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INVASIVE PLANT BIOMASS AS A RESOURCE OF BIOLOGICALLY ACTIVE SUBSTANCES FOR BIOECONOMY

Eva BORSKA¹, Jorens KVIESIS², Evelina NIEDRITE³, Linda ANSONE-BERTINA⁴, Maris KLAVINS^{5*}

¹⁻⁵ *Department of Environmental Science, University of Latvia, Jelgavas iela 1, Riga, Latvia*

* *Corresponding author. Email address: maris.klavins@lu.lv*

Abstract – Invasive plants can be considered a significant environmental problem: a direct threat to biodiversity, but also affecting productivity of agricultural production, forestry, and human and animal health. Considering the intensity of invasive plant spreading, European Union member states and other countries put efforts of invasive plant spreading control and eradication of existing populations. Invasive plant biomass can be a valuable resource for bioeconomy. The aim of the study is to evaluate possibilities to use invasive plant biomass as a source of biologically and pharmacologically active substances (polyphenolics, lipids and fatty acids). Invasive plants, common in North Europe has been used: lupine, Sosnowsky's hogweed and Japanese, Bohemian and Sakhalin knotweeds. For extraction, traditionally used solvents were compared with green (low toxicity, biogenic origin) solvents, and good performance of the environmentally friendly solvents has been demonstrated. Using for extraction sequence of solvents of differing polarity biorefinery concept has been demonstrated to obtain different groups of substances from the same biomass sample. An important group of substances in all invasive plants are polyphenols, thus indicating high stress tolerance of studied plants. Several polyphenols are plant specific (such as emodin, quercetin and others) and thus invasive plants can be a valuable source of phenolics for application in biomedicine, food industry and other areas. The data show that the fatty acid composition of different knotweed species is very similar. Bohemian knotweed exhibits higher proportions of certain fatty acids, such as linoleic acid and eicosanic acid, in comparison to other species. Japanese knotweed, on the other hand, generally displays intermediate levels for most fatty acids but stands out with distinct peaks in components such as linolenic acid. In contrast, Sakhalin knotweed dominates in several fatty acids, including palmitic acid, which highlights its unique biochemical profile. Thus, invasive plants can serve as valuable resource of biologically active compounds for differing applications and their biomass biorefinery can serve as resource thus supporting invasive plant eradication efforts.

Keywords – *Extraction; fatty acids; green chemistry; invasive plants; lipids; polyphenolics*

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