

Organic dye removal by combined adsorption–membrane separation process

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ABSTRACT

Wastewater reuse is one of the principal tasks of modern industry. For this purpose several physical, chemical and combined methods have been used. This contribution deals with the study of combined adsorption–membrane separation process in water treatment. The hollow fiber membrane microfiltration dead-end process combined with adsorption on powdered activated carbon (PAC) was used to separate organic dye from water solutions. Adsorption characteristics of organic dye Egacid Red G200 on PAC were studied in batch experiments. From the experimental data the parameters of Langmuir, Freundlich and Sips adsorption isotherms were evaluated. The Langmuir type kinetic model was investigated to find the best-fitted model for the experimental data obtained. During the submerged hollow fibre membrane microfiltration operated in dead-end mode it was found that the membrane was effective for removal of PAC particles from water suspensions. Only limited membrane fouling was observed in the range of variables tested. From this study it is evident that the combined membrane process has a potential application for organic dye removal.

Keywords: Membrane microfiltration; Wastewater; Organic dye; Adsorption; Activated carbon

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