解決西瓜組織培養玻璃化之問題與多重抗病轉基因西瓜珠系之構築

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摘 要

西瓜為熱帶及亞熱帶地區之重要經濟作物，在台灣同樣佔重要地位。西瓜在栽培期間易受西瓜銀斑病毒 (Watermelon silver mottle virus; WSMoV)、矮南瓜黃化病毒 (Zucchini yellow mosaic virus; ZYMV) 、木瓜輪點病毒西瓜系統 (Papaya ringspot virus Type W; PRSV-W) 及真菌等病原之危害，造成產量嚴重流失。由於缺乏抗病之遺傳材料，無法培育具有多重抗病的西瓜品系，且目前以傳統方法亦無法有效防治這些病害問題。此外，玻璃質化為西瓜組織培養過程容易產生之植物生理障害，使組織培養苗無法量產、品質降低及組織壞疽。由本研究結果發現，MS基本培養基添加SH維他命，且再添加Thiamine HCl 50 mgL-1可有效的降低西瓜苗玻璃質化的形成，提高組培苗的產率。利用農桿菌轉殖法分別將WSMoV 、ZYMV及PRSV-W等病毒之鞘蛋白基因及木瓜幾丁質分解? (Papaya Chitinase; CpCHI) 基因轉入西瓜中，企圖能得到具有抗真菌亦抗病毒的栽培株系。由瓶內接種實驗確認獲得具有抗立枯絲核菌 (Rhizotonia sloani) 的轉基因西瓜株系。本研究發現多重抗性基因CHI-ZW轉殖株比單一CHI基因轉殖株有更好的抗真菌特性。由聚合?連鎖反應及南方點漬法證明這些西瓜轉殖株皆有偵測到基因的併入，將轉殖株分別接種ZYMV、PRSV-W及R. solani；結果顯示，具有不同抗性程度及具有高度抗性的轉殖株。由西方點漬分析顯示各轉殖株之chitinase表現量亦不同，並且表現量與抗真菌能力呈正相關。由本研究結果顯示，多重基因構築的轉基因西瓜品系具有同時抗病毒又抗真菌的多重抗性功能，為植物病害防治上提供一條可行的防治途徑。

關鍵詞 : 西瓜銀斑病毒、矮南瓜黃化嵌紋病毒、木瓜輪點病毒西瓜系統、鞘蛋白基因、幾丁質分解?

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