

A16 Alcohol Dehydrogenase Isozyme in Rice (*Oryza sativa* complex)

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Objectives

1. To investigate alcohol dehydrogenase (*Adh*, E.C. 1.1.1.1) isozyme variability in *Oryza sativa* complex.
2. To evaluate germplasm resources of *Oryza sativa* complex for environmental stress tolerance.

Materials and Methods

Plant materials

1. *Oryza sativa*, which consisted of 36 paddy rice strains including indica and japonica; and 19 upland strains collected from worldwide.
2. *Oryza rufipogon*, which consisted of 35 strains collected in Asian countries.
3. *Oryza barthii*, which consisted of 2 strains originated in Africa.

Isozyme detection

Enzyme extracts were prepared from 1-5 shoots after 2-4 days of germination at 32°C in incubator. *Adh1* locus was assayed by starch-gel (system H, Tris-citric pH 7.6) methods (Glaszmann et al. 1988; IRRI, 1990). The staining bands were read using the systems suggested by Morishima and Glaszmann et al. (1990).

Results and Discussions

1. Polymorphisms for three alleles (*Adh1*¹, *Adh1*², and *Adh1*³) were not presented within the groups of paddy rice and *Oryza rufipogon* (Figure 1), it suggested that there is no indica-japonica differentiation at locus of *Adh1* in paddy rice as well as in *Oryza rufipogon*.

2. Polymorphisms for three alleles (*Adh1¹*, *Adh1²*, and *Adh1³*) were observed in upland rice (Table 1). It implied that upland rice is more adaptable to ecoenvironments, and may plays important role in indica-japonica differentiation.
3. Only one rice variety Basmati 385 possessed the allele of *Adh1³*, and only the strain Lu-tao possessed the allele of null, *Adh1⁰*.
4. *Adh* was believed to associate with environmental stress such as cold and drought tolerances, hence, this study provided information for environmental stress tolerance research.

Table 1. Polymorphisms for four alleles of *Adh1* locus in *Oryza sativa* complex.

Species	Number of strains	Origin	<i>Adh1</i> alleles				% of allele 2
			null	allele1	allele2	allele3	
<i>Oryza sativa</i>							
Paddy rice	36	Asia, Africa	1	34	0	1	0
Upland rice	19	Asia	0	10	9	0	47.3
<i>Oryza rufipogon</i>	35	Asia	0	35	0	0	0
<i>Oryza barthii</i>	2	Africa	0	2	0	0	0

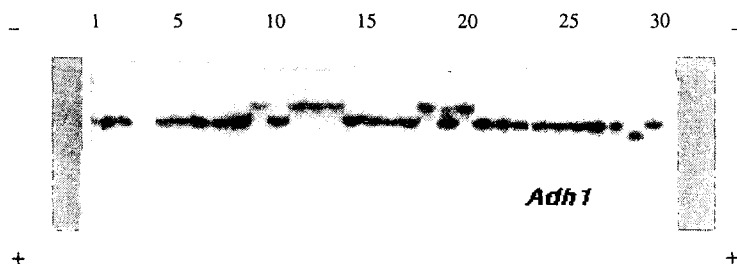


Fig 1. Starch-gel zymogram of alcohol dehydrogenase (*Adh1*).

Adh1 four alleles: *Adh1¹*, media moving band (Lane 25 etc.)

Adh1², slow moving band (Lane 20 ect.)

Adh1³, fast moving band (Lane 29)

Adh1⁰, null (Lane 3)