Pseudomonas fluorescens* served as a test organism. The changes in kinetic parameters of bacterial growth, optical density, ATP concentration in the batch cultures, as well as morphological changes of cells were monitored in order to evaluate a physiological response of bacterial cultures to the different combinations of the tested chemicals. A decrease of WF concentration in the broth from 0.1 % to 0.02 % resulted in a gradual reducing the lag period in the presence of 0.03 % DDAO, while the specific growth rate did not depend on the WF concentration. Comparison of the effect of ATP concentration and the OD₆₂₀ has revealed the differences in cells response to the presence of WF and DDAO. It was concluded that the antibacterial effect of QACs, particularly DDAO, is highly dependent on the composition of washing formulations, which can notably reduce the efficiency of the added QACs.

Keywords: ATP; Fluorescence; Quaternary ammonium salts (QAS); *Pseudomonas fluorescens*; Specific growth rate; Washing formulations (WF).