

BIOLOGICAL ACTIVITY OF *Exacum trinervium*

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Sri Lankan endemic plant *Exacum trinervium* (Trimen) Cramer, locally known as “Binara”, belonging to the family Gentianaceae, is an annual herb which grows in the wet zone highlands and is used to treat fever and dysentery in indigenous medicine. As this plant is poorly investigated, the present study was aimed to determine the biological activity of *E. trinervium* which involved two samples of the plant: leaves, flowers and buds (L); stem and roots (S). These samples were sequentially extracted by the bottle shaker method using hexane (HX-L, HX-S), ethyl acetate (EA-L, EA-S) and methanol (MT-L, MT-S) to obtain six crude extracts. Antioxidant activity, toxicity, antimicrobial activity, total polyphenolic content (TPC) and alkaloid content were evaluated using 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay, brine shrimp lethality assay, agar well diffusion assay, Folin-Ciocalteu method and acid-base method, respectively, for all six extracts. All extracts except HX-L exhibited a moderate antioxidant activity with the highest shown by EA-S with an IC₅₀ value of 171.8 (±13.7) mg L⁻¹. The HX-S, HX-L and EA-S extracts were detected with high toxicity with LC₅₀ values of 4.12 (±1.21) mg L⁻¹, 50.95 (±3.83) mg L⁻¹ and 93.77 (5.13) mg L⁻¹, respectively. Most importantly, the toxicity of HX-S was twelve-fold higher than the positive control, K₂Cr₂O₇. The TPC and the alkaloid content were the highest for the polar extracts. The TPC was two times higher for MT-S than MT-L, whereas the alkaloid content was approximately equal for these two extracts with values of 17.41% and 17.32%, respectively. Moderate antifungal activity was shown against *Candida albicans* by all the extracts, however, only a slight antibacterial activity was displayed against gram-positive *Staphylococcus aureus* and gram-negative *Escherichia coli*. Accordingly, an unequal distribution of phytoconstituents was observed in *E. trinervium* and greater activity was displayed by the stem and root sample except for antimicrobial activity. Very high toxicity was observed for HX-S extract, may be due to possible presence of highly toxic nonpolar alkaloids, flavanoids and/or terpenoids which will be investigated through further analysis.

Keywords: Alkaloids, DPPH assay, *Exacum trinervium*, Indigenous medicine, Toxicity