Optimization Parameters of Particle Bombardment for Tainung 67 Rice (*Oryza sativa* L.)

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**Summary**

The objective of this study was to establish a genetic transformation system using biolistic bombardment (Biolistic PDS1000/He device, Bio-Rad) for the most popular rice cultivar ‘Tainung 67’ in Taiwan. Embryogenic calli were induced from mature seeds on the medium containing 2, 4-D and they were used as material for bombardment. Transformation efficiency was evaluated by the transient expression of β-glucuronidase gene. The tested parameters included: the effect of preculture duration for explants, the type of microcarriers, density of microcarrier particles used for DNA preparation, the effects of osmotic treatments, and plasmids with various constructions. Parameters of biolistic device including the flight distance of microcarriers (6 and 9 cm) and macrocarriers (4, 8, and 12 mm) were investigated. The results showed that 7-day-precultured embryogenic calli had the best responses for bombardment among 2-7 day’ preculture duration. Enhanced transformation efficiency was found in the explants treated with high osmotic medium 4h prior to till 24 h after bombardment. Particles of gold and tungsten were both found suitable for rice transformation and there was no adverse effect when tungsten particles were reduced to 1/3 standard amount for DNA precipitation on transient GUS gene expression. However, it was found that gold particle had higher GUS expression at 120 h post-bombardment. A preliminary microprojectile transformation system with an average of 15-20 blue spots/explant GUS expression was routinely obtained for ‘Tainung 67’ by using the particle gun with 1,100 psi rupture disk, 6 or 9 cm microcarrier flight distance and 4 mm of macrocarrier flight distance setting.

**Key words**: Rice (*Oryza sativa* L.), Particle gun, Transformation.

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