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P7. HEAVY METAL TOXICITY in THE GEOTHERMAL WATERS

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The world needs alternative renewable primary energy resources. One of alternative energy sources is geothermal waters. Geothermal waters have been used for multiple purposes such as irrigation, fishing, greenhouse heating, mushroom growing, thermal spring. Geothermal waters are originated from volcanic areas. The hot waters contacting with the rocks absorb many of metal. The absorbed metals in the waters interfere to soil and groundwaters The heavy metals solubled in high concentrated are toxic effect. Boron and arsenic are two metals present the most in the geothermal waters. The quantity of boron and arsenic and derivaties of them in waters became a basic problem in soil and water. The boron in soil changes from 10 to 300 mg/kg depending on amount of organic matter, soil type and precipitation. The boron in groundwater occurs via washing of rocks and soils containing borate and borosilicate. Geothermal hot waters convert arsenic sulfides into arsenic trioxide by weathering of rocks via temperature effect. Therefore, the arsenic compounds mixes into rivers or groundwaters after dissolution. Consequently the groundwater pollution rich arsenic is a serious threat to mankind all over the world. It is reported that the concentrations of arsenic and boron in the groundwaters are 0.1-1.5 mg/l and 1-60 mg/l, respectively. Arsenic causes pollution by leaching of agricultural soils and then mixed with potable waters. WHO reported that the concentrations of arsenic in potable water have to be between 10 and 50 mg/l. The serious healthy problems caused by the arsenic in potable waters have been proved with many researches. The high concentrations of boron in the potable waters cause soil toxicity. Thus, the soil fertility and quality decreases, this affects crop rotation negatively.

The effects of arsenic and boron in the geothermal waters of Turkey on the human health and environment will be discussed in this review paper.