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**Studies for Temperature Adaptation and Role of Calcium using In
Vitro Propagation model of Gentiana kurroo**

Indian mid Himalayan medicinal plant *Gentiana kurroo* rich in pharmaceutically important metabolites like Gentiopicroside, Gentiamarin, Amaranoswerin is known for its stomachic-, hypoglycemic-, hypotensive-, anti-inflammatory-, anti-periodic- activities, therefore, has been overexploited from wild habitat and listed as critically endangered species by International Union for Conservation of Nature and Natural Resources (IUCN). Hence, present study was aimed to compare micro-propagation potential of this plant in response to varying plant growth regulators (GA3 + BAP + Kinetin in MS1 & NAA+BAP in MS2) and extra calcium pantothenate (1 ppm in C-1 and 2 ppm in C-2) in MS medium. The enzyme activities in wild plant exposed to varying temperature stress conditions vis-à-vis *in vitro* cultures growing at controlled conditions were assessed. The growth response was better in C2 than the C1; and in MS2 than the MS1. Cultures grown in MS2C-2 medium at 90 days of growth showed the best average of 25.1 leaves, 5.5 nodes and 7.8 cm long shoots. Calcium was hypothesized to play an important role for maintaining cell wall integrity and improving the overall culture growth. The Catalase activity after 20 days of growth increased by 67% whereas Superoxide dismutase and Glutathione reductase activities decreased by 33% and 2%, respectively, in the *in vitro* grown cultures vis-à-vis control. However, in the wild plant exposed to 22°C, the activities of Catalase, Ascorbate peroxidase and Superoxide dismutase increased by 1.37 fold on 20th day but Glutathione reductase activity increased by 4.33 fold vis-à-vis control maintained at 15°C. Role of antioxidant enzymes was envisaged for detoxification of stress generated reactive

oxygen species and survival of the plant at supra-optimal temperature. Precise understanding of the role of Ca in cellular metabolism using the *in vitro* model system along with adaptation of plant at higher temperatures to elicit pharmaceutically important metabolites would be the thrust areas.

Biography

Atul Kumar is presently working as Professor (Plant Physiology) and Head, Department of Plant Physiology at College of Basic Sciences and Humanities of GB Pant University of Agriculture and Technology, Pantnagar, India. After obtaining his Masters in Plant Physiology (1977) and Ph.D. in Horticulture (1983). He has been engaged in Teaching and Research in various aspects of Plant Sciences for over 30 years. He has expertise in the area of Plant Tissue Culture of important Fruits, Vegetables, Ornamentals, and Medicinal and Aromatic Plants (endangered species). Physiology of Abiotic stress in plants is another area of his interest. He has visited several countries, viz. Israel, China, DPR-Korea, Ethiopia, Australia, Germany, Kenya, Turkey and Japan in connection with participation in conferences, symposia for presentation of his research work and as a Lead Speaker. He received Advanced International Training on Plant Biotechnology at Hebrew University of Jerusalem, Israel for two months during 2002. He was also on the assignment of Visiting Professor during 2009 -2011 at Mekelle University, Ethiopia. He has been honored with "Bharat Jyoti Award" and "Rashtriya Sanman Award" during 2006 and 2007, respectively, by India International Friendship Society. Presently, he is a member of Board of Studies of different universities and a Reviewer for different National and International journals. He has authored four Text-cum-Reference Books on Plant Tissue Culture and has over 80 publications of different categories to his credit.

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