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

Indian mid Himalayan medicinal plant Gentiana kurroo rich in pharmaceutically important metabolites like Gentiopicrine, Gentiamarin, Amaroswerin 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^{o}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^{o}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 Japanin 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 "RashtriyaSanman 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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Mohammed Sayed Aly Mohammed

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Traditional Medicinal plants and immunity

A broad range of health-care practices is required to exploit the beneficial effects of Ayurveda, which is the most ancient system of medicines. Being the essence of Ayurvedic medicines, medicinal plants manifest miraculous effects in curing a vast range of diseases and disorders among humans and could be better called as elixirs of life. Currently, there is much growing interest in the use of these medicinal plants as modulators of the complex immune system. Through a number of vast researches conducted in the world, it is being explored that many of the chemicals in the form of alkaloids, flavonoids, terpenoids, polysaccharides, lactones, and glycoside products are responsible to cause alterations in the immunomodulatory properties. Keeping in mind, the tremendous potential of the medicinal plants and their derived drugs, I am clarifying this review with a purpose to globally popularize the world herbal medicines as immunomodulatory. Treatment with herbal drugs discuss to using a plant's seeds, berries, roots, leaves, bark and flowers due to therapeutic reasons. Using of drugs with herbal origin has a prolonged history of use, outside of conventional medicine. The use of herbal supplements has increased dramatically over the past 30 years. It is an evident from the human history that medicinal plants have been the treatment regimen to cure a variety of diseases, including diseases caused by insects, fungi, bacteria, and viruses. The effects shown by the plants are due to the ingredients present in them and they work in the same manner as the conventional drugs.

Biography

Mohammed Sayed Aly Mohammed has been involved in the Medicinal and Aromatic Plants Researches, fine Specialized is Biochemistry. Sharing in teaching in the National program for preparing of the adult educated through war production in the field of "Production of Medicinal and Aromatic Plants" from 2003-2005. He has been involved in the Teaching course of Biochemistry in Chemistry Department, Science College, Gazan University, King of Saudi Arabian from 2008-2013. He has Visited Plant Physiology in Sofia, Bulgaria Republic, for three weeks, through collaboration project in the year 2007. He has been doing the Teaching Corse of biochemistry at Saudia Arabian University of Giza, Science faculty 2008-2013.

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Suphla Gupta, Pooja Goyal and Ajai P Gupta

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Understanding the Role of WRKY Transcription Factor on the Genes involved in Glycyrrhizin Biosynthesis in Glycyrrhiza glabra L.

The underground roots (Licorice) of the Glycyrrhiza genus (G.uralensis, G.glabra and G.echinata) are commercially valued for pharmaceutical, flavor enhancer, natural sweetener and cosmaceutical properties. The popularity of the plant is evident by the growing global demand of the compound is projected to be 5.7% annually during 2017–2025. Roots of the plant are rich in bioactive flavonoids and tri-terpenoid saponins including glycyrrhizin. Several studies have highlighted the organizational complexity and inter-connection between genes and regulatory network operating inside the cell. The observation is further substantiated by vast genomic and transcriptomics sequence data of Glycyrrhiza species available in the public domain. The resource has created extensive knowledge base for the identification of genes and transcription factors, however, understanding of the regulation of the glycyrrhizin biosynthetic pathway is largely unknown. The study conducted in my Lab could identify two WRKY TFs (-8 and -15) up-regulating the expression of all the genes and three WRKYs (-4,-38 and -56) involved in the down-regulation all the four genes involved in glycyrrhizin biosynthesis under the influence of auxin. The presentation will discuss the hormone mediated regulation of WRKY TF of the four structural genes (bAS, CYP72A154, CYP88D6 and UGT) committed to glycyrrhizin biosynthesis. The study will help in understanding the role of NAA in regulating aspects glycyrrhizin metabolism and manipulating the pathway for its higher production.

Biography

Suphla Gupta Research areas include research involving Plant Molecular Biology, DNA Fingerprinting and Barcoding, Tissue Culture and Plant Proteomics. These techniques are the approaches to understand secondary metabolite biosynthesis in medicinal plants. Currently her Lab is engaged in understanding the regulation and transportation of secondary metabolites biosynthesis in Glycyrrhiza glabra employing in-vitro system. Her quest is to get an insight into the regulatory mechanism functioning inside the plant for the synthesis of an anticancer terpenoid, glycyrrhizin. Her Lab is researching to comprehend the role of bioactive secondary metabolite in plant primary functioning. Her Lab has chemically and genetically characterized and catalogued more than 250 Ginger germplasm from North western Himalayas and DNA barcoded medicinal plants collected from Cold desert areas of Leh and Ladakh region of India. The research outputs are the result of excellent work done by past and present students. Our Lab gets satisfaction in igniting the scientific temperament for rediscovering Nature and its inherent mechanism. She is also Editorial Board Member and reviewer of several International Journals.

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