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Enhancement of direct shoot regeneration and determination of bioactivesecondary metabolites in leaves of Galega officinalis L. (https://journals.tubitak.gov.tr/cgi/viewcontent.cgi?article=1323&context=biology)

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Abstract

Galega officinalis L. is a medicinal plant being used as a galactagogue and an antidiabetic in folk medicine. A new effective micropropagation protocol was established from leaf, stem, node, and root explants of G. officinalis for in vitro plant regeneration and callus induction systems. Murashige and Skoog (MS) medium supplemented with 55 various concentrations and 4 different combinations [benzyl adenine (BA)/naphthalene acetic acid (NAA), BA/indole-3-acetic acid (IAA), thidiazuron (TDZ)/indole-3-butyric acid (IBA), and TDZ/IAA] of plant growth regulators was used for the regeneration systems. The regenerated shoots were observed on only nodal explants through direct organogenesis at the 35th day. The highest shoot number (7.13 ± 1.12 shoots per explants) was obtained from nodal explants on MS medium supplemented with a 1.0/0.25 mg L-1 BA/NAA combination. The largest (2 cm in diameter) green and compact callus formations were induced using root explants on MS medium supplemented with 2.0/2.0 mg L-1 BA/NAA. A total of 16 and 11 phenolic compounds from wild-grown and in vitro-grown leaves was detected by using liquid chromatography-electrospray ionization-multistage/mass spectrometry (LC-ESI-MS/MS) analysis, respectively. Levels of apigenin, luteolin, and chlorogenic acid in in vitro-grown leaves were higher than those in wild-grown leaves. These findings showed that micropropagation of G. officinalis can be potentially used as a new protocol for the production of beneficial secondary metabolites in pharmaceutical and supplemental food industries.

Keywords

Micropropagation, plant growth regulators, callus, phenolic compounds, LC-ESI-MS/MS

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