

Effect of Glutaraldehyde on the Conformational Properties of *Kluyveromyces lactis* β -Galactosidase and Its Application to Sucrose Biosensor Preparation

Xiaobin Kang, Guangchang Pang*, Lihua Geng¹,
Jiapeng Li, Haiqiong Song and Fang Wang

Tianjin Key Laboratory of Food Biotechnology, College of Biotechnology and Food Science,
Tianjin University of Commerce, Tianjin 300134, China

¹Ensoul Technology Ltd.,

Room 603, No. 168, Guanganmenwai Street, Xuanwu District, Beijing 100055, China

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The effect of glutaraldehyde on the conformational properties of *Kluyveromyces lactis* β -galactosidase was determined. The optimum substrate of the enzyme interchanged from lactose to sucrose when it reacted with a certain concentration of glutaraldehyde. Its mechanism was studied by detecting the changes in fluorescence absorption. This is the first discovery that β -galactosidase can be converted to another kind of enzyme which can catalyze sucrose to produce glucose rather than lactose. On the basis of this phenomenon, an amperometric sucrose biosensor using β -galactosidase modified by glutaraldehyde as the immobilized enzyme and poly- β -cyclodextrin as the carrier was prepared. The response characteristic of the sucrose biosensor was also studied. Under optimum conditions, the current response had a linear relationship with the sucrose concentration in the range of 0–2 g/dL with a correlation coefficient of 0.9996 and a response time of < 30 s. The sucrose biosensor exhibited excellent diffusion and stability, and retained its sensitivity after 7 d of continuous use. This sucrose biosensor is expected to provide an effective and economical alternative for the quick and sensitive detection of sucrose in the food and beverage industries in the future.

*Corresponding author: e-mail: pgc@tjcu.edu.cn