

## **Thermal treatment for beneficial use of petroleum impacted dredged marine sediment with enhanced ecological values as soil**

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The beneficial use of dredged marine sediment which is enormously generated every year due to management and development of navigation-channel is considered as a sustainable treatment option due to the limitation of ocean disposal treatment. The dredged sediment is sometimes contaminated by total petroleum hydrocarbon (TPH) and heavy metals because of anthropogenic activities. The contaminated sediment should be properly remediated to reduce ecotoxicological effects from contaminants in sediment and enhance ecological values of treated sediment if it is to be utilized as soil. The TPH contaminated dredged sediment was thermally treated for beneficial use as soil with enhanced ecological value. The TPH in sediment was effectively removed using thermal treatment (TT). Thermal treatment was conducted at 300 celcius and for 30 mins using a muffle furnace. The physicochemical properties (TN, TP, CEC, TOC etc.) of treated sediment were not significantly changed due to relatively low treatment temperature and short residence time. Mobility and fractionation of residual heavy metals in treated sediment were also changed presumably due to newly formed char on sediment particles and repartitioning among the sediment matrix as indicated by the sequential extraction procedure and toxicity characteristic leaching procedure (TCLP). The germination and growth of barley were not improved after treatment due to salinity increase which was mainly caused by sulfur oxidation and partitioning of volatile substances generated during treatment. In order to enhance the ecological values of thermally treated sediment, ventilation during thermal treatment for off-gas discharge and water washing for salinity removal after thermal treatment were applied. The germination and growth of barley were considerably improved via both treatments.

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