



## ABSTRACT

Biofilm formed in food industrial premises is very common and of serious concern today in case of food hygiene. The purpose of this research was to assess the screening of food industrial biofilm forming bacteria and to check the resistance of these isolates against commercial antibiotics and their susceptibility against medicinal plants. For this, bacterial isolates were collected from food industries. Antibiotic resistance of strains was checked and highly resistant strains were subjected to biochemical and physiological characterization indicated that these are mesophilic. Molecular characterization of bacterial isolates showed that bacterial isolates were *Enterobacter cloacae*, *E. coli*, and *Enterobacter ludwigii*. Biofilm forming capacity was evaluated by different methods. Tube method indicated that *Enterobacter cloacae*, *E. coli*, and *Enterobacter ludwigii* form good biofilm after 72 hours from the time of inoculation. These strains form black colonies on Congo red media and showed biofilm formation by Air-liquid interface assay. Agar well diffusion assay was used to measure the antibacterial effect of aqueous and methanolic plant extracts of *Camellia sinensis*, *Mentha piperita* and *Syzygium aromaticum* against selected strains in mono culture and mixed culture bacterial biofilms. The results showed that methanolic extracts inhibited bacterial growth with zone of inhibition ranging from 2 to 10mm in mono culture while 2 to 20mm in mixed culture. Whereas, aqueous extracts inhibited growth with zone of inhibition ranging from 0 to 8mm for mono culture and 0 to 5mm in mixed bacterial cultures. Clove methanolic extract inhibit bacterial growth more strongly in case of combination of strains while all other aqueous or methanolic extracts inhibit bacterial growth more effectively against mono culture bacteria as compared to their effect on mixed cultures. The degree of antimicrobial activity of plant extracts tested can be put in the order: Clove > Green tea > Peppermint. Results have indicated that methanolic extracts are more effective to resist the growth of bacteria than aqueous extracts. Herbs and spices were commonly used in medicines since ancient times for treating various disorders exhibited antimicrobial activities against tested foodborne pathogens. These are proved to be a safe, effective and alternative way for treating the foodborne infections.