

ABSTRACT

Dental health issues, a serious problem in rural and urban populations of developing countries like Pakistan. Chemicals used to control oral health problems present several side effects and less effective to control biofilms hence the phytochemicals are good alternative of chemicals used. Hence the aim of this study is to assess the biofilm forming capacity of oral bacteria and the effect of herbal plant extracts on them. For this purpose, oral sample from 30 subjects at Punjab dental hospital, Lahore were collected. Out of 72 strains, 25 strains were purified on the basis of morphological variations. 10 highly resistant strains were characterized on basis of biochemical tests. Three strains were selected and characterized further by physiological and molecular characterization. Biofilm characterization was done for 3 strains [F₂₂ (*Bacillus cereus*), B₄ (*Enterobacter aerogenes*) and SpG₆ (*Micrococcus caseolyticus*)] following three methods i.e. Congo red, liquid interface coverslip method and test tube method. Selected strains were tested for their susceptibility to the aqueous and methanolic extracts of three (Garlic, Banana and Piper mint) plants in both planktonic and biofilm mode. The effect of plants in planktonic mode was tested by agar well diffusion method. Results showed both gram positive and gram negative strains. Physiological characterization showed 37°C as optimum temperature for all strains, however, all strains showed best growth at pH 7 except *Enterobacter aerogenes* which showed best growth at pH 6. Biofilm formation by Congo red method resulted in black colonies for 3 strains which were further confirmed by cover slip assay after 24 hours and test tube method having maximum biofilm formation after 72 hours. Aqueous extract of garlic showed highest antibacterial activity for all strains. The methanolic extracts of plants showed more antibacterial affect than aqueous extracts except garlic. MIC was determined by broth dilution method. Biofilm formation reduced significantly by herbal plant extracts in all three strains. Our results suggested that these plant extracts played a critical role in the reduction of biofilm formation in both gram positive and the gram negative oral isolates, hence reducing the oral and systemic infection by these isolates.