氣爆膨發處理對幾丁質物化性質的影響

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摘要

幾丁質(chitin)為 2-乙醯胺基-2-脫氧-β-D-葡萄糖(2-acetamido-2-deoxy-β-D-glucose)以 β-1,4 醣苷鍵鏈接的長鏈多醣，是一種具生物降解性，生物相容性，無毒性且對環境友善的生物材料，但由於幾丁質分子間以及分子內含有大量的氫鍵，而使其晶體結構排列整齊，結晶度高，導致幾丁質之溶解度低，不溶於一般的水溶液以及有機溶液，不利於後續的加工以及應用。但可運用各種物理方法，如氣爆膨發，微波輻射照射，超音波處理和 γ 輻射照射來降低幾丁質的結晶度並擴大幾丁質及其衍生物的應用。本報告的目的為探討在不同原料以及不同氣爆膨發設備且不同的膨發條件下，幾丁質經過氣爆膨發加工後對其物化性質如結晶度、乙醯度、孔洞大小等的影響。經過氣爆膨發後會使幾丁質產生褐變的現象，α-幾丁質表面從原有緊密堆疊的纖維變得較為平滑，且孔徑變大及孔洞數量增加。α-幾丁質之結晶度有顯著的降低，說明膨發可以改變幾丁質之結晶結構。但壓縮膨發處理後之 β-幾丁質其結晶度反而會提升，這可能是壓縮膨發的過程中會進行機械性擠壓，從而使結晶區被破壞後再重組。β-幾丁質之去乙醯度的確有顯著提升的效果，但 α-幾丁質之去乙醯度卻沒有都提升，在有的條件下是不變的，這可能和其使用之設備以及反應條件有關。另外，經過膨發後之 α-幾丁質其酵素水解後之產物產量都比控制組來得高。

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