

Modification of Waste Hemp and Flax Fibers for Removal of Selected Sedative Residues from Polluted Water

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The possibility of utilizing waste lignocellulosic fibers for the removal of selected sedative residues from polluted water was investigated as an attempt to reuse textile waste and reduce its disposal costs. To increase the adsorption efficiency, waste hemp (H) and flax (F) fibers were modified with a benzoyl peroxide solution. Unmodified and modified fibers (H_{BP} and F_{BP}) were characterized by scanning electron microscopy and Fourier transform infrared spectroscopy, and it was found that applied modification caused the differences in morphology and surface chemistry, as the consequence of changes in the distribution of hemicelluloses in the structure of examined fibers. Adsorption properties were examined in the means of adsorption kinetics, isotherms, and the influence of the initial pH of the adsorption solution. The applied modification increases the adsorption capacities of examined fibers, especially for bromazepam removal. Also, modification increases the adsorption rate and changes its order, while adsorption equilibrium data fits better the Langmuir isotherm model. Obtained results showed that waste hemp and flax fibers can be applied as low-cost adsorbents to efficiently remove sedative residues from water.

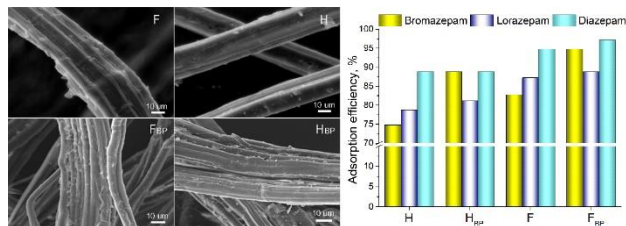


Fig. 1. SEM photographs and adsorption efficiency of examined fibers

Keywords: waste materials, lignocellulosic fibers, modification, adsorption, sedatives.

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