

# INVESTIGATION OF SORPTION OF 2,4-DICHLOROPHENOL ON SPECIAL HUNGARIAN OIL SHALE

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## **Abstract**

Environmental pollution would be a global problem therefore new methods have to be developed in order to eliminate the different contaminants e.g. from the natural waters. Special problems are caused by the organic pollutants generated in the chemical industry and agriculture (technological intermediates, pesticide residues etc.). These compounds are often highly toxic and contaminate both the soil and the groundwater. The study of environmental behavior of these chemicals is very important and can help in pollution prevention.

The aim of the present work was to find a method to reduce the groundwater contamination caused by organic compounds. The applicability of a special Hungarian oil shale as an adsorbent was tested. The organic material content of the applied oil shale was above 30 % being mostly kerogen. Static equilibrium experiments were carried out in order to study the adsorption of 2,4-dichlorophenol from aqueous solution using analytical methods like HPLC-UV. The data fit to a Langmuir-like isotherm within the equilibrium concentration range of 0 and 100 mg/l. According to the laboratory tests conducted so far this adsorbent immobilizes the contaminants more efficiently than a number of other substances applied in different remediation technologies. Concerning the amounts added, above 90 % of the 2,4-dichlorophenol was adsorbed by the oil shale.

The contaminants are bound strongly by the sorbent therefore they cannot be washed out by the groundwater flow. It results in prolonged retention time of these compounds thus their biological availability will be better. The sorbent has its own special bacterium flora which can lead to effective biodegradation as well as to lower toxicity.

The application of the oil shale has a significant advantage because it does not require a separate treatment process for regeneration. Results showed that this oil shale can be used efficiently in the treatment of natural waters polluted by chemicals.

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