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ENZYMATIC INDICATORS OF SOIL QUALITY AND NUTRIENTS CONTENT IN THE FOREST SOILS FROM ROMANIA

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Abstract

The present study analyses the activity of enzymatic and physical-chemical properties from forest soil samples collected from 12 plots from Romania that belong to the II level European monitoring network. The obtained data offer important information about the quality of forest soils as they approach this direction through the enzymatic index of soil quality. This was achieved by determining the activity of four enzymatic characteristics. For determination of soil enzyme activities (actual dehydrogenase, potential dehydrogenase, catalase and urease) spectrophotometric and colorimetric methods were used. For establishing a hierarchy of the areas admitting equal importance for the four enzyme activities, we have calculated the enzymatic indicator of the soil (EISQ). The analysed soils proved to have a considerable biological potential (defined by the values of the quality enzymatic indicator which exceed 0.5). The highest EISQ values (0.87) were obtained in Predeal and Sinaia where actual dehydrogenase activity (ADA) and potential dehydrogenase activity (PDA) indicators have recorded maximum values. The minimum values of the EISQ were determined in the two plots from Videle (0.471; 0.475). Correlation coefficients were used to test the relationship between soil enzyme activities and soil properties. ADA was significantly positive correlated with PDA ($r=0.929$, $p<0.05$). The two-way t-test was used for testing the statistical differences of the enzymatic activity values between plots. The results show that in two cases the differences were significant: Predeal vs. Ștefănești and Giurgiu vs. Fundata. Negative and positive relationships were observed among soil biological and chemical parameters. Thus, were observed significant correlation between ADA and C:N ratio ($r=-0.41$). Urease (U) realized only one correlation with C:N ratio ($r = -0.47$). With exception of catalase enzyme (CA), all soil enzymes realized negative correlation with C:N ratio. Other chemical property with was positively correlated with three enzymes parameters (ADA, PDA, CA) is P content ($r = 0.41$; $r = 0.44$; $r = 0.51$).

Keywords: enzymatic indicator, physical and chemical properties soil enzymatic activity

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