Investigating the Potential Use of Different Adsorbents to Mitigate Soil Contamination

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This research addresses the use of several adsorbents in mitigating soil contamination of heavy metals and radionuclides. Many radiological or heavy metal sources emit harmful substances such as Lead, and Cesium. These dangerous substances accumulate in the soil, and plants absorb them through their roots. The objective of this research is to find a suitable combination of adsorbents and pollutants, in ideal conditions, and application methods. This was done through several quantitative analysis methods such as ICP-MS and SEM. These were utilized to measure the concentrations of the adsorbents and pollutants within the soil in several conditions. In addition to investigating the physical changes in the soil before and after remediation. Many samples were tested with varying soil depths such as 0-15cm and 15-30cm, and amounts ranging from 0.1-1g. Initially, the soil was tested alone with contaminants like Lead and Cesium to observe the highest retention rates. It was concluded that Lead was retained better by the soil. Further on, it was investigated which soil types worked best with which adsorbents; such as zeolite, bentonite, and silicate– in tackling the pollutants present. Once an ideal combination was found, such as Lead and silicate with 100% adsorption; a control variable was set with a variation in amounts of soil, pollutant, and adsorbent. This was created to test the adsorption isotherms and understand fully the model behind the adsorption that took place. The results show a promising future as the ideal conditions were found, which will move on to future work focusing on ideal application methods. On the other hand, Cesium has shown distinct results from its other samples with zeolite, reaching 86%, which can be explored to find optimum conditions.

Technical Track

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Primary author:　DAMLAKHAN, Fatima (KACST)

Co-author:　Dr ALSHEHRI, Salman (KACST)

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