P2-49

Facile processing of cellulase by a biomimic of plant seed oil body

陳冠宇,[1] 葉倩妤,[1] 陳柏庭,[2] 姜中人,[3,*] 趙雲鵬 [1,*]

[1] 逢甲大學生醫工程碩士學程/化工系
[2] 南台科技大學生技系
[3] 中國醫藥大學醫技系
E-mail: oleosin91@yahoo.com.tw; ypchao@fcu.edu.tw
NSC 101-2221-E-035-057-MY3; 101-EC-17-A-10-S1-156

Industrial development of the cellulose-based production process is afflicted by the cost of cellulase. One best solution lies in an effective method for production and immobilization of cellulase. *Escherichia coli* has been well recognized as a superior protein producer. However, most of heterologous proteins have the problem of solubility in *E. coli*, which makes immobilization of recombinant proteins laborious and difficult. In this work, we addressed the issue with exploitation of artificial oil bodies (AOBs), the biomimic of plant seed oil bodies (SOBs). To illustrate, endoglucanase CelA and cellobiohydrolase CelK from *Clostridium thermocellum* and β-glucosidase Gls from *Anaerocellum thermophilum* were chosen for expression. Each of three genes was fused with oleosin (Ole), a structural protein of SOBs, and expressed in *E. coli*. All three fusion proteins (i.e., Ole-CelA, CelK-Ole, and Ole-Gls) in insoluble forms were predominantly produced. Subsequently, three hybrid proteins in the cell debris were directly mixed with plant oils and the mixture was subject to sonication to assemble AOBs. Moreover, the assembly condition and the reaction condition were optimized by response surface methodology. Consequently, recombinant CelA, CelK, and Gls were co-immobilized on AOBs and the immobilized cellulase exhibited stability for 8 repeated use. The result indicates that our approach may open a new avenue for easy processing of recombinant cellulase.

Keywords: Cellulase、Artificial oil bodies、Response surface methodology.