https://doi.org/10.7250/CONECT.2026.046

POLYPHENOLIC PROFILE OF INVASIVE PLANT – REYNOUTRIA SPP SPECIES

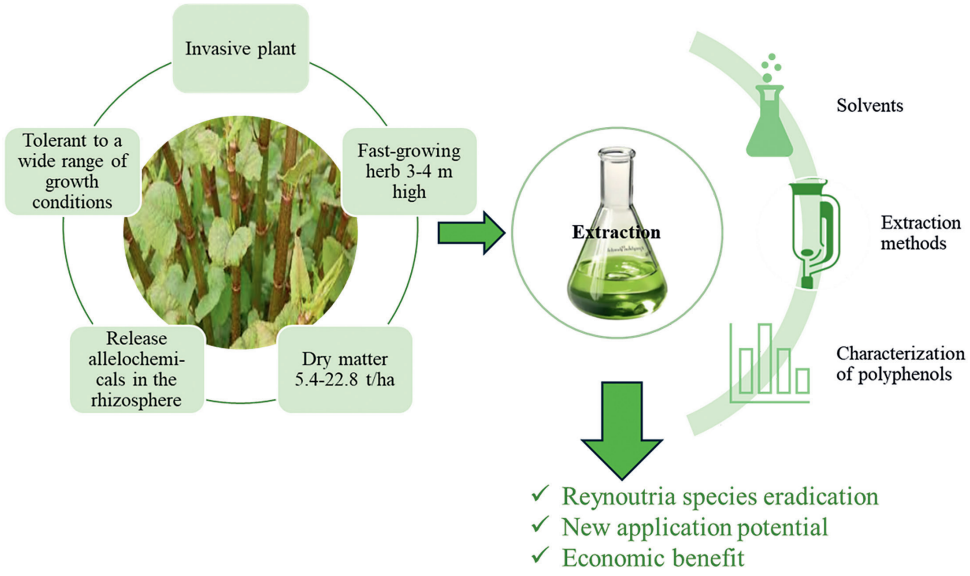
Linda ANSONE-BERTINA[1*], Linards KLAVINS[2], Jorens KVIESIS[3], Evelina NIEDRITE[4], Maris KLAVINS[5]

[1–5] *Department of Environmental Science, University of Latvia, Jelgavas str.1, Riga, Latvia*

[*] ***Corresponding author.*** *Email address: linda.ansone-bertina@lu.lv*

Abstract – The global spread of invasive plant species causes significant ecological, economic, and public health problems by disrupting ecosystems and reducing biodiversity. Species of the genus *Reynoutria* (knotweeds), including *Reynoutria japonica*, *Reynoutria sachalinensis*, and their hybrid *Reynoutria* × *bohemica*, are among the most invasive alien plant species of concern in the European Union. These plants are rich in polyphenols, a group of biologically active secondary metabolites with potential pharmaceutical and ecological value. The present study aims to develop an extraction, purification, and characterization approach for polyphenolic complexes from *Reynoutria* species, supporting invasive species management through the valorisation of biomass (Fig. 1). Polyphenol extraction was performed using different plant parts (roots, stems, and leaves, etc.) of three *Reynoutria* species, various solvents (methanol, ethanol, water, etc.), and several extraction techniques (maceration, Soxhlet extraction, ultrasound-assisted extraction, etc.). The yield of extractives was determined gravimetrically, total polyphenolic content was quantified using the Folin-Ciocalteu method, and antiradical activity was evaluated by DPPH assay. The chemical composition of selected extracts was analysed by GC–MS. The highest extraction yields were obtained from leaves of all studied species, followed by roots, while stems showed the lowest yields. Maximum extractive contents reached 238.85 mg/g for R. japonica, 220.72 mg/g for *R.* × *bohemica*, and 205.14 mg/g for R. sachalinensis leaves. Among the tested methods, Soxhlet extraction following maceration provided the highest yields and total polyphenolic content. *R. japonica* leaves exhibited the highest total polyphenolic content (89 ± 2 mg GAE/g dry matter) and the strongest antiradical activity (150 ± 4 mg trolox equivalents/g). Antiradical activity showed a strong correlation with polyphenol concentration in all samples. The results indicate that *Reynoutria* leaves and roots are valuable sources of polyphenolic compounds and that extraction efficiency strongly depends on the applied method and solvent. This study demonstrates the potential to transform invasive knotweed biomass into a source of bioactive compounds, thereby contributing to sustainable invasive species management strategies.

Keywords – Extraction; invasive plants; knotweed; polyphenolics



Polyphenol complexes from Reynoutria and their potential benefits