IN VITRO ANTIBACTERIAL ACTIVITY OF AQUEOUS EXTRACTS OF TERMINALIA CHEBULA AND TERMINALIA BELLIRICA FRUITS AGAINST SOME MULTIDRUG-RESISTANT HUMAN PATHOGENS

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Alternative approaches in the treatment of bacterial infections are urgently required because of the emergence of antibiotic resistant mutants due to the increased use and misuse of antibiotics. Plants appear to be a valuable source for new antimicrobials that can be employed in combating drug-resistance. The extracts of Terminalia chebula Retz. (Combretaceae) and Terminalia bellirica Roxb. fruits are known to have antibacterial properties. However, the data on their activity against multidrug resistant human pathogens is limited. The current study was undertaken to evaluate the antibacterial activity of aqueous extracts of T. chebula and T. bellirica fruits against methicillin-resistant Staphylococcus aureus (MRSA), extended spectrum β-lactamase (ESBL) producing Escherichia coli and multidrug-resistant (MDR) Acinetobacter spp, Klebsiella pneumoniae and Pseudomonas aeruginosa.

Aqueous extracts of dried and powdered T. chebula and T. bellirica fruits were prepared by three methods - heating under reflux, bottle-shaking and ultrasound sonication at ambient temperature. Using the cut-well method, all the aqueous extracts were screened against 8 MRSA strains, 2 ESBL producing E. coli strains, 2 strains of MDR Acinetobacter spp, 2 strains of MDRK. pneumoniae and 2 strains of MDR P. aeruginosa S. aureus ATCC 25923 and NCTC 6571, E. coli ATCC 25922 and ESBL producing K. pneumoniae ATCC 70060 served as control organisms. The minimum inhibitory concentration (MIC) was determined using the agar dilution method.

All six aqueous extracts displayed antibacterial activity against all the strains of MRSA, MDR Acinetobacter spp and MDR P. aeruginosa within the range of 0.25-4 mg/ml. Furthermore, all three aqueous extracts of T. chebula displayed antibacterial activity against ESBL-producing E. coli at 5 mg/ml. The extracts obtained by the reflux method showed the highest antibacterial activity for both the fruits with MIC values of 0.25-0.5, 0.5-1 and < 0.125-0.5 mg/ml for MRSA, MDR Acinetobacter spp and MDR P. aeruginosa, respectively. However, aqueous extracts of both fruit samples obtained by the three extraction methods did not exhibit activity against MDR K. pneumoniae at or below 5 mg/ml. The aqueous extracts of T. chebula demonstrated comparatively high antibacterial activity than T. bellirica.

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