

## Removal of Chromium (VI) from Aqueous Solution by Teff (Eragrostis Teff) Husk Activated Carbon: Optimization, Kinetics, Isotherm, and Practical Adaptation Study Using Response Surface Methodology

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**Abstract :** Recently, rapid industrialization has led to the excessive release of heavy metals such as Cr (VI) into the environment. Exposure to chromium (VI) can cause kidney and liver damage, depressed immune systems, and a variety of cancers. Therefore, treatment of Cr (VI) containing wastewater is mandatory. This study aims to optimize the removal of Cr (VI) from an aqueous solution using locally available Teff husk-activated carbon adsorbent. The laboratory-based study was conducted on the optimization of Cr (VI) removal efficiency of Teff husk-activated carbon from aqueous solution. A central composite design was used to examine the effect of the interaction of process parameters and to optimize the process using Design Expert version 7.0 software. The optimized removal efficiency of Teff husk activated carbon (95.597%) was achieved at 1.92 pH, 87.83mg/L initial concentration, 20.22g/L adsorbent dose and 2.07Hrs contact time. The adsorption of Cr (VI) on Teff husk-activated carbon was found to be best fitted with pseudo-second-order kinetics and Langmuir isotherm model of the adsorption. Teff husk-activated carbon can be used as an efficient adsorbent for the removal of chromium (VI) from contaminated water. Column adsorption needs to be studied in the future.

**Keywords :** batch adsorption, chromium (VI), teff husk activated carbon, response surface methodology, tannery wastewater

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