

西瓜组织培养与遗传转化研究进展

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摘要: 西瓜是我国重要的经济作物,其面积和产量居世界水果前列。由于西瓜资源的遗传背景相对狭窄,对于一些重要病害缺乏可利用的抗性材料,采用转基因手段有助于创制新种质。转基因技术是生物遗传改良和基因功能验证的重要方法,而组织培养和遗传转化是植物转基因成功与否的2个前提条件。西瓜遗传转化采用的方法有多种,而农杆菌介导法应用最广泛。大量的研究表明,西瓜是被公认比较难于转化的作物,目前为止转化效率低仍然是阻碍西瓜转基因的主要瓶颈。本文分析了西瓜组织培养的影响因素,如西瓜的种子贮存时间、基因型、苗龄、外植体类型、激素组合、培养条件;同时分析了农杆菌介导法影响西瓜遗传转化效率的主要因素,包括筛选标记基因、农杆菌菌株类型、预培养时间、农杆菌侵染时间和浓度、共培养时间;探讨了目前西瓜组织培养和遗传转化体系所存在的问题,提出了今后的研究方向。

关键词: 西瓜;组织培养;遗传转化

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Research advances on watermelon tissue culture and genetic transformation

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Abstract: Watermelon is one of the economically significant cucurbits in China for its production yield and areas rank the first in the world. There are many agricultural problems in the cultivation of watermelon for which traditional breeding method often does not have already explained, such as lacking of resistance cultivar against viral diseases. However, there are inadequate germplasm resources to meet the needs of watermelon breeders. Other important issues requiring improvement are fruit quality, nutrition, flavour, tolerance of storage of fruits and resistance to abiotic stresses. The above problems are difficult to solve through time-consuming conventional breeding methods, but biotechnology shed more light on solving this issue. Transgenic technology is a powerful tool for gene functional validation and genetic improvement of plants. Tissue culture and genetic transformation are the two basic components for that. Tissue culture is a prerequisite to successful genetic transformation which introduce significantly interest genes into the plant genome while preserving genetic identity of plants. Recent advances in this technology have resulted in successful development of commercially disease and herbicide resistant plants which enhanced tolerance to environment stresses, increased crop productivity and reduced the usage of harmful pesticides. The plants have been engineered for safe and inexpensive production in large quantities produced in transgenic plants, as well as plants which possess enhanced nutritional traits to date. In this paper, we analyzed the major factors affecting watermelon tissue culture which is aimed to regenerate explants of cotyledons, hypocotyls, apical buds, anthers, ovaries, protoplasts and leaves. But most watermelon tissue culture

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