

HI-TECH-METAL LITHIUM IN THE NATURAL ENVIRONMENT AND HEALTH ISSUES

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Hi-tech-metals are classified as strategic metals within the EU. They are important for the development of new technological applications and advanced consumer products. Hi-techmetals include antimony, beryllium, cobalt, gallium, germanium, indium, iridium, lithium, niobium, platinum, palladium, rhodium, ruthenium, tantalum and certain rare earth metals. There is only a limited amount of information available about the potential exposure to hitech-metals in natural environment. Lithium (Li) occurs naturally trace amounts in the minerals of rocks and soils, and in aquatic environments. The major dietary sources of Li are drinking water and edible vegetables. The pharmaceutical use of lithium in the treatment of bipolar disorders is well known. There have been suggestions that low-Li in drinking water may be associated with behavioral abnormalities, the risk of suicide, and coronary heart disease among others. Evident geographical variation in the incidence of diseases mentioned above and Li concentration in ground water exists in Finland. This study was conducted to investigate the Li concentrations in the humus layer and edible mushrooms. A total of 70 humus samples and 80 mushroom samples were collected from a 5 km² study area near the abandoned Luikonlahti mine (which was in operation from 1968-1983) in eastern Finland. The total concentration of Li in humus ranged from 0.25 to 12.80 mg/kg with the median value of 1.77 mg/kg. The available fraction of Li (ammonium acetate extraction) ranged from 0.03 to 0.24 mg/kg with the median value of 0.03 mg/kg. Li concentrations of all edible mushroom samples were below the detection limit value (< 0.1 mg/kg). Generally, Li is considered easily available to plants although there are large differences in the ability of different plant species to take up Li. There are few studies dealing with the Li concentrations in edible mushrooms. Different mushroom taxa seem to show differences in their ability to accumulate Li. The results of our study indicated that Li originates from stable silicate minerals and insoluble Li seemed not to end up in food chains via mushrooms studied. Because drinking water seems to be the main source of Li, geomedical studies assessing potential associations between various health parameters on individuals or groups and the Li concentration in ground water are warranted.

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