

以深共熔溶劑配合去乙醯酶進行幾丁質去乙醯化

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摘要

幾丁質為自然界中含量最豐富的海洋生物聚合物，廣泛的氫鍵網絡使其在大多數溶劑中的反應性和溶解性較差，這也限制了幾丁質的實際應用，因此需要將其氫鍵破壞或使其轉化為幾丁聚醣。深共熔溶劑(deep eutectic solvent, DES)的氫鍵受體可與幾丁質結構的乙醯胺基和羥基作用，導致幾丁質的分子內和分子間氫鍵斷裂，氫鍵供體則進入分子鏈之間，阻止分子鏈再聚集，而幾丁質去乙醯酶(chitin deacetylase, CDA)能使幾丁質 N-乙醯葡萄糖單元中的乙醯胺基水解，將幾丁質去乙醯化為幾丁聚醣。本研究目的為利用綠色溶劑-深共熔溶劑溶解幾丁質，再以幾丁質去乙醯酶將氫鍵結構已被破壞之幾丁質去乙醯化，將離心後之上清液和沉澱物中分離出的幾丁質，進行去乙醯度計算。本實驗所用之 CDA 最適條件為 60 °C、pH 8，且 CDA 活性會隨著保溫時間增加而下降。 α -chitin 幾乎溶於氯化膽鹼/乙二醇(CE)、氯化膽鹼/甘油(CG)、氯化膽鹼/蘋果酸(CM)、氯化膽鹼/草酸(CO)、碳酸鉀/甘油(KG)這五組 DES 中，而 β -chitin 溶解程度較 α -chitin 差，經不同 DES 作用之 α -chitin 和 β -chitin 的 FTIR 圖譜皆與市售 chitin 相似，表明經 DES 作用後的 chitin 結構沒有被破壞。經酵素作用後， α -chitin 最高去乙醯度(degree of deacetylation, DD)的組別為氯化膽鹼/蘋果酸溶解後經幾丁質去乙醯酶反應之 α -chitin (CDA CM- α)的 47.24%，表明 CM 為較佳的預處理 α -chitin 之組別； β -chitin 最高 DD 的組別為氯化膽鹼/甘油溶解後經幾丁質去乙醯酶反應之 β -chitin (CDA CG- β)的 59.09%，表明 CG 為較佳的預處理 β -chitin 之組別。

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