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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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