

UTILITY OF BETA-CYCLODEXTRINS FOR ENHANCING ARTEMISININ PRODUCTION IN *ARTEMISIA ANNUA* CELLS

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Artemisinin is an effective antimalarial compound produced, though at low levels (0.1–1% dry weight), by the aerial parts of the herbal plant *Artemisia annua* L. Due to its antimalarial properties and short supply, efforts are being made to improve our understanding of artemisinin biosynthesis and its production. *A. annua* cell and tissue cultures were also explored for the production of artemisinin, although the yields obtained have been so far quite low. We have recently established *A. annua* cell cultures able to biosynthesize artemisinin and to respond to the elicitation by methyl jasmonate (MeJA). Interestingly, amounts of artemisinin produced by these cultures were also found in the spent culture medium. Cyclodextrins (CDs) are known to increase the water solubility of various compounds, by forming host-guest inclusion complexes. The aim of this work was to evaluate the ability of 2,6 dimethyl- β -cyclodextrins (DIMEB) to enhance artemisinin production in *A. annua* suspension cell cultures. HPLC analysis of artemisinin and Real Time PCR gene expression analysis were carried out in DIMEB treated and untreated cultures. DIMEB induced a 300-fold increase of artemisinin levels in the spent culture medium after a three-day-treatment thus showing to significantly enhance artemisinin production in *A. annua* cell cultures. The addition of MeJA induced a further increase of the artemisinin amounts. The gene expression results obtained did not make it possible to assess a clear correlation between transcript accumulation of the artemisinin biosynthetic genes and artemisinin levels. Further investigations are needed to clarify whether the increase of artemisinin production induced by DIMEB was the result of the enhancement of the artemisinin biosynthetic flux .