

Establishment of detection and monitoring system for genetically modified papaya

Seed Improvement and Propagation Station
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I. Establishment of detection system for genetically modified papaya

The increasing of transgenic plant release to the international markets has provoked a strong demand for appropriate detection methods to detect the existence of transgenic plants. The Seed improvement and propagation station (SIPS), Agricultural Research Institute, Taiwan Agricultural Chemicals and Toxic Substances Research Institute, and four district agricultural research and extension stations, Taoyuan, Taichung, Tainan, Hualien, and the National Chung Hsing university, Transworld Institute of Technology etc. were assigned to establish the detection and monitoring system for genetically modified crops. In the first year, the GM papaya containing the PRSV coat protein gene was chosen as the major material for this purpose. The results showed that the GM papaya seedlings could be detected through PCR-based markers.

The first stage was to confirm the instruments and detection capability of the joined laboratories. SIPS provide the GM and Non-GM standard papaya samples. (Fig.1) The second stage was to detect the GM and Non-GM papaya samples with various mix ratio. The purpose was to evaluate the detection capacity for GM papaya. (Fig.2) The last stage was to conduct the blind test using samples of Poinsettia, Echinacea, Pepper, Calla lily, with different mix ratios with GM and Non-GM papaya. (Fig.3)

II. Establishment of monitoring system for genetically modified papaya

The establishment of monitoring system was based on the GMOs detection system developed by the joined inter-laboratory. All the papaya materials were collected from the fields all around the Taiwan island according to the records provided by the district experimental stations. Detection results of this survey were mapped onto the maps of Taiwan, especially the locations where papaya were cultivated. Records of this investigation included the GPS coordinates, addresses, farm's name, and field location. The results of this project will also establish the database of papaya cultivation in Taiwan for future tracing and monitoring.

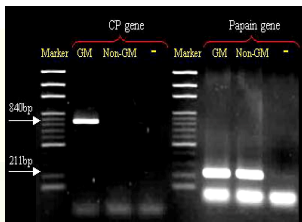


Fig.1. Detection of PRSV coat protein gene and housekeeping gene (papain) of GM and Non-GM papaya with specific primers. —: Negative control.

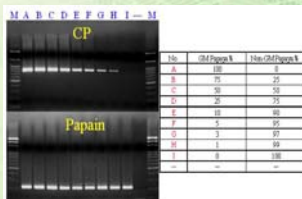


Fig.2. Samples of various mix ratio of GM and Non-GM papaya were applied in PCR to detect the CP and papain genes using gene specific primers. —: Negative control.

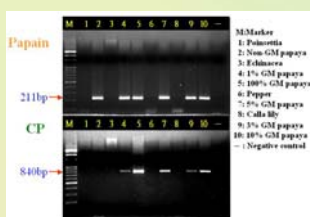


Fig.3. Blind test for CP gene and Papain gene.