

Title Practical lessons in the commercialization of genetically modified plants-long vase life carnation

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Abstract

Florigene has developed and marketed the world only commercially available cut flower crop – carnation genion genetically modified for novel flower colour. These products have been accepted in the marketplace, and are currently grown or consumed in South America, Europe, Japan, North America and Australia. Carnation with an enhanced vase life has also been developed by Florigene. Carnation flowers senesce after they are cut from the plant. The process is well understood, and depending on variety, the deterioration of the flower can be expected from 5 to 10 days after cutting. The process is triggered by the production of ethylene in the flower, the perception of which by ethylene receptors initiates a series of biochemical changes. Senescence can be prevented by either inhibiting the production of ethylene or inhibiting or blocking the perception of ethylene. Carnation growers routinely use chemicals to enhance vase life, and genetic modification was envisaged as a way to eliminate the use of these chemicals, reducing costs and waste. Independent genetic modification of both the ethylene biosynthesis pathway and ethylene perception has been successfully achieved in carnation. Our own group transformed numerous varieties, generating hundreds of transgenic lines, and other laboratories and research institutions have also produced transgenic carnation with enhanced vase life. However, no products have been commercialized. From the Florigene perspective this has been because of;(a) Cost of transformation. The need to generate multiple varieties on a regular basis, because carnation is vegetatively propagated. (b) Cost of regulatory approval. In most countries the technical information requirements to support regulatory approval have increased. (d) Availability of alternate technologies. There are several ways to achieve the same phenotype through genetic modification, and a number of alternative chemical methods have been developed. (e) Public perception of genetic modification technology. (f) The marketing environment. The marketing of the genetically modified varieties, at a necessary premium, in the face of invisible chemical treatments and potential of “copy cat” marketing poses an interesting challenge.