

**THE CHANGES IN BASIC SOIL CHARACTERISTICS  
AND ACCUMULATION OF HEAVY METALS UNDER IMPACTS OF  
VITICULTURE IN ACIDIC VINEYARD SOIL AT TÁLLYA, TOKAJ-HEGYALJA**

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**Abstract**

Since the XVI-XVII centuries, Tállya, which was one of the most significant regions of the Tokaj-Hegyalja, had become famous for its vine-growing. However, the soil erosion and tillage process, as well as toxic compounds from chemical fertilizer, Cu-fungicides had transformed the basic soil parameters of the topsoils and brought environmental risks from soil pollution especially from trace elements. Research results at Tállya indicated that grape cultivation had influenced on the soil environment, particularly the 0-10 cm soil layer via the alkalization process. The average soil pH of the topsoil in Halastó vineyard was 6.36 at the slightly acid level, while the soil pH at the control area (the forest) was 4.66 classified in the strongly acid category. Besides, the difference between the humus content of the topsoil in the control area (4.00%) and in the vineyard (1.48%) illustrated the decline in soil humus and the potential from soil nutrient erosion after viticulture was applied. Viticulture and soil erosion according to the terrain impacted on soil texture, from there, topsoil in the vineyard had a lighter texture than this in the control area. Analysis results showed that all of studied heavy metal elements (Zn, Pb, Co, Ni, Cr) had lower total content compared with background concentration, except for Cu. There was remarkable high Cu content at the soil surface (87.13 mg/kg on average) which exceeded pollution limit "B". Enrichment factor analysis (Sc as reference element) reflected that Zn (EF = 0.80), Pb (EF = 1.26), Co (EF = 1.52), Ni (EF = 0.75), and Cr (EF = 1.03) have not enriched in the topsoil, in contrast, EF of Cu was 10.69 at significant enrichment level. The high enrichment factor of Cu also indicated that Cu mainly originated from anthropogenic sources.

**Keywords:** Heavy metal accumulation, soil erosion, enrichment factor, vineyard soil, Tokaj

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