

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

**M.P.J. Dharmaratne¹, A. Manoraj², B.M.R. Bandara¹, V. Thevanesam^{2*},
N.S. Kumar³ and E.W.M.A. Ekanayake²**

¹*Department of Chemistry, Faculty of Science, University of Peradeniya, Sri Lanka*

²*Department of Microbiology, Faculty of Medicine, University of Peradeniya, Sri Lanka*

³*Institute of Fundamental Studies, Kandy, Sri Lanka*

**vasanthithevanesam@yahoo.com*

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 MDR *K. 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*.

Financial assistance given by the National Research Council (NRC-11-122) is acknowledged.