

VIRTUAL EVENT

International Conference on
**Management of Naturally
Occurring Radioactive
Material (NORM) in Industry**

19–30 October 2020

#NORM2020



Contribution ID: 101

Type: Poster

NITRIC ACID SOLUTION RECYCLE AFTER CHEMICAL TREATMENT OF POLLUTED IRAQI SOIL WITH NATURALLY OCCURRING RADIOACTIVE MATERIALS “NORM”

The reuse of waste leaching nitric acid solution acquired from previously treated, Radium polluted soil collected from Al-Basrah governorate - Al-Rumaila oil field, was investigated using five types of adsorbents (Shamplan plant, Palm fiber, Fresh tea, Bentonite clay and Zeolite 5A) using batch adsorption experiments. Among all, fresh tea and zeolite had the best performance. Therefore, they were subjected to a further comprehensive study. The effect of dosage (5,10,15,20, and 25 g), temperature (20,40, and 50°C), and pollutants initial concentrations ^{226}Ra (210.25, 800.86, 1487.85 Bq/L), ^{228}Ra (42.24, 173.99, 307.81 Bq/L) and ^{224}Ra (92.02, 347.15, 454.14 Bq/L) were investigated. The highest removal efficiency for ^{226}Ra , ^{228}Ra , and ^{224}Ra were 51, 48, and 47 using zeolite and 35, 31, and 79% using fresh tea respectively. Freundlich equilibrium sorption isotherm represented the measured sorption data with correlation coefficient of 0.977, 0.958, and 0.971 using zeolite and 0.971, 0.882, and 0.973 using fresh tea for ^{226}Ra , ^{228}Ra , and ^{224}Ra respectively. Kinetic modeling analysis showed that the pseudo-second order equation was the most appropriate model with correlation coefficient of 0.997, 0.998, and 0.989 using zeolite 0.994, 0.957, and 0.973 using fresh tea for ^{226}Ra , ^{228}Ra , and ^{224}Ra respectively.

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Session Classification: Session III - Experiences Related to Decommissioning of Facilities and Remediation of Contaminated Sites

Track Classification: NORM Decommissioning and Environmental Remediation