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Phytochemical Screening and *In Vitro* Antimicrobial Activity of *Desmodium triflorum* Against *Escherichia coli*, *Enterococcus faecalis*, and *Klebsiella pneumoniae*

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Abstract

Emergence of multidrug resistant microorganisms become a major threat to treat gastroenteric diseases. Phytomedicines, derived from diverse medicinal plants in Sri Lanka, offer potent antimicrobial agents against microorganisms, making them a valuable alternative to antibiotics in treating gastroenteric diseases. This study aims to control gastroenteric diseases causing microorganisms by *Desmodium triflorum* plant extracts. Crude plant extracts were obtained with maceration; using Hexane, Dichloromethane (DCM), Ethyl acetate, Acetone and Methanol solvents separately. Antimicrobial activity of plant extracts was investigated by Kirby-Bauer disk-diffusion method against *Klebsiella pneumoniae*, *Escherichia coli*, and *Enterococcus faecalis*. Zone Of Inhibition (ZOI) was measured and calculated mean ZOI were interpreted based on CLSI zone dimeter breakpoints. All extracts from *D. triflorum* showed significant difference ($P \leq 0.05$) in antimicrobial activity against tested microorganisms. DCM extracts of *D. triflorum*, showed remarkable *in vitro* antimicrobial activity by suppressing *E. faecalis* with the highest mean of ZOI (9.333± 0.577 mm). Minimum inhibitory concentrations (MIC) of DCM extract from *D. triflorum* were determined by microbroth dilution method. *D. triflorum* showed MIC of 1<MIC>0.5 mg/mL for *K. pneumoniae*, 2<MIC>1 mg/mL for *E. coli*, and 2<MIC>1 mg/mL for *E. faecalis*. Preliminary phytochemical analysis revealed the presence of terpenoids in hexane extract, alkaloids, terpenoids, saponins in DCM extract, alkaloids, saponins in ethyl acetate extract, alkaloids, saponins in acetone extract, and phenols, tannins, alkaloids, saponins, terpenoids, flavonoids in methanol extract obtained from *D. triflorum*. DCM extract of *D. triflorum* was subjected to GC–MS analysis to identify the likely compounds responsible for the antimicrobial properties. Ten compounds in *D. triflorum* were identified as potential contributors to its antimicrobial activity. The highest percentage of total observed as n-Hexadecanoic acid which is 3.927%. Present study concludes DCM is the most effective solvent for solubilizing antimicrobial compounds. The highest inhibitory action of *D. triflorum* was demonstrated against *E. faecalis*. Isolated active compounds from *D. triflorum* will be a potential source for the synthesis of novel drugs to control the pathogenicity of *E. faecalis* by addressing multidrug resistance in gastroenteric microorganisms.

***Keywords**: Desmodium triflorum*, Multidrug resistant, Antimicrobial activity, DCM extract, GC-MS analysis