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The role of waste thermal water in the soil degradation

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Thermal water exploitation is widespread, because it is considered to a „green" renewable energy source, the transporter of the Earth crust's heat. It is suitable for very diverse purposes: balneology, heating, mineral water, municipal hot water supply, technological water, etc. After usage, large amount of thermal water becomes sewage water with high concentrations of salts, heavy metals, ammonia, nitrate, and high temperature. Besides that, most of these waters have an unfavourable ion composition. Na+ (and in some cases Mg+) is predominant among cations. A common way of treatment is to let off the waste thermal water in unlined ground channels to leak into the soil. This can cause physical and chemical soil degradation. Continouos Na+ supply occurs, that occupies the place of Ca2+ on the ion exchange surfaces. Thus, adverse effects of Na+ can appear, like formation of extreme moisture regime, peptization, liquefaction. Beside Na+, Mg2+ also helps the formation of physical degradation in the soil. High water retain and unfavourable structure evolves.

Not only the physical features of the soil are touched, fertility of production sites as well. Namely sorrounding the unlined ground channels, agricultural areas are seated, so it is important to protect productivity of the soil to maintain yield. Because of the seepage of high salt concentration waters, salt accumulation can be observed near to the channel lines.

The investigated sample sites are located in the Great Hungarian Plane. We determined the main pollutants of the thermal waters, and the effects to the sorrounding soils. On two selected investigation areas (Cserkeszőlő, Tiszakécske) salt profiles and Na+ adsorption isotherms are presented to characterize soil degradation. Genetic soil types are differ on the investigated areas, so the aspect of impact is different, as well.