

Herbicidal Activity of *Digera muricata* against *Melilotus indicus* and identification of Allelochemicals

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Summary Synthetic herbicides are in use to combat weeds in crops but all are associated with numerous ill effects. In recent years, search for ecofriendly herbicides is very active, but reports regarding herbicidal activity of *Digera muricata* against a weed, *Melilotus indicus*, under in vivo conditions are missing. So, in the present study, herbicidal activity of *D. muricata* was evaluated against *M. indicus*. Herbicidal activity was checked at two concentrations (50% and 100%) of *D. muricata* aqueous extracts in repeated sets of pot bioassays. Herbicidal activity was evaluated by growing *M. indicus* either alone or in combination with wheat. There were 5 treatments (dH₂O, half dose herbicide, full dose herbicide, 50% plant extract, and 100% plant extract). 50 and 100% plant extracts of *D. muricata* decreased the shoot length, fresh weight, and dry weight of *M. indicus* by 69 and 85%, 58 and 89%, 30 and 78%, respectively, when grown alone. However, when *M. indicus* was grown side by side with wheat, 50 and 100% plant extract of *D.*

muricata decreased the shoot length, fresh weight and dry weight of *M. indicus* by 37 and 59%, 33 and 52%, 26 and 69%, respectively. On the other hand, synthetic herbicide completely eradicated the test weed at both test concentrations. Synthetic herbicide negatively affected the growth of wheat in comparison with extracts of *D. muricata*. As the aqueous extract of *D. muricata* exhibited potent toxicity towards test weed without harming the wheat crop, so the extracts of *D. muricata* can be used to explore novel herbicidal compounds. Spectroscopic analysis of *D. muricata* extract revealed the presence of β -caryophyllene, ferulic acid, d-pinitol, hexadecanoic acid, lupeol, quercetin, germacrene, 10-epi- γ -eudesmol, β -amyrone, stigmast-5-en-3-ol, oleate, hexatriacontane, and berberine, at higher concentrations. It was concluded that herbicidal activity of *D. muricata* was due to the presence of these allelochemicals.

Keywords Herbicide, *Triticum aestivum*, *Digera muricata*, *Melilotus indicus*