

Annals of Civil and Environmental Engineering

Volume - 8, Issue - 1

Research Article

Published Date:-2024-04-25 10:58:18

[Evaluation of Soil Water Characteristic Curves of Boron added Sand-bentonite Mixtures using the Evaporation Technique](#)

Compacted bentonite or sand-bentonite mixtures are considered buffer/backfill materials in the engineering barriers of deep geological repositories for high-level nuclear waste (HLW) disposal in many countries. The design and long-term functionality of nuclear repositories have critical importance for environmental safety and public health. The initially unsaturated buffer material could become re-saturated long after following the sealing of the repository. Although the saturation degree of the buffer might decrease due to high temperatures and evaporation, it tends to increase with groundwater intrusion. Therefore, the soil water characteristic curves (SWCCs) for these unsaturated soils are a key factor in geotechnical engineering. Yet, the determination of SWCCs can be time-consuming and prone to inaccuracies. The HYPROP (Hydraulic Property Analyzer) evaporation technique is a preferred method for accurately determining water retention curves of soils. This reliable method was applied to estimate the water retention curves for sand-bentonite mixtures in the presence of boron minerals. Known for their minimal thermal expansion and commonly used in various industries, boron minerals may improve the thermal stability of sand-bentonite mixtures. The findings revealed that the boron addition increased the water retention capacity of the 10% bentonite mixtures but had a negligible impact on the 20% bentonite mixtures.

Research Article

Published Date:-2024-04-02 16:36:56

[Drinking-water Quality Assessment in Selective Schools from the Mount Lebanon](#)

The present study aims to assess and compare the quality of drinking water according to WHO Standards and then illustrate the resulting diseases. Eight samples have been taken from selective different schools in the Mount Lebanon Region. The laboratory tests of the collected samples were performed to determine various physical (e.g., temperature, pH, electrical conductivity, etc.), chemical (Ca^{+2} , Cl^- , Fe, Mg^{2+} , NO_3 , Na^+ , SO_4^{2-}), and microbial such as E. coli, coliform, and non-coliform. Several techniques were used for the analysis including Atomic Absorption Spectrometry, Flame Photometer, and Total Organic Carbon (TOC). The resulting water quality was compared with the standard limits. Each school has different defects according to specific contamination that existed. To save local residents and according to the results of this study, regular monitoring for water quality was proposed; besides more water filtration plants should be installed to provide safe drinking for children's health.

Research Article

Published Date:-2024-02-09 17:16:05

[Isolation and Influence of Carbon Source on the Production of Extracellular Polymeric Substance by Bacteria for the Bioremediation of Heavy Metals in Santo Amaro City](#)

The city of Santo Amaro (Bahia, Brazil) gained visibility among the scientific community due to the contamination of the Subaé River by lead and cadmium from the PLUMBUM Mineração e Metalurgia Ltda industry, on the banks of the river in 1956, which produced lead ingots. The present work aimed to investigate the adsorption capacity of heavy metals (Pb and Cd) of EPS produced by bacterial species from the Subaé River, for possible future application of these biopolymers in bioremediation processes in areas impacted by the aforementioned heavy metals. Subaé river water was collected for physical-chemical analysis and bacterial isolation. It was verified that all isolated bacteria produced an expressive amount of Exopolysaccharide (EPS). Thus, the optimization of this production in different sugars (sucrose, glucose, and mannitol) and in three different pHs: 5.5; 6.5, and 7.5. All bacteria produced EPS in large quantities and the best sugar was sucrose at pH 7.5. In order to use the EPS for the bioremediation area, the adsorption test of lead and cadmium was carried out by the isolated EPS. 0.5 g of the EPS was dissolved in 50 ml of deionized water, then the solutions of metals, lead acetate, and cadmium sulfate (procedure performed separately) were incubated at 28 °C for 16 h after that period, and were centrifuged. Samples were filtered to separate the insoluble EPS and the filtrates obtained were used in the quantification of the metals by atomic absorption (FAAS- Flame Atomic Absorption Spectrometry). *Bacillus* spp., *Bacillus cereus*, *Staphylococcus* spp., and *Serratiamarcescens*, all showed tolerance to the tested metals, due to the efficiency in the adsorption capacity of the EPS, and it was possible to distinguish seven genera, *Klebsiella pneumonia*, *Pseudomonas aeruginosa*, *Lysinibacillus* spp. to be used in the bioremediation of environments contaminated with heavy metals.

Review Article

Published Date:-2024-01-23 11:10:52

[Management and use of Ash in Britain from the Prehistoric to the Present: Some implications for its Preservation](#)

The properties that make the wood of fast-grown Ash pliable, strong, and resilient have been exploited by man for thousands of years, and are illustrated by reference to the probable use of Ash timber for tools, arms, and transport by the Roman Army of Occupation in Britain two thousand years ago. Militarily organized and disciplined, the Roman Army was responsible for changing the face of Britain with huge infrastructure projects that required significant numbers of tools, equipment, and fuel, in addition to the arms it used to maintain control over the fractious tribes of the north. The extent to which it maintained supplies of this valuable resource by managing its woods, possibly by coppicing, is discussed and raises the question as to the degree of genetic selection involved in coppicing.

Ash: *Fraxinus excelsior*: extinction: prehistoric and historic uses: Roman army military use of Ash.
