Establishment of high plumbagin (an anticancerous compound) yielding hairy root lines of *Plumbago zeylanica* through *Agrobacterium rhizogenes* mediated transformation

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*Plumbago zeylanica* commonly known as Chitrakmoolam is a perennial shrub used for the treatment against many disorders like dyspepsia, skin diseases, cancer and rheumatism. In present study HPLC evaluation of its major bioactive compound-plumbagin showed that, roots have maximum content (1.7 mg g⁻¹ dry wt.) followed by stem and leaves. In order to enhance its content in vitro, hairy root cultures from leaf explants through *Agrobacterium rhizogenes* mediated transformation, were established with transformation efficiency of 46% and 33% on full and half strength MS medium, respectively. Eight hairy root lines R1, R3, R4, R5, R6, R7, R8 and R9 were established. Based on morphological patterns, these were grouped into four categories: Group-1 (R1, R3 and R8), Group-2 (R4, R6 and R7), Group-3 (R5) and Group-4 (R9). Group-1 was observed to have fewer lateral roots and less root hair. Group-2 and Group-3 roots comprise of fine hairs and frequent lateral branching. In group-3, roots initiated from calli, whereas in group-2, they emerged directly from root surface. Group-4 roots appeared dark, leathery with no visible root hairs and grew slowly. SEM analysis showed very fine and long root hairs on R4 surface; globular, short and long root hairs on R6, while other root lines showed both types of root hairs. Growth analysis revealed that R5 has maximum FGI (0.875) and DGI (0.864) whereas R3 has the least. HPLC analysis exhibited variable amounts of plumbagin in different root clones being maximum in R5 line [22 fold (2200 times) higher over in vitro root extract] followed by R3 and R8 thereby strongly advocating enhancement of plumbagin in hairy roots.

Biography

Upasana Sharma is currently a PhD Scholar in Department of Botany, University of Delhi. She is a Postgraduate in Botany from University of Delhi, India. She has presented a in Indian Science Congress 2015 and she is currently working on the “Metabolic Engineering of Anticancerous Bioactive Compounds”.

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