

Processing Strategies for Enhanced Production of Phytochemicals by Plant Cell Technology

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Plant cell culture provides a viable alternative over whole plant cultivation for production of secondary metabolites. In order to successfully cultivate the plant cells at large scale, several engineering parameters such as cell aggregation, mixing, aeration, and shear sensitivity are taken into account for selection of a suitable bioreactor. The media ingredients, their concentrations and the environmental factors are optimized for maximal synthesis of a desired metabolite. Increased productivity in a bioreactor can be achieved by selection of a proper cultivation strategy, feeding of metabolic precursors and application of suitable elicitors. Our laboratory has been working in this area for enhanced production of podophyllotoxin by *P. hexandrum* cell culture. Optimization of media and environmental conditions, as well as application of different cultivation strategies in batch, fed batch and continuous bioreactors has resulted in significant enhancement of podophyllotoxin titer and productivity. *Linum album*, which accumulates high amounts of podophyllotoxin and 5-methoxypodophyllotoxin, has also been used for further increasing production of podophyllotoxin by application of mycorrhiza-like fungi, *Piriformospora indica* and *Sebacina vermifera*. The lecture will deal with these aspects of plant cell technology with reference to production of podophyllotoxin and other phytochemicals.