

## Abstract

*Catharanthus roseus* has many valuable pharmaceutical compounds which are used for cancer treatment. A novel approach for increasing these compounds is transforming the plants with *Agrobacterium rhizogenes* due to hairy root production. Hairy roots have some important characters including: fast growth rate, no need to growth regulators and alkaloid production stability. This study was carried out in order to study effective factors on hairy root production in *C. roseus*. Five strains of *A. rhizogenes* with two ODs: 0.5 and 1 were used for transformation of two types of explants: in vitro and in vivo leaves. Three densities of acetosyringone (0, 50 and 100  $\mu$ M) and light or dark condition were applied for coculture. Further three amounts of methyl jasmonate was used to study the effect of this compound on production the alkaloids. HPLC was used for vinblastine and vincristine alkaloids. The results showed that A4 is the best strain with OD=1 for increasing transformation of in vivo explants in light condition. Also, transformation efficiency is better in high concentration of acetosyringone. Results of HPLC analysis showed that application of MeJA in media up to 150  $\mu$ M caused increasing the production of alkaloids. Results of this study reveals that many factors are effective in hairy root production witch must be optimized in each research and also the best concentration of elicitors should be obtained for increasing the metabolites.

Key words: *Agrobacterium rhizogenes*, alkaloids, hairy root, methyl jasmonate

