

Early detection of biofilm formation of selected bacterial isolates through a new screening method using 'image J'

Abstract

Aim: The cells growing in biofilms are physiologically distinct even from the same microorganism in the planktonic state. Although mixed-species biofilms predominate in most of the environments, single-species biofilms exist in a large variety of infections, on the surface of medical implants and parts of the machineries in the food industries. Convenient method and early detection of these biofilms are therefore, necessary to avoid or prevent the important implants from the bacterial biofilm formation. Therefore present research was undertaken with the aim to establish an in vitro method for early detection and screening of biofilm with easily applicable image J. **Methodology and results:** Eight bacterial colonies were isolated from the poultry wastes (PW), dental plaques (DP) and hospital effluents (HE). Among them, three isolates were finally selected for the study based on their source of origin, colony characteristics and the biofilm forming ability determined by test tube assay. The isolates were provisionally identified as *Salmonella arizonae* (from PW), *Micrococcus luteus* (from DP) and *Aerococcus viridians* (from HE) and examined for their biofilm forming ability through a novel in vitro method, cover slip assay. The images of crystal violet stained biofilms of the isolates on the surface of the cover slips were captured and analysed by image-processing software image J. The results of the cover slip assay were then compared with those from test tube assays to conform the efficacy and reliability of the method for screening and evaluating biofilm formation. The results suggest that the novel in vitro method for biofilm screening by cover slip assay is effective for evaluating selected bacterial biofilms. The ability to form biofilm was not specifically correlated with the colony characteristics but the initial attachment for early development of the biofilm was significantly correlated with their motility. **Conclusion, significance and impact of study:** The method of biofilm screening with the cover slip assay used in this study is novel, very simple but powerful and effective method, is expected to have significant impact and gain additional interest among the scientists for biofilm screening and study.

Keyword: Bacterial isolates; Biofilm; Low cost method; Cover slip assay; Image J