Adsorption and desorption of copper(II) ions onto garden grass
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highlights
"Garden grass (GG) exhibits an excellent sorption capacity for the removal of copper.
"Physical sorption occurs onto garden grass.
"Copper sorption capacity was 58.3428–60 mg/g for 1 g doses.
"Sulphuric acid was the better eluent for copper.
"Desorption system could be explained by the isotherm models.

abstract
The garden grass (GG) was firstly used to remove copper(II) from water as bioadsorbent. From the results of characterisation, the GG had the merits of high specific surface area, significant adsorption sites and functional groups. Copper-adsorption significantly depends on the initial copper concentrations, contact time, pH, adsorbent doses, particle sizes and temperature. The positive values of \( \Delta G \) indicates that the adsorption of copper onto garden grass is non-spontaneous and values lies within the ranges of 4.452–13.660 kJ/mol for supporting physical adsorption. 0.1 N H\(_2\)SO\(_4\) was found as suitable eluent, which could be used 5 cycles of adsorption–desorption. The data from adsorption and desorption equilibrium were well fitted by the Langmuir, SIPS and Redlich–Peterson isotherm models. The maximum adsorption and desorption capacities were 58.34 and 319.03 mg/g, respectively, for 1 g dose. Adsorption and desorption kinetics could be described by the Pseudo-first-order model.

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