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Characterization and leachability propensity of bottom ash from medical waste incineration

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Abstract: The leachability of bottom ash medical waste from a Jordanian incinerator was studied in this work. The ash was characterized in terms of particle size distribution, chemical and mineralogical composition followed by leaching of several size fractions at different conditions (leaching time, temperature, initial pH, particle size and solid liquid ratio). The major elements found in the ash were Ca, Si, Al, Cl, Na, Fe, Ti, S, Mg, Ba and K, while the main mineral phases found in the ash were calcite, halite, sylvite, anhydrite, hematite, hydrochlorborite, cristobalite, melanterite and chlormayenite. Leaching data indicates that as leaching time and S/L increased, the concentration of metals increased in the leachate. The highest leaching level was at a S/L ratio of 60 mg/ml. As the particles sizes decreased, the concentration of the majority of metals studied increased. Meanwhile, the effect of particle size on other metals wasn't regular due to the fact that sieving resulted in more concentrated metals at certain particle size. Leachability results also indicate that variation in the initial pH has a slight effect on the degree of leaching. The concentration of some metal ions increased with temperature, while others increased initially but subsequently decreased. The extracted quantities of all the heavy metals were less than the limits set by EPA.