Effects of the different grape rootstocks on the arsenic, cadmium, cobalt and lead concentrations of the grape musts

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The research results of the last decades clarified that the industrial and the inadequate agricultural activity may increase abnormally the concentrations of potentially toxic elements in soils. The grape rootstock is a filter system in the grape, which could prevent the accumulation of the various trace elements in the grape berry in toxic concentrations from the soil. Therefore, it's important in the wine production those grape rootstocks should be applied, which uptake the toxic elements of the soil only in low concentrations and the toxic elements appear in the possible smallest concentrations in the grape musts.

Field experiment was set up at the model farm of University of Debrecen on humic sand soil. 12 different grape rootstocks were compared (Riparia Sauvage, Riparia Tomentosa, Riparia Selecta, Berlandieri x Riparia T.5C, Berlandieri x Riparia T.8B, Berlandieri x Riparia T.K. 5BB, Berlandieri x Riparia S.O.4, Berlandieri x Riparia K 125 AA, Berlandieri x Riparia T.G. 5A5, Aramon x Riparia 143B M. et de G., Szilágyi 157 Pécs, Vitis Berlandieri Ősamerikai). Cserszegi Fűszeres scion was grafted into the above rootstocks. The concentrations of As, Cd, Co and Pb were examined in the musts of the different rootstocks to define which grape rootstock can uptake the examined 4 elements from the soil in the smallest measure and to reduce the load of potentially toxic elements of grape musts and wines. The contents of As, Cd, Co and Pb in the musts were analysed by inductively coupled plasma mass spectrometry (ICP-MS).

The following results were obtained in the musts of different rootstocks: the As, Cd, Co and Pb concentrations changed between 2.67 µg/kg and 4.41 µg/kg, between 0.26 µg/kg and 0.88 µg/kg, between 1.47 µg/kg and 3.75 µg/kg and between 8.93 µg/kg and 16.7 µg/kg, respectively. These results justify, that the selection of the rootstocks influence the As, Cd, Co, Pb contents of the musts therefore, the selection of rootstock is an important factor to increase the food-safety in the wine product chain. On the basis of our results the Vitis Berlandieri Ősamerikai is an advantageous rootstock, as the smallest arsenic and lead concentrations were found in its must. Advantageous rootstocks were the Berlandieri x Riparia T.G. 5A5 because of the lowest measured Co content and the Berlandieri x Riparia K 125 AA due to the lowest measured Cd content.

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