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In vitro study of antibacterial effect of *Emblica officinalis* (Gaertn) on Gram positive bacteria

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The use of plants to treat infections is an age old practice in traditional medicine. The present study was aimed to investigate the antibacterial effect of the fruit of *Emblica officinalis* on gram positive bacteria. Sequential extraction was carried out to extract the active substances from the fruit using series of solvents namely hexane, dichloromethane (DCM), ethyl acetate (EA), ethanol, methanol and water at room temperature. The solvent from each filtrate was removed using rotary evaporator and then all extracts were kept at 4 ^{0}C. Antibacterial effect of each sample was tested against *Bacillus subtilis* and *Staphylococcus aureus* by agar well diffusion method. A well of 8.0 mm of diameter was made on nutrient agar plate including 10^{6} cells of bacteria and 10 mg of each extract was inoculated into the well. Streptomycin (50 µg) and mixture of acetone and ***dimethyl sulfoxide (1:1 v/v)*** were used as the standard and control respectively. The diameter of inhibition zone was measured to investigate the antibacterial effect after 24 hours of incubation at 37 ^{0}C. Triplicate test was done for each test sample. The data were subjected to one-way analysis of variance (ANOVA) and followed by Least Significant Difference (LSD) test. The results revealed that there was a significant ($P<0.05$) difference among the samples tested on *B.subtilis* and *S.aureus*. The ethanol extract showed the highest effect on *S.aureus* and *B.subtilis* among all other tested extracts. However the inhibition zone for *S.aureus* (14.2 ± 0.2 mm) was higher than the *B.subtilis* (12.5 ± 0.2 mm). The experiment with streptomycin standard revealed that the inhibitory effect was higher on *B.subtilis* (24.0 ± 0.10 mm) than *S.aureus* (12.7 ± 0.3 mm). There was no significant ($P>0.05$) difference in the inhibitory effect of ethyl acetate and methanol extracts on *S.aureus*. Ethyl acetate and methanol extracts of *E.officinalis* showed higher inhibitory effect on *S. aureus* than *B.subtilis* whereas aqueous extract had higher effect on *B.subtilis* than *S.aureus*. The control experiment showed that bacterial growth was not affected by mixture of acetone and DMSO. Isolation and purification of ethanol extract can lead to identify the novel active compounds.

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