

Title Genetically modified flowering potted plants with reduced ethylene sensitivity
Author H. Mibus, S. Sriskandarajah and M. Serek
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Abstract

Genetic modification has proved to be an effective way in controlling ethylene synthesis and perception. Use of the mutant ethylene receptor gene, *etr1-1*, from *Arabidopsis* seems most promising, especially when it is expressed under the control of a flower specific promoter.

In order to introduce the *etr1-1* mutant gene in ornamental plant species we established effective regeneration and transformation systems for a range of popular potted plants including *Campanula*, *Kalanchoë*, *Rhipsalidopsis* and two orchid species *Oncidium* and *Odontoglossum*. Fertile transgenic adult plants of *Campanula carpatica* Jacq. and *Kalanchoë blossfeldiana* Poeln. were obtained by *Agrobacterium tumefaciens*-mediated transformation. The construct used for transformation contained *etr1-1* gene under the control of the petal specific *fbp1*-promoter from petunia. Flowering T0 lines were tested for their ethylene sensitivity in 2 µl L-1 ethylene. The flowers on control (non transgenic) *Kalanchoë* and *Campanula* plants wilted within 2 and 3 days, respectively. The best transgenic line of *Campanula* flowered up to 27 days in ethylene, while the best *Kalanchoë* line had most of the flowers open for longer than 10 days of continuous ethylene exposure. T1 progenies of both species showed stable inheritance and expression of *etr1-1*, which make them useful for future breeding.

Before the ethylene insensitive plants can be commercially available, several issues have to be solved. Use of *nptIII* for selection may cause implication by registration for commercial use, especially in European countries. Furthermore, molecular analysis indicated unwished expression of *etr1-1* in leaves or roots, which in some cases correlated with lower ability of rooting of cuttings. Use of flower specific promoters from the species of interest can be recommended to solve the problem.