

表現抗菌蛋白基因之轉基因西瓜抗真菌評估

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摘要

台灣位於熱帶及亞熱帶，全年氣候適合瓜類的栽培，栽培面積廣大且種類繁多，以西瓜和甜瓜最為大宗。西瓜屬葫蘆科，雙子葉開花植物。台灣每年西瓜種植面積約為一萬二千公頃，產值約二十四億元，為台灣重要農產品之一。西瓜在種植時常受到真菌的感染，如猝倒病(*Pythium aphanidermatum*)、立枯病(*Rhizoctonia solani*)、枯萎病(*Fusarium oxysporum* f. *niveum* (E.F.Smith) Snyder and Hansew)、白粉病(*Erysiphe cichoracearum* DC.)、炭疽病(*Colletotrichum lagenarium* Ellis et Halsted)等。一般藉由噴灑大量的農藥或抑菌劑來克服病害，因考慮農藥對環境的危害與殘留的問題，希望能利用遺傳工程的方法，將抗真菌蛋白導入植物體內，期望能達到防治的效果。抗真菌蛋白基因Bo-AFP3與Cp-AFP3，由中央研究院蕭介夫博士提供，經胺基酸序列比對，發現其結構類似於植物防禦素(plant defensins)中的AFP3，屬於cysteine-rich protein，包括4個雙硫鍵，分別由青花菜及木瓜中篩選出，故命名為Bo-AFP3及Cp-AFP3，比較推演出來的胺基酸序列，發現Bo-AFP3及Cp-AFP3具有95.92%的相似性。本研究主要將Bo-AFP3與Cp-AFP3基因利用農桿菌轉殖的方式，將AFP3送入西瓜內，並觀察其對*R. solani*的抗性，期望抗真菌蛋白基因在西瓜中大量表現，減低*R. solani*的危害。目前已成功的構築出八株來自Bo-AFP3的轉基因西瓜及六株Cp-AFP3轉基因西瓜，經由聚合酵素鏈鎖反應、南方點漬法證明抗真菌蛋白基因確實併入西瓜染色體中。在瓶內接種真菌實驗中發現，在接種*R. solani*後，非轉殖株在第五天呈現萎凋、莖爛、植株上佈滿菌絲發病死亡，而轉基因西瓜有三株抗性較好，較非轉基因保留較多未腐爛的葉子且平均抽高了二公分，顯示轉基因株能對*R. solani*明顯有延遲病徵的發生。

關鍵詞：西瓜、抗真菌蛋白、農桿菌、基因轉殖

目錄

目錄 封面內頁 簽名頁 授權書iii 中文摘要iv 英文摘要vi 誌謝vii 目錄viii 圖目錄x 1.前言1 1.1西瓜之概述1 1.2西瓜常見的病害及民間防治方法2 1.3*Rhizoctonia solani*的病徵及特點4 1.4抗真菌蛋白的作用機制及來源5 2.材料與方法11 2.1實驗材料11 2.2農桿菌基因轉移與轉基因西瓜植株之再生12 2.2.1農桿菌之培養基配製與培養條件12 2.2.2基因轉殖與再生培養13 2.3轉基因株之分子分析13 2.3.1植物基因組DNA 抽取法14 2.3.2聚合酵素鏈鎖反應15 2.3.3南方點漬法16 2.3.4特异性probe製備17 2.3.5植物總量RNA抽取法18 2.3.6北方點漬法19 2.3.7蛋白質膠體電泳及西方點漬法20 2.4轉基因植物之瓶內抗病評估及分析22 2.4.1供試菌株及其特性22 2.4.2*R. solani*之培養23 2.4.3轉基因西瓜之瓶內抗病評估23 2.4.4*R. solani*之plate抗菌分析23 2.5轉基因植物之發根與馴化處理24 3.結果25 3.1轉基因西瓜株系組織培養結果25 3.2聚合⁺噁嘧滅醯醯R結果25 3.3轉基因西瓜苗南方點漬法分析結果26 3.4轉基因西瓜株系瓶內*R. solani*接種結果26 3.5*R. solani*之plate抗菌分析結果27 4.結論29 參考文獻42 附錄49 圖目錄 圖 1、西瓜基因轉殖流程33 圖 2、Bo-AFP3聚合酵素鏈鎖反應結果34 圖 3、Cp-AFP3聚合酵素鏈鎖反應結果35 圖 4、Bo-AFP3南方點漬法分析結果36 圖 5、Cp-AFP3南方點漬法分析結果37 圖 6、Bo-AFP3轉基因慧玲西瓜之瓶內接種38 圖 7、Cp-AFP3轉基因華寶西瓜之瓶內接種39 圖 8、延遲病徵之轉基因華寶西瓜40 圖 9、Cp-AFP3粗萃蛋白抗菌分析41

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