

Expression of a mutated ADP-glucose pyrophosphorylase, upreg1, in transgenic rice alters the regulatory properties of the enzyme from transgenic rice and lettuce

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Upreg1, a mutated large subunit of ADP-glucose pyrophosphorylase (AGPase) of potato alters the regulatory properties when expressed together with wild-type small subunit of potato AGPase. In this study, we firstly coexpressed upreg1 gene with three different small subunit genes from potato and perilla in *E. coli* and transformed rice and lettuce with upreg1 gene. Recombinant AGPase purified from *E. coli* showed various kinetic and regulatory properties. AGPases containing Upreg1 large subunit were more sensitive to 3-PGA and less sensitive to Pi as compared with AGPases containing the wild type large subunit. When expressed in immature embryo of transgenic rice and leaves of transgenic lettuce, upreg1 altered the regulatory properties of the enzyme. AGPases extracted from transgenics showed higher sensitivity to 3-PGA and lower sensitivity to Pi. Transgenic rice and lettuce showed altered phenotype in terms of yield productivity. Transgenic lettuce showed more rapid growth than nontransgenic control and the grain weights of transgenic rice were higher. Currently we are measuring photosynthetic carbon assimilation rate of transgenic lines.