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RETARDED *IN PLANTA* SENESCENCE OF TREHALOSE-PRODUCING TRANSGENIC TOBACCO PLANTS

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Transgenic tobacco plants engineered to produce trehalose exhibited a pronounced delay in *in planta* leaf senescence. In wild type tobacco plants, symptoms of senescence judged by leaf bleaching began to appear at 10th week and culminated at 13th week. In contrast, trehalose-producing plants began to show senescence only after 1 3th week. We monitored changes in several senescence parameters including chlorophyll content, RNA content, protein content photochemical efficiency (Fv/Fm), antioxidant enzyme activities, and malondialdehyde (MDA) content to compare differences in senescence between wild type and transgenic plants beginning 6th week.

Wild type plants showed faster decline than transgenic plants in both chlorophyll content and Fv/Fm. At 13th week wid type plant retained only 12% of initial chlorophyll content while transgenic plants maintained 60% of that. The difference in Fv/Fm was more dramatic, showing 78% decline in wild type in contrast to less than 10% in transgenic plants. Change in protein and RNA content also showed a similar trend: at 12th week 44-63% of initial RNA and protein content was remained in transgenic plants compared with 10-20% in wild type plants. Activities of several antioxidant enzymes also changed differently during senescence. Catalase activity was dramatically increased in the early stage of senescence, but was rapidly decreased after 10th week in wild type plants while in transgenic plants it remained unchanged. Changes in activities of glutathione reductase, ascorbate peroxidase, and dehydroascorbate reductase were more or less same until 10th week in both plants, but decreased more rapidly in wild type plant thereafter.

MDA content, an indicator for membrane integrity, was sharply increased in wild type plants while it was slightly increased in transgenic plants as senescence was proceeding. The result suggests that retarded senescence in trehalose-producing plants may come from its ability to stabilize membrane structure.