

عنوان مقاله:

Compost' leachate recycling through land treatment and application of natural Zeolite

محل انتشار:

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خلاصه مقاله:

Background: The entrance of untreated wastewater or disposal leachate to water resources such as surface water, groundwater or irrigation water increases the risk of contaminant accumulation. Removal or deduction of water contaminant concentration is then crucial before entering water to the natural resources or its transfusion directly to the soil as irrigation water. Four studies were carried out in a pilot plant to evaluate the effect of natural zeolite to decrease chemical and biological index of compost factory leachate. Land treatment was considered as the main strategy; however, some pouding and column experiment was implemented as well. Wastewater chemical and biological indexes were analyzed. These indexes consisted of Na, K, Mg, Ca, Co₃, HCO₃, Ni, Cd, Pb, Cr, chemical oxygen demand (COD), fecal coliform and total coliform (TC). In addition, soil was analyzed for EC, pH, cation and anion. Results: In the first study, three types of zeolite derived from Semnan, Mashhad and Miyaneh mines were tested with four sizes (70, 140, 270 and 840 μ m) at 25°C in summer 2007. It was concluded that high value of the cation concentration in the leachate causes neither adsorption of remaining cation nor heavy metals. There was no statistically significant difference between the zeolite sizes and the heavy metal adsorption. The results also showed that the adsorption ratios were 52%, 23% and 40% for Na, Ca and Mg, respectively. In the second study, a loamy sand soil was enriched by adding 5% and 10% of the zeolite. The result uncovered that adding 10% of the zeolite to the soil brings about more elements' absorption in comparison to application of the 5% zeolite. Irrigation with the leachate reduced soil specific yield significantly. In the third study, a complete randomized design experiment was used with six treatments (two kinds of soil, loamy sand and clay loam, and three levels of zeolite, 0%, 5% and 10%) and three replications performed in the lysimeter size. The results revealed that irrigation with the leachate reduces soil bulk density, infiltration rate and saturated hydraulic conductivity. Heavy metals could not be absorbed by loamy sand soil, whereas clay loam soil had a high ability to absorb heavy metals and reduce the salinity. In loamy sand and clay loam soil, 10% zeolite had a significant effect on heavy metals' absorption. The result of subsequent study (the same setup as the third study) exhibited the fact that the COD was significantly decreased by ... application of 5% zeolite, while this reduction occurred via applying 10% of zeolite in TC. Conclusions: In short, this

