From Invader to Solution: Exploring Himalayan Balsam as a Source of New Bioherbicides

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Résumé

According to data from the Food and Agriculture Organization of the United Nations, the total pesticide use in agriculture was estimated at 3.7 million tonnes of active ingredients in 2022, double the amount used in 1990. Numerous studies have demonstrated a link between excessive pesticide use and environmental degradation, resource depletion and adverse effects on Human health. This escalating concern has drawn the attention of governments worldwide.
In response, European countries are actively implementing new measures and best practices to reduce pesticide use by 50% by 2030, in line with the goals of the European Green Deal. Within this context, our research aims to contribute to this objective by developing environmentally friendly alternatives, such as bioherbicides. These biocontrol products, composed of natural components, are less likely to cause environmental damage than conventional pesticides, due to their natural occurrence.

This work is part of an ongoing research project focused on invasive alien plant species abundantly present in the Grand Est region of France, with the goal of exploring their phytochemical diversity for potential phytotoxic effects. A preliminary screening on *Lepidium sativum* L. seeds highlighted high anti-germinative activity of crude extracts from *Impatiens glandulifera* Royle's leaves. The results presented here show the implementation of an innovative, in-house developed method combining HPLC-microfractionation with anti-germinative testing in 96-well microplates, as part of a bioguided fractionation approach to further investigate the ethanolic leaf extract.
Among the obtained microfractions, two exhibited an outstanding activity. Phytochemical analysis using HPLC-UV-HRMS suggests the presence of naturally occuring naphthoquinone glycosides in these fractions. Method optimization is currently underway to purify these naturally occurring compounds in sufficient quantities for further experiments.

Mots-Clés: Impatiens glandulifera Royle, phytotoxicity, biohercides, bioguided microfractionation, invasive plants

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