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# 等温滴定量热法和荧光滴定法研究十二烷基硫酸钠与纤维素酶的结合

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摘要 用等温滴定量热法和荧光滴定法研究了阴离子型去垢剂十二烷基硫酸钠（SDS）与绿色木霉纤维素酶相互作用的热力学，SDS结合纤维素酶的亲和力较弱，为较 小的放热反应，并伴随着一定程度的熵增，为焓和熵共同驱动的反应，而且存在着 显著的焓-熵补偿作用。该结合过程的摩尔恒压热容为较大的负值（-186 J·mol~ (-1)·K~(-1)），这表明疏水相互作用是形成复合物的主要作用力，SDS的加入使 纤维素酶的内源荧光发生猝灭，同时导致该蛋白荧光光谱最大发射峰位的红移和酶 活力的部分丧失，这表明SDS与纤维素酶的相互作用既包含结合反应也包含SDS诱导 该蛋白部分去折叠的过程。

关键词 量热法 荧光分析 纤维素酶 十二烷基硫酸钠 荧光猝灭剂

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## Studies on the Binding of Sodium Dodecyl Sulfate to Cellulase by Isothermal Titration Calorimetry and Fluorescence Titration

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**Abstract** Thermodynamics of the interaction of an anionic detergent, sodium dodecyl sulfate (SDS), with cellulase from Trichoderma reesei has been studied by isothermal titration calorimetry and fluorescence titration. The binding of SDS to cellulase is driven by a favorable entropy increase with a less favorable enthalpy decrease, and shows strong enthalpy-entropy compensation and weak affinity. A larger negative heat capacity change of the binding, - 186 J·mol~(-1)·K~(-1), at all temperatures examined indicates that hydrophobic interaction is a major force for the binding. SDS quenches the intrinsic fluorescence of cellulase, and causes both a red shift in the maximum fluorescence emission wavelength of the protein and a partial loss in the enzymatic activity. These results indicate that the interaction of SDS with cellulase includes contributions of the binding and the partial unfolding of die protein induced by SDS.

**Key words** CALORIMETRY FLUORIMETRIC ANALYSIS CELLULASE SDS FLUORESCENCE QUENCHER

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