



Title

EQUIPMENT AND PROCESS OF DECONTAMINATION BY WASHING OF HEAVY METAL POLLUTED SOILS



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Patent/ Application number

Patent OSIM: RO133822 -B1/29.04.2021



Short presentation

The process uses a suitable mixing and shredding equipment where the contaminated soil together with the washing solution containing potassium salts of humic acids and chitosan is introduced into the attrition chamber, inclined at 1° with respect to the horizontal plane. The stirring of the mixture in the attrition chamber is performed with 12 mixing blades arranged on a rotating shaft and inclined at 3° with respect to the rotating shaft. The rotating shaft is driven by an electric motor. This decontamination process and equipment for washing of heavy metal polluted soils ensures a high contact of the soil particles with the washing solution, which leads to high efficiency. By using this process and equipment the need for soil sorting on small particle size prior the decontamination is eliminated, and it is also an ecological process due to the nature of the washing agents used. By using this equipment and process in the case of treating, in a single step and under optimal conditions, an amount of 400 g of sandy soil contaminated with heavy metals with an initial concentration of 633.05 mg/kg of lead, 424.81 mg/kg of copper, 201.76 mg/kg of zinc, 45.38 mg/kg of chromium and 13.68 mg/kg of nickel using a washing agent containing 5% soluble potassium salts of humic acids (pH=9.60), in a soil:solution ratio of 1:5 (g/mL) and a stirring time of 360 minutes at 700 rpm, the decontamination efficiency reaches 99.06% and 37.65% in the case of lead and copper, respectively. In the case of treating, in a single step and under optimal conditions, an amount of 250 g of the same sandy soil using a washing agent containing 2% chitosan (pH=7.88), the decontamination efficiency reaches 91.02% and 49.79% in the case of lead and copper, respectively.



Applicability

Decontamination of soils polluted with heavy metals - an innovative soil washing process and equipment for decontamination of soils polluted with heavy metals using soluble potassium salts of humic acids and chitosan have been developed. The soil washing equipment developed can also be adapted to treat polluted soil with organic pollutants and to use other washing agents. Ecological rehabilitation of heavy metal polluted sites – a larger capacity soil washing plant based on this patent can be used for the ecological rehabilitation of heavy metal polluted sites.



Images

