

As natural and low-cost material, *Stipa tenacissima* L. fibers were used as an adsorbent to remove methylene blue from aqueous solutions. Alkaline procedure was used to remove non-cellulosic substances to improve sorptive capacity by changing fiber morphology which was analyzed by FTIR, X-ray diffraction, ATG and SEM. A mesoporous structure was developed and the specific surface (S_{BET}) was notably increased from ~ 3 to $62.48 \text{ m}^2/\text{g}$. Batch sorption show that equilibrium was obtained with: 5 g/L of fibers after 40 min at 30°C , the adsorbed dye amount increases with increasing pH. The removal rate was about 99.11%. Experimental data were well described by Freundlich isotherm model; while adsorption kinetic constants fitted with the pseudo-second order one. The adsorption thermodynamics and isotherms found to be consistent with a spontaneous exothermic physic-sorption reaction (negative value of $\Delta H^\circ < 20\text{K Joule/mole}$). Alfa fibers could be used advantageously to eliminate methylene blue from aqueous solutions.