Induction and maintenance of callus from leaf explants of Mirabilis jalapa

Abstract

Mirabilis jalapa L., commonly known as 'four o'clock plant' produces a strong, sweet smelling fragrance after the flowers open at late afternoon. It is a well known ornamental plant as the flowers of different colours can be found simultaneously on the same plant or an individual flower can be splashed with different colours. The colour-changing phenomenon is one of the unique characteristics of M. jalapa as it can display flowers with different colour when it matures. Apart from its ornamental value, it has also earned its place in herbal medicine practices around the world. Its array of biological activities continues to support its use worldwide for control of viruses, fungi and yeast. In this study, callus culture was initiated from the leaf explants of M. jalapa. The suitable strength of MS (Murashige and Skoog) nutrient media was determined and the effects of different types of auxins [4-amino-3,5,6-trichloro picolinic acid (picloram), 2,4-dichlorophenoxyacetic acid (2,4-D), ・-naphthaleneacetic acid (NAA)] and cytokinin [6-benzyl amino purine (BAP)] at 0.0 2.5, 5.0, 7.5, 10.0, and 20.0 ・M were investigated in order to determine the suitable callus induction and maintenance media. The establishment of callus culture was greatly influenced by the strength of MS medium, type as well as the concentration of plant growth regulators (PGRs) used. The best callus induction response was obtained on half strength (½) MS media supplemented with 20.0 ・M picloram which produced healthy and friable callus. Meanwhile, ½ MS supplemented with NAA or BAP as well as PGR-free medium did not produce any callus; rather, explants became necrotic after 3 to 4 weeks of culture. Calli were successfully maintained in ½ MS supplemented with 10.0 ・M picloram. Callus in maintenance medium showed a sigmoid growth pattern and reached a maximum growth rate between weeks 1 and 3.