
Thaumatin II: a simple marker gene for use in plants

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Most marker genes for use in higher plants require sophisticated tissue culture facilities and expensive reagents for detection e.g. NPTII, CAT and GUS marker genes. These assays are time consuming and require trained workers.

Transgenic plants propagated in the field or in primitive conditions should have a simple marker gene for the easy identification of transgenic plants and their progeny. A sensitive and extremely convenient gene is the thaumatin II gene¹.

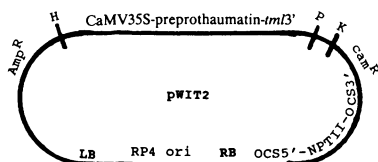


Figure 1 Shuttle vector pWIT2. Amp^R, Ampicillin resistance. Cam^R, chloramphenicol resistance. P, PstI. K, KpnI. H, HindIII. LB, T-DNA left border. RB, T-DNA right border. OCS3'-NPTII-OCS3', kanamycin resistance marker gene. size 34kbp.

Shuttle vector pWIT2 was used to transform *Solanum tuberosum* c.v. *Iwa* with a CaMV35S5'-preproThaumatin II-*tml3'* chimeric gene. See fig 1. Thaumatin expression was examined by protein slot blots. See fig 2. Biological activity of the thaumatin gene product was confirmed by the characteristic intensely sweet taste of thaumatin. Regenerated transgenic plants were easily identified, with no sample preparation, by their intensely sweet taste in seconds. 0.1g of leaf, stem, hairy root, or callus tissue was sufficient for tasting. The human tongue can detect thaumatin at 10⁻⁸M².



Figure 2 Protein slot blots. Bio Rad Slot immunoblot apparatus, rabbit antiserum and goat anti-rabbit immunoglobulin G conjugated to alkaline phosphatase were used to screen transformants for thaumatin production according to the manufacturers instructions. 7 transformed lines (1-7) and a negative control (n) are shown. Approximately 0.5 micrograms thaumatin/gram tissue was detected.

Genes for expression in crop plants e.g. herbicide resistance, *Bacillus thuringiensis* endotoxin, or in particular, genes to improve potato food quality, could be linked to the thaumatin II marker gene for easy and cheap identification of transgenic plants and their progeny. This would also make using transgenic plants of more practical value in agriculture. Confirmation of genotype with this thaumatin marker gene takes seconds and could be performed by farmers unaided. Purchase of expensive certified tubers could be avoided making use of transgenic crop plants more attractive.

REFERENCES

¹Edens, L. et al (1982). *Gene* 18:1-12

²Higginbotham, J.D. (1979). In *Developments in sweeteners I*. Applied science publishers. London pp. 87-123