Concentration of heavy metals in ash produced from Lithuanian forests

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Wood ash contains important amounts of heavy metals. This quantity depends on burned specie, temperature of exposition and heat duration time. Due the high mineralization imposed by the temperatures, ash is used as lime product in agriculture and forests. Also, after a forest fire large quantities of ash are produced and distributed in soil surface. This mineralized organic matter can induce important environmental problems, including soil toxicity provoked by heavy metals leachates from ash. There is an extensive literature about heavy metals contents on ash in different species. However, it recently highlighted that the same species placed in different environments can respond diversely to same temperatures. This question is of major importance because temperature effects on severity can be a function of the plant communities instead of specie characteristics. These findings add a higher degree of complexity in the understanding of temperature effects on ash composition and consequent availability of heavy metals. The aim of this study is to compare the ash chemical heavy metal composition, Cobalt (Co), Chromium (Cr), Cooper (Cu), Silver (Ag), Lead (Pb), Nickel (Ni), Manganese (Mn) and Zinc (Zn), from Pinus sylvestris and Betula pendula, collected in key and representative areas of Lithuanian forests, located in southern, coastal and central part. Samples were collected from alive trees, taken to laboratory and air dried. Subsequently were crushed and submitted to muffle furnace at temperature of 550ºC during two hours. The ash samples were digested and in a HNO3-HCl solution and then analysed with AAS. Comparisons between species and sites were performed with a Non-parametric one-way ANOVA's on rank transformed data followed by Tukey's HSD, significant at a $p < 0.05$. Results showed significant difference between Co and Ag concentrations between Pinus sylvestris and Betula pendula. Also, significantly different concentrations of Pb, Cu, Ni and Mn were determined among investigated sites. No significant difference was found for Zn and Cr among investigated sites. Variation of metals between sites and stands can be explained by their age, flammability difference between plant communities and anthropogenic heavy metal load. These and other aspects will be discussed with more detail in the communication.