Title Post-harvest enhancement of aroma in transgenic lisianthus (*Eustoma grandiflorum*) using the Clarkia breweri benzyl alcohol acetyltransferase (BEAT) gene

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Citation Postharvest Biology and Technology, Volume 43, Issue 2, February 2007, Pages 255-260

Keywords Lisianthus; Fragrance; Transformation; Volatiles

Abstract

Lisianthus (*Eustoma grandiflorum*) is an ornamental plant with beautiful but scentless flowers. In an attempt to induce a fragrance in their flowers, lisianthus plants were transformed with the *Clarkia breweri* gene coding for benzyl alcohol acetyltransferase (*BEAT*), catalyzing the synthesis of the volatile compound benzyl acetate under the regulation of the CaMV35S promoter. An external supply of benzyl alcohol induced five to seven times higher production of benzyl acetate in detached flowers and leaves of transgenic lisianthus plants, compared to non-transformed plants. No benzyl acetate was detected in tissues of both control and transgenic plants fed with water. When fed with additional alcoholic compounds, i.e. hexanol, benzyl alcohol, isoamyl alcohol, phenethyl alcohol, and cinnamyl alcohol, assumed to be used as substrates by BEAT, transgenic *in vitro*-grown lisianthus plantlets produced significantly higher levels of acetates than control plants. These results demonstrate the possibility of producing substrate-dependent acetates in transgenic lisianthus plants, which could lead to induction of new aromas.