(05-1-39)

Molecular cloning and characterization of acid phosphate genes from rice

Hwa-Young Lee, Soon-Jae Jeong, Young-Byung Yi, Jaesung Nam, Doh-Hoon Kim*

College of Natural Resources and Life Science Dong-A University Busan 604-714, Korea

Objective

1. Investigate extensive analyses of transcriptional regulation of OsAP genes expression in response to phosphate starvation.
2. Determine the molecular mechanism by which rice plant respond to phosphate depletion in soil.
3. Generate new transgenic rice plants that can overcome the phosphate depletion in soil.

Material & Method

1. Material : Rice (Oryza sativa) cv. 'Dong-jin'
2. Method : Northern blot analysis, genomic/cDNA library screening, PCR cloning

Result and Discussion

We isolated the 3 different acid phosphate genes (OsAP1-3) from rice (Oryza sativa). The encoded polypeptides are 60% identical to other plants and show high degree of amino acid sequence similarity with acid phosphatase of Arabidopsis thaliana and tomato. There are signal peptide in OsAP2 and OsAP3 polypeptides. OsAP2 is 824-bp long and contains an open reading frame encoding a 274 amino acid polypeptide, whereas OsAP3 is 968-bp long and encodes a 322 amino acid polypeptide. The two clones are 13% similar in their nucleotide sequence within the coding region. The two polypeptides are 13% identical in their amino acid sequence. The RNA blot analysis showed that expression of OsAPs are various in response to phosphate deficiency. In particular expression of OsAT2 and OsAP3 were up-regulated in phosphate deficiency condition. We are generating transgenic rice and Arabidopsis plants overexpressing OsAP genes.

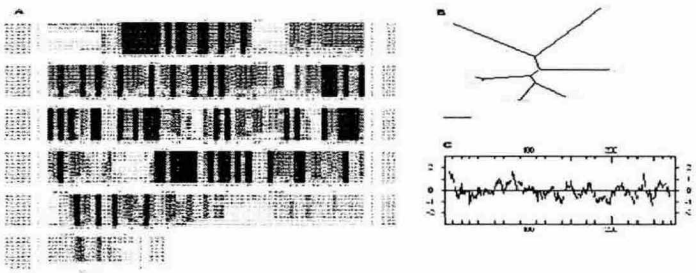

Fig. 1. Rice acid phosphatase (OsAP2).

*Corresponding author : Doh-Hoon Kim, Tel : 051-200-7507, E-mail : dhkim@mail.donga.ac.kr