

Application of Plant Promoter to Production of Useful Components

Sang-Soo Kwak

Plant Cell Biotechnology Laboratory, Korea Research Institute of Bioscience and Biotechnology (KRIBB), Oun-Dong 52, Yusong, Taejeon, 305-333, Korea (sskwak@mail.kribb.re.kr)

Production of useful components in cultured plant cells has been attractive for commercial production. Only low molecular components derived from plants such as shikonin in *Lithospermum erythrorhizon* and taxol in *Taxus* spp. have been succeeded in the mass production. Nowadays, metabolic engineering is considered as a strong tool for the production of useful compounds not only in whole plants but also in plant cell cultures. Thus a strong expression system using an appropriate promoter is required to express a foreign gene efficiently in cultured cells. Meanwhile, cultured plant cells might be good materials for the study of antioxidative mechanism and mass production of antioxidants, because they are considered to be grown under high oxidative stress conditions. Recently, we have established an efficient production system of peroxidase (POD) in suspension cultures of sweet potato (*Ipomoea batatas*), showing that A2 POD isoenzyme occupy approximately 7.5% of total soluble cell protein. We have also isolated four POD cDNAs (three anionic *swpa1*, *swpa2*, *swpa3* and one neutral *swpn1*) from suspension cultures of sweet potato and characterized their expression in terms of oxidative stress. Four genes were predominantly expressed in cultured cells of sweet potato. Particularly *swpa2* cDNA was strongly expressed in cultured cells, whereas it was not expressed in intact plant tissues. It was strongly induced by oxidative stresses such as wounding, chilling and ozone, suggesting that the gene might have a stress-inducible promoter. In the presentation, the isolation and characterization of a novel oxidative stress-inducible POD promoter from sweet potato and its possible applications will be introduced in terms of development of transgenic plants and cell lines for the production of useful components.