DISCOVERY OF NON-TOXIC ANTIBACTERIAL GLYCOSIDES FROM *DROSERA GIGANTEA*

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The rise of antibiotic resistance necessitates the discovery of novel, safe antimicrobials. Carnivorous plants accumulate phenolic acids and flavonoids with modest antibacterial activity, while their more potent naphthoquinones (e.g., plumbagin) are cytotoxic [1]. Our previous study showed that antibacterial potency among selected carnivorous plant species did not correlate with plumbagin content [2], suggesting the presence of alternative bioactive metabolites. We hypothesized that carnivorous plants could be a source of novel, non-toxic antibacterial compounds effective against antibiotic-resistant pathogens.

Extracts from twelve *in vitro*-propagated Drosera species were analysed for plumbagin content using HPLC and screened for activity against a plumbagin-resistant *Pseudomonas aeruginosa* [2] strain by broth microdilution. Five species, representing high, moderate, and low plumbagin producers, were further evaluated for antibacterial activity and *in vivo* toxicity in *Caenorhabditis elegans* (LC_{50} assay). The most potent extract was fractionated by TLC, and its constituents were identified using HPLC-MS and NMR. TLC-MTT bioautography was used to pinpoint the compound responsible for antibacterial activity. Additionally, due to its exceptional biological activity, the extract's systemic and dermal toxicity was assessed in a murine model.

Drosera gigantea exhibited strong antibacterial activity despite having the lowest plumbagin content among the tested Drosera species. Fractionation yielded nine metabolites; the analysis of mass spectra (HPLC-MS, Compound Discoverer) allowed preliminary identification of four metabolites. Three compounds with the highest yield were characterized by NMR, revealing two known droserone glycosides [3] and one novel glycoside. Bioautography confirmed that the novel glycoside co-localized with the antibacterial zone. The systemic and dermal safety of *D. gigantea* extract was confirmed in mice.

We report the first non-toxic antibacterial glycoside from *D. gigantea*, demonstrating that carnivorous plants can provide glycosidic antibiotics that avoid naphthoquinone-associated cytotoxicity. This discovery expands the chemical space available for combating antibiotic resistance.

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