

## LSA—800B吸附树脂对苹果汁吸附脱色的动力学研究

### Kinetic studies on the adsorption of dark colored compounds from apple juice using LSA—800B adsorbent resin

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中文摘要:

该文研究了不同温度(25℃~70℃)和不同树脂浓度(1, 2, 4, 8 g/L)条件下LSA—800B树脂对苹果汁吸附脱色的动力学过程。试验结果表明, 该树脂吸附平衡曲线符合Langmuir和Freundlich模型, 获得了不同温度下的模型参数值 ( $K_{ad}$ 、 $Q_0$ 、 $K_f$ 和 $n$ )。吸附焓变化( $\Delta H$ )值为4.16 kJ/mol说明这一过程是吸热过程。自由能( $\Delta G$ )随温度升高而呈下降趋势说明此过程是自发过程。由试验数据进一步计算出了不同树脂浓度和不同温度下苹果汁吸附脱色的动力学参数。随着温度升高吸附能力提高, 但初始平衡时间有所减少; 在2~4 g/L的树脂浓度范围内, 吸附效果比较明显, 在55℃时, 树脂达到初始平衡的覆盖率 ( $\theta_e$ ) 较高, 据此确定了该树脂对苹果汁吸附脱色的适宜温度和树脂浓度范围分别为55℃, 2~4 g/L。

英文摘要:

The kinetic process of adsorption and decolorization for apple juice by using LSA—800B adsorbent resin were studied at different concentrations (1, 2, 4, 8 g adsorbent resin per liter of apple juice) and temperature (25~70℃). The results showed that the adsorption data of LSA—800B adsorbent resin fitted well with both Langmuir and Freundlich models. The parameters of the models ( $K_{ad}$ 、 $Q_0$ 、 $K_f$  and  $n$ ) were also obtained at different temperatures. The changes of adsorption enthalpy value ( $\Delta H$ ) of 4.16 kJ/mol indicated the endothermic nature of the adsorption process. A decrease of Gibbs free energy ( $\Delta G$ ) with temperature increase also indicated the spontaneous nature of the process. The kinetic parameters of the adsorption and decolorization for apple juice at different temperatures using adsorbent resin of different concentrations were also determined. The adsorption ability was improved with increasing temperature, but the initial equilibrium time was decreased. The adsorption effect was comparatively evident at 2~4 g/L resin concentration, also the cover rate ( $\theta_e$ ) reached to initial equilibrium was higher at 55℃. Hereby, the suitable temperature and concentration for the adsorption and decolorization of apple juice by using the resin can be defined as 55℃ and 2~4 g/L.

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