



Adsorption characteristics of amended bioretention fillers on heavy metals

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ABSTRACT

Static experiments of single fillers and mixed fillers were performed to study the adsorption and desorption characteristics of soil and amendments on heavy metals. Bioretention dynamic simulation experiments were conducted to study the effects of amended media on heavy metal removal in urban runoff. Efficient mixed improvement fillers were screened and developed. The results showed that the adsorption capacity of bioretention soil media (BSM) + 10% fly ash (by mass) for heavy metal Zn was higher than that of other fillers. Under the condition that the influent concentration of Zn was 0.5 mg/L, BSM, BSM + 10% medical stone, BSM + 10% water treatment residue, and BSM + 10% green zeolite were added to the minicolumn, and the effluent concentration of Zn increased with the water inflow. After the recurrence interval of the influent water volume reached 3 years, the effluent Zn concentration gradually approached 0.4 mg/L. The minicolumn packed with BSM + 10% fly ash showed a continuous long-term adsorption capacity. After 18 d of operation, the adsorption rate of minicolumn BSM + 10% fly ash was up to 83.06%, and the concentration of effluent Zn was less than 0.20 mg/L. These values meet the Class II surface water environmental quality standards of China. In engineering applications, mixed amended BSM can be added to control the degree of contamination of receiving water bodies by heavy metals.

Keywords: Bioretention; Runoff pollution; Isothermal adsorption; Heavy metal

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