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Quantitative Improvement of Tocopherols in Lettuce (*Lactuca sativa* L.) by the Modulation of Homogentisic Acid Phytoltransferase Gene Expression

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Objectives

Tocopherols are typical phytochemicals whose multiple health-promoting effects are demonstrated by plethora of sound scientific evidences. Oriental leaf lettuce is one of the favorite vegetables but it contains low levels of tocopherols. Transgenic approach was attempted to enhance health-promoting quality of lettuce by elevating tocopherols contents via the ectopic expression of a rate-limiting gene involved in tocopherol biosynthesis.

Materials and Methods

1. Materials

Oriental lettuce (cv. Chungchima) was used for genetic transformation. Homogentisic acid phytoltransferase (*ScHPT*) sequence was originated from *Synechocystis*. *ScHPT* cDNA sequence was driven by CaMV35S promoter and introduced into *Agrobacterium* (LBA4404).

2. Methods:

ScHPT was stably transformed into lettuce genomic DNA via the *Agrobacterium*-mediated transformation. All the procedures for tissue culture and DNA transformation was conducted as previously described (Kim et al., 2000, *Kor. J. Plant Tissue Culture* 27, 435-439).

Results and Discussion

Total tocopherol content in the transgenic lines expressing *ScHPT* mRNA increased 34% on average compared with that in the nontransgenic plants. The increased total tocopherol content in transgenic plants was contributed by increases in all the tocopherol isoforms. However, the increase rate of each isoform varied significantly. (This research was supported by Research Center for Industrial Development of Biofood Materials in Chonbuk National University, Jeonju, Korea).