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High frequency somatic embryogenesis and plant regeneration in root explant cultures of carnation

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Objectives

To establish the high frequency plant regeneration system via somatic embryogenesis from root-derived calluses in carnation.

Materials and Methods

1. Plant materials : Approximately 0.5 cm long root tips of carnation (*Dianthus caryophyllus* L. cv. Scarlet)

2. Methods : To investigate the effect of growth regulators on embryogenic callus formation, root explants were placed on MS medium supplemented with 0, 1, 2, or 4 mg l^{-1} TDZ in combination with 1 or 2 mg l^{-1} NAA. After 3 weeks of culture, data for the mean frequency of root explants producing off-white calluses were collected. Calluses formed on root explants were transferred to MS basal medium without removal of initial root explants. After an additional 4 weeks of culture, data for the mean percentage of root explants producing somatic embryos were collected.

Reuslus and Discussion

Root explants cultured on medium supplemented with various growth regulators solely or in combination formed off-white friable calluses on the surfaces after 3 weeks of culture. Root explants formed calluses at a frequency of 86% on medium containing 1 mg l^{-1} TDZ and 1 mg l^{-1} NAA. Upon transfer to MS basal medium, root-derived calluses formed globular to heart-shaped somatic embryos which subsequently developed into torpedo-shaped to cotyledonary somatic embryos after additional 4 weeks of culture. The highest frequency (50%) of somatic embryo formation was obtained from calluses on root explants that had been cultured on medium containing 1 mg l^{-1} TDZ in combination with 1 mg l^{-1} NAA. Somatic embryos developed into plantlets at a frequency of approximately 80% and rooted successfully without any treatment. Plantlets transplanted into potting soil were maintained in a growth chamber, where they were grown to maturity.

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