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Transformation of Carnation with Flavonoid Biosynthesis Related Genes

KH Hwang, BH Min, HY Joung, BJ Ahn

College of Bioresources Science, Dankook University, Cheonan 330-714, Korea

Nong Woo Bio Co. Ltd, Yeoju, Gyeonggi-do 469-880, Korea

National Horticultural Research Institute, RDA, Suwon 440-760, Korea

Objectives

Carnation is a major cut flower plant and improved cultivars are plentiful through rigorous breeding efforts. Still desirable cultivars possessing disease tolerances and other useful traits like true blue flower color or environmental tolerances are expected to be bred. To produce transgenic carnation plants expressing modified flower colors, we tried to insert several flovonoid biosynthesis related genes stepwise. Four cultivars of red flowered carnation including 'Desio' were transformed with a DFR gene encoding dihydroflavonol 4-reductase and a CHI gene encoding chalcone synthease isomerase was used to transform three yellow flowered cultivars. Explants of leaves, stems and shoot tips were excised and infected with Agrobacterium tumefaciens strain LBA4404 harboring a binary vector pGA748/DFR or pGA748/CHI. After 10 days of coculture, the tissues were cultured on MS media supplemented with 1 mg/L BAP, 0.1 mg/L NAA, 250 mg/L cefotaxime/carbenicillin, 500 mg/L kanamycin. Kanamycin resistant putative transformants were selected and regenerated through over six times of subcultures only among the cultures derived from shoot tip explants. More than 50 plants were confirmed to contain the transgenes through PCR, Southern and Northern blot analyses. They were established in soil and multiplied through cuttings. Morphological deformities were not detected at juvenile stages and are being grown to bloom to examine their phenotypes.

*Corresponding author.