

ENVIRONMENTAL IMPACT OF OPEN DEPOSITIONS OF SOLID WASTE FROM ESTONIAN OIL SHALE INDUSTRY: ECOTOXICOLOGICAL ASPECTS

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Estonia accounts for 70% of the world's processed oil shale and generates over 90% of its power from oil shale. Oil shale mining and processing generate various wastes such as waste rock, semi-coke, ashes. They are currently deposited in open sites and potentially inducing hazard to surrounding soils and groundwater. Controversial opinions have been published concerning environmental consequences of oil shale mining. Indeed, research has demonstrated that for environmental assessment, mobility and bioavailability are the most important parameters which can not be deduced from the total concentrations measured in waste streams or emissions. Also, (eco)toxicity of contaminants in matrixes such as soil, sediment and solid wastes cannot be predicted by chemical analysis of selected pollutants/parameters.

We will present a critical review of the ecotoxicological risk of open deposition of solid wastes from oil-shale industry based on a combined chemical and ecotoxicological approach showing that oil shale combustion ashes and fresh semicoke did not contain heavy metals, oil products, PAHs and phenols in hazardous levels but showed water-extracted toxicity, mostly due to unfavorable pH (1). Also, the data on oil shale combustion ashes were re-evaluated in the context of ecotoxicological impact of potential use of oil shale combustion ashes for CO₂ sequestration/carbon management (2). This review shows the usefulness and need for combined use of chemical and biological methods for a better environmental monitoring and a meaningful hazard evaluation of oil shale industry waste streams.

References

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2. Kahru, A., Sihtmäe, M. (2007). The potential ecotoxicological effects of CO₂-neutralised/carbonated oil shale combustion ashes. In Estonian with English summary. Chapter 3 from the report “ “Süsihappegaasi heitkoguste mineraalse sidumise ja geoloogilise ladustamise võimaluste hindamine tehnoloogiliselt, geoloogiliselt ja toksikoloogiliselt” (Technological, geological and toxicological evaluation of CO₂ mineral sequestration)

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