Approximate Analytical Solution for Time-Fractional Nonlinear Telegraph Equations with Source Term

ABSTRACT

Antibiotics which once a boon in medicine and saved millions of lives are now facing an ever-growing menace of antibacterial resistance, which desperately needs new antibacterial drugs which are innovative in chemistry and mode of action. For many years, the world has turned to natural plants with antibacterial properties to combat antibiotic resistance. On that basis, we aimed to identify plants with antibacterial and antibiotic potentiating properties. Seventeen different extracts of 3 plants namely Burkillanthus malaccensis, Diospyros hasseltii and Cleisthanthus bracteosus were tested against multi-drug resistant Acinetobacter baumannii, Escherichia coli, Pseudomonas aeruginosa, Klebsiella pneumoniae, Methicillinresistant Staphylococcus aureus (MRSA) and methicillin-susceptible Staphylococcus aureus (MSSA). Antibacterial activity of hexane, methanol and chloroform extracts of bark, seed, fruit, flesh and leaves from these plants were tested using, disk diffusion assay, minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) assays. Antibiotic potentiating capabilities were tested using time-kill assay. B. malaccensis fruit chloroform extract showed the biggest zone of inhibition against MRSA (13.00±0.0 mm) but C. bracteosus bark methanol extract showed the biggest inhibition zone against MSSA (15.33±0.6 mm). Interestingly, bark methanol extract of C. bracteosus was active against MRSA (8.7±0.6 mm), MSSA (7.7±0.6 mm) (Gram-positive) and A. baumannii (7.7±0.6 mm) (Gram-negative). Overall, the leaf methanol and bark methanol extract of C. bracteosus warrants further investigation such as compound isolation and mechanism of action for validating its therapeutic use as antibiotic potentiator importantly against MRSA and A. baumannii.