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CERTIFICATE OF PRESENTATION

With this certificate we acknowledge the ON SITE oral presentation
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Removal of Hexavalent Chromium from Aqueous Solutions Using Eucalyptus Chips

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Maachou, Mohamed Hachi, Ghezlen Berrahou, Nail Elmebrouk Ben Amara,
Housseem Eddine Sayah*

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Secretary of the Conference

Guzovic Zvonimir

Removal of hexavalent chromium from aqueous solutions using Eucalyptus chips

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Abstract

This research aimed to investigate the kinetic equilibrium and thermodynamics involved in removing hexavalent chromium from aqueous solutions using Eucalyptus chips. Laboratory-scale experiments were conducted, exploring the impact of sorbent quantity, pH levels, and initial hexavalent chromium concentrations on biomass removal capacity within a 5-hour treatment period. Optimal conditions were identified as follows: a pH of 4.5, an initial chromium concentration of 100 mg/L and a biosorbent dose of 1 g/L, under these conditions, the biosorption capacity reached 69.46 mg/g. The modeling study revealed that the pseudo-second-order model effectively described the adsorption kinetics, with external mass transfer identified as controlling the biosorption process in diffusion kinetics analysis. Data from the adsorption equilibrium were well-fitted by the isothermal models Dubinin-Radushkevich, Langmuir, and Temkin. The biosorption process was determined to be endothermic and spontaneous based on thermodynamic studies.

Desorption, a crucial aspect, has facilitated the recovery and reuse of eucalyptus chips for more than three cycles, with appreciable yield. The metal recovered in a reduced volume can then be reused or treated by physical or chemical means, which offers economic advantages. Significantly, eucalyptus chips, originally destined for incineration, have been reused as a potential biosorbent for heavy metals, without further treatment. This approach is in line with the principles of environmental protection and waste recovery, and is part of a sustainable development strategy. The adsorption of hexavalent chromium onto Eucalyptus chips presents a novel and sustainable approach for environmental remediation. This method utilizes a natural and abundant material to efficiently remove toxic chromium from water sources. By offering an eco-friendly alternative to conventional adsorbents, Eucalyptus chips contribute to mitigating water pollution and protecting ecosystems.

Key Words: Hexavalent chromium; Biosorption; Eucalyptus chips; Waste water treatment

Approach to mechanical recycling and biorefinery.

- SDEWES2024-0852 The concept of a technological system for treatment and using rainwater in swimming pool installations
- SDEWES2024-0843 Zero-Carbon Emission Renewable Natural Gas Production from Municipal Solid Waste (MSW) via Chemical Looping

Waste and wastewater treatment and reuse 4 (Wed 11/09 09:00)

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- SDEWES2024-0785 Rethinking the energy concept of wastewater treatment plants for an efficient use of available heat potentials
- SDEWES2024-0632 ASSESSING THE QUALITY INDEX OF TREATED WATER FROM THE BOUMERDES WASTEWATER TREATMENT PLANT IN ALGERIA
- SDEWES2024-0748 Evaluation of Construction and Demolition Waste Management Practices Towards Achieving the UN SDGs Using BWM and Fuzzy-TOPSIS
- SDEWES2024-0741 Removal of hexavalent chromium from aqueous solutions using Eucalyptus chips.
- SDEWES2024-0718 Analysis of the impact of impurities of PEM electrolyser for hydrogen production

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- SDEWES2024-0961 Coupling Seawater Desalination with Hydrogen Production by Conventional Electrodialysis
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- SDEWES2024-0905 Degradation of Glyphosate in Agriculture Wastewaters through Photocatalysis Combined with Microalgae Treatment
- SDEWES2024-0432 Toxicity and Environmental Burden of Fischer-Tropsch Catalytic Synthesis Wastewater