

Evaluation of Biological Activities of Invasive Alien Plants for Development of Functional Biomaterials

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This study aims to confirm the possibility of using the invasive alien plants in Jeju as a functional biomaterial. To achieve this purpose, 70% ethanol extract and solvent fractions were prepared for five invasive alien plants (*Hypochaeris radicata*, *Rumex acetosella*, *Humulus japonicus* Siebold & Zucc., *Solanum viarum*, *Lactuca scariolar*) and their antioxidant, antibacterial anti-inflammatory and anti-obesity effects were investigated. The DPPH radical scavenging activity of ethanol extract from invasive alien plants was shown in the order of *Rumex acetosella* > *Hypochaeris radicata* > *Humulus japonicus*. Antimicrobial activity of ethanol extract against food poisoning bacteria (4 species) and oral cavity-induced microorganisms (6 species) was measured. As a result, the extract of *Humulus japonicus* showed high antibacterial effects against food poisoning bacteria (*E. coli*, *V. parahaemolyticus*) and oral microbes (*L. casei*, *S. epidermidis*, *E. faecalis*). In LPS-induced RAW 264.7 cells, the anti-inflammatory effect of ethanol extract from invasive alien plants was investigated. As a result, the NO production inhibition activity was highest in the *Rumex acetosella* and the *Humulus japonicus* Siebold & Zucc. ethanol extract, and the NO production inhibition activity was concentration-dependent. In addition, the *Rumex acetosella* and the *Humulus japonicus* Siebold & Zucc. ethanol extract showed a concentration-dependent inhibitory effect on cytokine (IL-6) production. These extracts also showed inhibitory activity of COX-2, an inflammatory protein. This suggests that NO production inhibition activity by the extract of invasive alien plants is the result of inhibition of iNOS and COX-2 expression. Currently, organic solvent fractions of crude extract are manufactured and the investigation of active ingredients is continuing along with evaluation of biological activity such as anti-inflammatory. These results are expected to be a major data for the study on the separation and utilization of active ingredients with antioxidant, antibacterial and anti-inflammatory effects using foreign plant crude extract and solvent fractions, and are highly likely to be applied to the development of functional food and cosmetics materials.

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