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Kasdi Merbah University, Ouargla
Faculty of Applied Sciences
Department of Mechanical Engineering
Applied mechanics and energy systems laboratory (LMASE)

# CERTIFICATE OF PARTICIPATION

This certificate is awarded to

## Ali ALOUACHE

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**Examination of Experimental Data and Breakthrough Curves for Hexavalent Chromium Biosorption Using Eucalyptus Chips in a Fixed-Bed Column**

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# Examination of Experimental Data and Breakthrough Curves for Hexavalent Chromium Biosorption Using Eucalyptus Chips in a Fixed-Bed Column

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**Abstract:** This study examined using biomass from eucalyptus chips in a fixed-bed column to remove Cr(VI) from aqueous solutions. Through experimental trials, a number of important design parameters, including bed depth (10–15 cm), flow rate (5–20 mL/min), and inlet concentration (30–50 mg/L), were investigated. 15 cm of bed depth, 10 mL/min of flow rate, and 50 mg/L of intake concentration were found to be the ideal parameters. Additionally, the experimental data was analyzed and breakthrough curves under various operating conditions were predicted using the BDST, Thomas, and Adams–Bohart models. The BDST model demonstrated strong agreement with the experimental findings. The Adams-Bohart model worked well for the first stage of biosorption, but the Thomas model (R2 > 0.97) appropriately reflected breakthrough curves. Three cycles of biosorption regeneration were conducted using the biosorbent after washing Cr(VI) with 0.05 M HNO3 to renew the column. The results showed noteworthy Cr(VI) elimination and effective regeneration, however there was a small decrease in biosorption capacity across cycles. In fixed-bed column applications, eucalyptus chip biomass has emerged as a viable biosorbent for the removal of Cr(VI).

***Keywords:*** *Eucalyptus chips, Hexavalent chromium, Biosorption; Modeling; Fixed-bed column*

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