IMPACT OF FERTILISATION TREATMENT ON CHEMICAL COMPOSITION OF TALL FESCUE GROWN ON FLOTATION TAILING DETERMINED BY FTIR SPECTROSCOPY

Snežana Brajević[1*], Ilinka Pećinar[2], Aleksandar Simić[2], Nikola Milanović[1] Steva Lević[2], Željko Dželetović[1]

[1]University of Belgrade, Institute for the Application of Nuclear Energy, Belgrade, SERBIA
[2] University of Belgrade, Faculty of Agriculture, Belgrade, SERBIA

*corresponding author: snezana.brajevic@inep.co.rs

Tall fescue (*Festuca arundinacea* Schreb.) is an adaptable species used for phytostabilisation of soils contaminated with heavy metals. The chemical composition of *F. arundinacea* grown on the flotation tailings of a Pb/Zn/Cu mine in central Serbia in two treatments (control-C and 200 kg ha^{-1} AN-N2) was characterised by Attenuated Total Reflectance Fourier transform infrared spectroscopy (ATR FT-IR) (IRAffinity-1, Shimadzu, Japan). The averaged FTIR spectra of root and leaf samples are in the range of 600–1800 cm^{-1} , with the highest intensity band at 1032 cm^{-1}, characteristic of xyloglucan. The C–O–C stretching vibration in the range up to 900 cm^{-1}, at ~1161 cm^{-1}, the CH_2 wagging vibration at ~1319 cm^{-1}, and the C–H bending vibration at 1373 cm^{-1} were recognised as specific for cellulose. The bands at 1516 and 1605 cm^{-1} specific only to the root samples are from aromatic skeletal vibrations, specific to lignin, as is the band around 1647 cm^{-1} representing a C=C bond in the side chain of the lignin monomer. According to the PCA of the FTIR spectra, the control root samples differed from the N2 treatment mainly in the plant cell components, cellulose and xyloglucan (from band position 979, 1271, 1165 and 1023 cm^{-1}), aromatic ring vibrations such as lignin derivatives (band at 1510 cm^{-1}) and lipid acid esters (band at 1734 cm^{-1}). PCA of the leaf samples showed no differences, but mainly similarities, between the control and treatment samples based on carbohydrates (bands at 979, 1033, 1249, 1462 cm^{-1}) and lipid esters (band at 1732 cm^{-1}). Raman spectroscopy, in combination with multivariate analysis based on PCA, could provide deeper insights into the chemical differences in plant organs caused by N2 treatment of *F. arundinacea*.