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Antifungal Activity of Invasive *Mikania micrantha* H.B.K. (Asteraceae) Plant Extracts against Selected Phytopathogens

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Abstract

Diseases caused by phytopathogenic fungi reduce the quality of cut ornamental foliage plants. At present, application of synthetic fungicides is the main mode of controlling phytopathogens. Undesirable non-target effects on other organisms and the development of fungal resistance are major drawbacks of the usage of synthetic fungicides. Thus, alternative strategies are required to replace synthetic fungicides. This study focused on antifungal properties of *Mikania micrantha* as an inexpensive, potential source to be developed as a natural fungicide. *M. micrantha* is an invasive weed in Sri Lanka. Diseased leaf samples of selected ornamental foliage plants were collected from Kandy and Kurunegala districts. Fungal pathogens were isolated onto potato dextrose agar medium and pure cultures were obtained. Leaves and roots of *M. micrantha* were harvested from Central Province. Plants were washed, air-dried, powdered and sequentially extracted into hexane, dichloromethane (DCM) and methanol (MeOH) using ultra-sonication (30 min, 40 kHz) method. Solvents were evaporated using a rotary evaporator. Plant extracts (2 mg/disc) were screened for antifungal activity against selected fungal species using disc diffusion bioassay. Commercial fungicides, Mancozeb and Propineb (50 µg/disc) were used as positive controls. Experiments were arranged in completely randomized design and the areas of inhibition were measured and data were analysed using one-way ANOVA with Minitab 16. All assays were carried out in triplicate and the procedure was repeated at least twice. Results revealed that, *Colletotrichum gloeosporioides*, *Pestalotiopsis mangiferae* and *Fusarium* sp. were the disease causing pathogens of *Dracena reflexa*, *Cordyline* sp. and *Dracena sandriana* respectively. The six extracts of *M. micrantha* showed varying degrees of antifungal activity against tested fungal species. Leaf and root extracts of hexane and DCM have shown antifungal activity for all tested fungal species. Antifungal activities of DCM extracts were higher than other extracts, indicating the presence of moderately polar antifungal compounds. The highest area of inhibition for disc diffusion bioassay was given by DCM leaf extract against *C. gloeosporioides* (3.42±0.34 cm^2); the areas of inhibition corresponding to Mancozeb and Propineb were 2.17±0.14 and 1.29±0.06 cm^2, respectively. Thus, DCM leaf extract of *M. micrantha* has the potential to be developed as a natural fungicide to manage fungal diseases in ornamental foliage plants.

Keywords: Antifungal, Cut foliage, Invasive plants, *Mikania micrantha*, Phytopathogens