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Somatic embryogenesis of rose (Rosa sp.)

Estabrooks, Tammy Lynn, 1974-

Date: 2004
Type: Text

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Abstract:

Somatic embryogenesis (SE) offers vast potential as a method for clonal propagation of roses. By this method, tissue from an elite plant is cultured in vitro and induced into an embryogenic state, in which bipolar somatic embryos are formed. The somatic embryos are capable of regenerating whole plants that are genetically identical to the plant used as the original tissue source. Although somatic embryogenesis holds several advantages over conventional means of propagation, SE technology requires improvement before use on a commercial scale. This thesis describes studies aimed at developing somatic embryogenesis technology for roses. A suitable methodology for SE of the commercially valuable rose cultivar 'Livin' Easy' (Rosa hybrida L.) was developed. This is the first report of SE induction in the cultivar 'Livin' Easy'. Murashige and Skoog basal medium supported growth and promoted successful induction of embryogenic tissue when supplemented with plant growth regulators, whereas Woody Plant Medium and plant growth regulator-free medium did not. The synthetic auxin 2,4,5-trichlorophenoxyacetic acid was successful in inducing SE at higher rates and over a greater concentration range than the commonly employed 2,4-dichlorophenoxyacetic acid. This was the first report of the utilization of 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) for the induction of SE in rose. Somatic embryos successfully converted into plantlets at high rates up to 95%. Embryogenic tissue occurred on 60% of the plantlets, a phenomenon referred to as recurrent somatic embryogenesis.

Description:

vii, 151 leaves : ill. (some col.) ; 28 cm

xii, 151 leaves : ill. (some col.) ; 28 cm.

Includes abstract.

Includes bibliographical references (leaves 130-140).

Subject:
- Roses -- Somatic embryogenesis
- Embryology
- Rose culture

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Poster: Late and Moved Abstracts

Abs # 1407: The effect of 2,4,5-trichlorophenoxyacetic acid on rose somatic embryogenesis

Presenter: Estabrooks, Tammy L., T_ESTABROOKS@smu.ca

Authors Estabrooks, Tammy L. (A) Browne, Robin (B) Dong, Zhongmin (A)

Affiliations: (A): Saint Mary's University
(B): PlantSelect Biotechnology Systems Ltd.

Somatic embryogenesis (SE) technology requires improvement before it can be implemented on an industrial scale as a clonal propagation system for roses. Due to genotype-specificity, there is not a universal protocol successful in inducing SE in all cultivars of rose. This study investigated the effects of the commonly employed auxin 2,4-dichlorophenoxyacetic acid (2,4-D) with one not previously reported in rose, 2,4,5-trichlorophenoxyacetic acid (2,4,5-T).These two compounds were tested at various concentrations in two different basal media (MS and WPM) using both leaflet and petiolte explants of the rose cultivar 'Livin' Easy'. Frequency of callus formation, embryogenic tissue initiation, somatic embryo formation, germination and survival rates after transfer to soil were determined. 2,4,5-T in MS medium promoted the highest percentage of SE induction for both leaflet and petiole explants. 2,4-D was not successful in producing somatic embryos, although callus and embryogenic tissue were successfully induced. 2,4,5-T had a wider working concentration range than 2,4-D in inducing embryogenic tissue and was successful in producing embryos when embryogenic tissue was transferred to either medium containing lower concentrations (40% of original) of 2,4,5-T or auxin-free medium. These results may prove useful for the induction of SE in rose cultivars unresponsive to 2,4-D. The genetic mechanisms underlying the different effects of 2,4-D and 2,4,5-T on embryo development are currently under investigation.