

Role of Non-adsorbing Polymers in Bacterial Aggregation

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ABSTRACT

Escherichia coli (*E.coli*) AB1157 was used to study of the effect of surface charge and extracellular polymer (EPS) production upon bacterial aggregation with respect to incubation times. Bacteria exhibit similar properties to inert colloids and can display pair-wise attraction when in close proximity. This interaction is thought to be governed by the surface chemistry and net charge of the surface. This concept was applied here in order to help understand bacterial aggregation at the cellular and sub-cellular level. Studies were carried out using 0.5 to 2.5wt% *E.coli* harvested at different growth phases with varying concentrations of non-adsorbing polymer, sodium polystyrene sulphonate (SPS). The electrophoretic mobility of the model system at different growth phases was determined using standard colloidal techniques. The generation time and growth rate was found to be 40minutes and 0.94h^{-1} respectively. *E. coli* was found to be negatively charged and its cell surface properties changes at different growth phase. Significant changes in electrophoretic mobility of *E.coli* AB1157 with respect to ionic strength were found. The aggregation studies revealed that the bacteria aggregation is influenced by the concentration of non-adsorbing polymer used and the surface chemistry. Knowledge from this research will be applicable in several disciplines such as treatment of disease e.g. formation of biofilm in cystic fibrosis, preventing microbial colonization of medical implants, waste water treatment, bioremediation and stem cell cultivation and will play a crucial role in future studies of bacterial aggregation.