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Media optimization in immobilized culture to enhance the content of curcumin in *Curcuma longa* (Zingiberaceae) and protein profile of treated samples in static culture

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Emerging trends of exploiting plant cell culture for the production of high value phyto-pharmaceuticals, immobilization of plant cell has a very important role. In the described study, the immobilized culture *Curcuma longa* (Zingiberaceae) was used to enhance the production of their active compound curcumin. The maximum content of curcumin was obtained in cultures fed with 5 mg/100 ml of cinnamic acid (3.36% per 300 beads) at the age of two weeks in Zenk medium. To examine the involvement of protein in curcumin biosynthesis, it was also examined curcumin content as well as the protein profile of treated samples of *Curcuma longa* in *in vitro* static culture. Significantly, the seven fold enhancement in curcumin content was obtained in two weeks old rhizome culture, which was maintained on Zenk production media incorporated with 5 mg/l of cinnamic acid (control 1.57%and induced 8.717%). Quantitative estimation was done by using HPTLC with standard curcumin. In protein profile studies,all the treated samples were analysed for their proteomic profile using SDS page and it was observed that protein of 23,420 D was most prominent in all samples. This may be of glycine rich protein (works on defence mechanism) which is already reported in Curcuma comosa. The intensity of the bands was reduced in treated samples as compared to control, that may be due to the formation of Reactive Oxygen species (ROS) in culture condition and which modified the protein. In this case, increased level of sucrose (5%) has been added to *Curcuma longa* culture media, that creates an oxidative stress and eventually the curcumin production increased. The significant part of the research is to use the plant explants as source to develop immobilize culture and static rather than callus in Zenk production media, which reduce the time as well as expenditure. Many aspects of research in *Curcuma longa* are being covered in these days but still some aspects are untouched regarding secondary metabolites on proteomics and molecular level. In addition to that it helps in making an ecosystem balance (prevention in deletion of green cover for obtaining natural products).

Biography

Pratibha Chaturvedi is awardee of Women scientist scholarship, Department of Science and Technology, Ministry of Science and Technology, New Delhi, India. She is life member of Indian Science Congress. She has submitted her PhD thesis to Rajasthan University. She has published 25 research papers ofnational and international repute and three books from Germany. Her area of research interests are secondary metabolites, production and enhancement in tissue culture of medicinal plants and proteomics and plant biochemistry. Her two works have been awarded by IDMA, Indian drugs journal for best research paper in Natural Products Category 2013, and for poster presentation on Curcumin production in tissue culture of *Curcuma longa* by International Conference on Stem Cell and Cancer, October 2013 in Haffkine Institute Mumbai.

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