



## **Trace elements in the soils of the Tikves region in the Republic of Macedonia**

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The paper presents the results obtained during the investigations carried out for the availability of selenium and trace elements (Ni, Cd, Cr, B) to the soils of the Tikves region. Examination by ICP-AES method were carried out on fifty samples taken from the top soils. Se value in soils ranges within 1.7 mg/kg (from 1.10 to 6.30 mg/kg). The results show that the soils in the Tikves region contain elevated selenium contents compared with those in the world (Ure at al., 1979; Frank, et al., 1979; Lag, 1974, Steinnes, 1980). The increased amounts are due to the combustion of fossil fuels in the Feniindustri processing plants in the vicinity of Vozarci. It is of note that the increased amounts of selenium are due to the dry climate that enhances the increase of selenium in the soil and the use of fertilizers in vineyards. Investigations carried out for the presence of nickel in the soils of the Tikves region indicate that its mean value amounts to 83.2 mg/kg (from 27 to 195 mg/kg). A comparison with the values found in some countries in the world indicates that in the area of Sirkovo and Rosoman there are increased contents of nickel (Bradley, 1980; Aubert et al., 1977; McKeague et al., 1974; Tjell et al., 1972). The increased contents of nickel are similar to the values published for some region in the world in which contamination comes from local sources, mostly industry (mainly non-ferrous industries, iron, steel and chemical industries), agriculture, use of mineral fertilizers, especially phosphates, road traffic etc. (Cox et al., 1981). Cr contents in the soils of Tikves are within the 25 – 198 mg/kg interval (mean value of 90.62 mg/kg). The highest chromium concentrations have been found near the villages of Sikovo and Rosoman. A comparison between the results obtained for chromium concentrations in Tikves with those published for some countries in the world (Naidenov et al., 1977; McKeague et al., 1980; Kitigashi et al., 1981; Ure et al., 1979) shows that chromium concentration in Tikves are similar to those found in other

countries in the world. Content of B in the soils of the region under consideration is within the 21 – 47 mg/kg interval or mean value of 38.72 mg/kg. Boron concentrations in the soils of Tikves are similar to those in certain parts of the world (Kosanovic et al., 1962; Ravikovic et al., 1961; Cumakov, 1988).

The content of Cd in the area ranges from 1.20 to 6.90 mg/kg or mean value of 3.5 mg/kg. It is obvious that the content of cadmium is relatively high compared to the content of the element in other parts of the world (Kabata – Pendias, 1981; Frank et al., 1979; Rauta et al., 1985). Increased concentrations of cadmium have been found in other regions of the Republic of Macedonia, which points out the possible anthropogenic emission of cadmium in the wider region.