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Evaluation of the bioactive potential of *Argyreia populifolia* leaves extract: assessing antioxidant, cytotoxic and phytotoxic properties

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Argyreia populifolia (Girithilla) is a flowering plant belonging to the Convolvulaceae family and native to the tropical regions of South Asia. Mainly the plant is traditionally utilized in various folk medicines and agricultural applications. The leaves of *A. populifolia* are known for their rich composition of bioactive compounds which have garnered scientific interest for their potential therapeutic applications. The collected fresh leaves were air-dried and powdered. The ground powder sample was extracted into the methanol by using a sonicator for 30 minutes at three intervals. The resulting solution was evaporated using a rotary evaporator to obtain the crude extract. This crude extract was subjected to several assays to evaluate its biological activities including antioxidant properties against DPPH (2,2-Diphenyl-1-picrylhydrazyl) radicals, cytotoxic activity against *Artemia salina* (brine shrimps) and phytotoxic activity against lettuce seeds germination across a concentration range of 1000 mg L⁻¹ – 31.25 mg L⁻¹. DPPH radical scavenging assay for *A. populifolia* revealed IC₅₀ value of 4.31 ± 2.60 mg L⁻¹ is higher, compared to the positive control of ascorbic acid value of 1.97 ± 0.06 mg L⁻¹. The cytotoxic activity was tested using the brine shrimp lethality assay, revealing an LC₅₀ value of 176.98 ± 9.73 mg L⁻¹, significantly higher than the positive control of K₂Cr₂O₇, with an LC₅₀ of 35.16 mg L⁻¹. Phytotoxicity was evaluated using lettuce seed germination, where the root and shoot inhibition IC₅₀ values were 4.46 ± 2.79 mg L⁻¹ and 2.48 ± 1.89 mg L⁻¹ respectively compared to the positive control of abscisic acid, with IC₅₀ values of 0.29 ± 8.00 mg L⁻¹ for root and 0.25 ± 8.09 mg L⁻¹ for shoot inhibition. These results demonstrate that the extract of *Argyreia populifolia* possesses significant and remarkable antioxidant properties, high potential cytotoxicity properties, and phytotoxicity properties of root and shoot.

Keywords: Cytotoxicity, DPPH, germination, phytotoxicity, radical