

Variation of Grain Shape and Chemical Constituents in T-DNA Inserted Rice

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Objective

The objective of this study was to improve the chemical constituents of rice grain using T-DNA insertional mutagenesis.

Material and Methods

- Plant material
 - Donor cultivars : Hwayoungbyeo, Dongjinbyeo
 - T-DNA inserted lines : 32 T₃ and T₄ lines
- Methods
 - Analysis of chemical constituents
 - NIR spectrophotometer, FOSS 6500 (Near-Infrared Spectroscopy)
 - Lipid, protein, and amylose contents
 - Grain shape
 - Opaque, giant embryo, and round kernel

Results

- The lipid contents of a donor cultivar, Dongjinbyeo, was 2.11% and that of T-DNA inserted lines ranged from 1.75 % to 3.33 % with a mean of 2.57 %.
- The protein contents of 'Hwayoungbyeo' was 7.92% and that of T-DNA inserted lines varied from 6.20 % to 10.91 % with a mean of 2.57 %.
- The amylose contents of 'Dongjinbyeo' was 17.62% and that of T-DNA inserted lines varied from 15.67 % to 15.95 % with a mean of 15.77 %.
- Opaque-endosperm, round, and giant-embryo kernels were selected in T₃ and T₄ generation of T-DNA inserted lines

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Table 1. Mean values of lipid, protein, and amylose contents in rice grain of T-DNA inserted lines.

	Lipid (%)		Protein (%)		Amylose (%)	
	Mean	Range	Mean	Range	Mean	Range
Dongjinbyeo	2.11	-	7.03	-	17.62	-
T-DNA inserted lines	2.57	1.75-3.33	6.93	6.35-7.69	15.77	15.67-15.95
Hwayongbyeo	2.17	-	7.92	-	18.87	-
T-DNA inserted lines	1.82	1.62-1.98	7.50	6.20-10.91	15.90	15.86-16.08

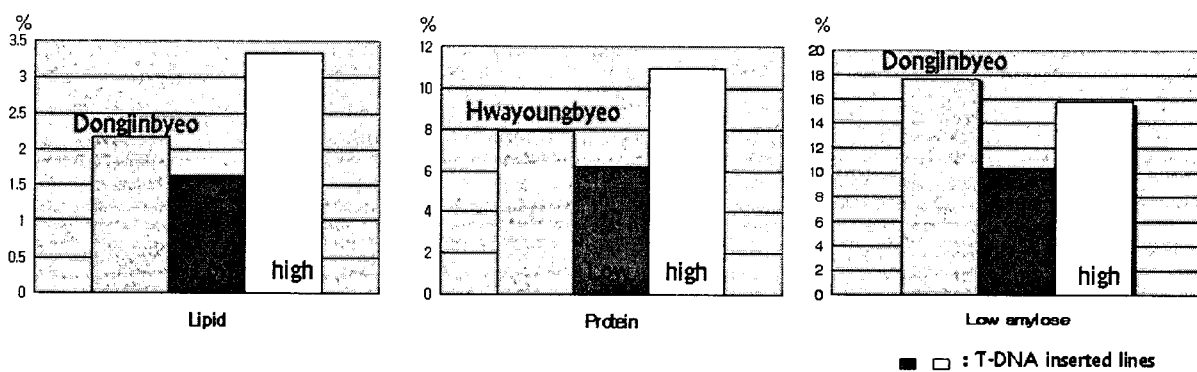


Fig. 1. Variation in lipid, protein, and amylose contents between donor cultivars and T-DNA inserted lines.

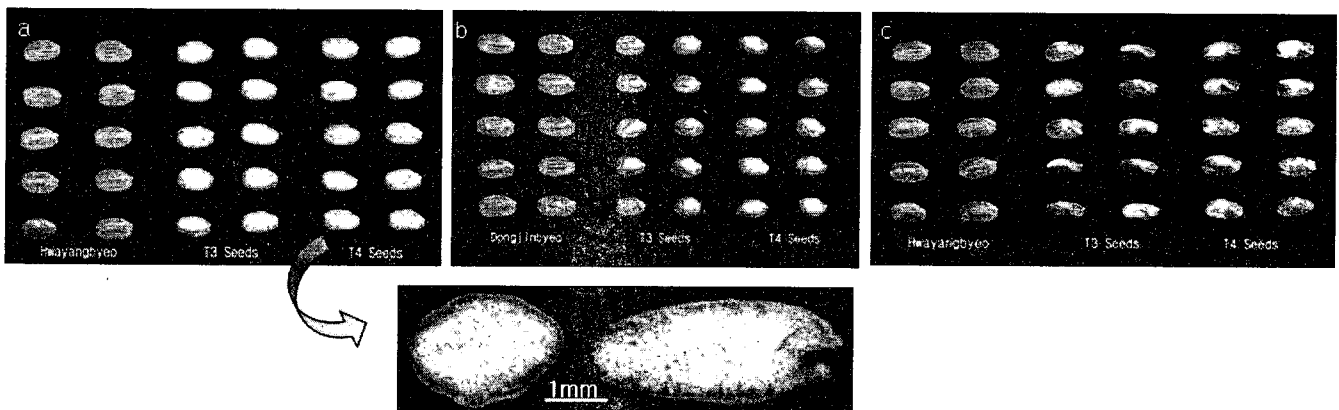


Fig. 2. Grain shape of T-DNA inserted lines.

- (a) Opaque-endosperm kernels of T3 and T4 generation
- (b) Round kernels of T3 and T4 generation
- (c) Giant-embryo kernels of T3 and T4 generation