Hydroxylation and glycosylation of Δ9-tetrahydrocannabinol by Catharanthus roseus cell suspension culture

ABSTRACT

ϕϑ-tetrahydrocannabinol is the active constituent in Cannabis sativa, with reported analgesic, anti-emetic, anti-oxidative, neuroprotective, and anti-inflammatory activities. ϕϑ-THC has been used to treat a number of disease states including pain, anxiety, asthma, glaucoma, and hypertension. Poor water solubility of ϕϑ-THC greatly reduces its clinical effectiveness. Consequently, there is a need to modify the compound to increase its polarity and pharmaceutical efficacy. The aim of this study was to test the capability of Catharanthus roseus suspension cultured cells to convert ϕϑ-THC into more polar derivatives. The transformed metabolites were analyzed and isolated by HPLC. Structures of some new derivatives were proposed on the basis of molecular ion peaks and fragmentation patterns obtained from LC-MS and UV spectra obtained by HPLC, respectively. ϕϑ-THC was rapidly absorbed by Catharanthus roseus cultured cells and upon biotransformation new glycosylated and hydroxylated derivatives were isolated by preparative HPLC. In addition, cannabinol was detected as degradation product, including its glycosylated derivative. Based on these results, it is concluded that Catharanthus cultured cells have great potential to transform ϕϑ-THC into more polar derivatives and can be used for the large scale production of new cannabinoids, which can be a source of new compounds with interesting pharmacological profiles.

Keyword: Biotransformation; cannabinol; Catharanthus roseus; cell suspension culture; ϕϑ-tetrahydrocannabinol