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## Prediction of the Adsorption of Diazepam by Activated Carbon in Aqueous Media

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**Abstract:** Adsorption isotherms for the diazepam-activated carbon system in simulated intestinal fluid (SIF), without pancreatin, and in SIF with different percentages of ethanol were determined as were the solubilities of diazepam in SIF and in SIF with different percentages of ethanol. The surface area of the activated carbon was also evaluated. The results for the experimental work provided information on the relationship between adsorption and solubility. An excellent logarithmic relationship was observed between the adsorption affinity and the solubility of diazepam in the ethanol-SIF mixtures. This relationship was explained by a linear relationship between the differential free energy of displacement and the differential free energy of solution. Excellent correlations were also observed between the amounts of diazepam adsorbed by activated carbon and the solubilities of diazepam in the ethanol-SIF mixtures. This relationship was used to predict the complete isotherm, which was in excellent agreement with the experimental work.