

Type III Polyketide Synthase from Indian Gooseberry: An Ideal Candidate for Metabolic Engineering to Develop Novel Nutraceuticals

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Emblica officinalis Gaertn (Indian Gooseberry) is one of the most important medicinal plants used in various Ayurvedic formulations and traditional medicine. The plant is native to India, also grows in the tropical and subtropical regions including China, Pakistan, South East Asia and Srilanka. It has beneficial role in cancer, diabetes, liver treatment, anaemia and has application as antioxidant, immunomodulatory, antipyretic, analgesic etc. The plant is rich in secondary metabolites like flavonoids, phenols, tannins, alkaloids and vitamin C. Because of the numerous health benefits attributed to the consumption of *E. officinalis* as tonic and medicine, there is considerable interest in defining the pathways that control the accumulation of active components. It has been suggested that type III polyketide synthase (PKS) family of enzymes has specific role in the biosynthesis of natural products like flavonoids, alkaloids and curcuminoids. We could successfully isolate and characterise a novel type III polyketide synthase from *E. officinalis*. Along with this focus is also given to improve the substrate specificity of the identified type III PKS with the aid of site-directed mutagenesis. The findings of the *in vitro* and *in planta* functional characterization of the mutants based on high-throughput metabolomics is one of the interesting outcomes of the study. Heterologous expression and *in vitro* enzymatic assay of EoPKS1 mutants resulted in the formation of quinolone/acridone precursors which can contribute to the large scale combinatorial biosynthesis of pharmaceutically relevant compounds *in vitro*.

Biography:

Soniya was awarded doctorate from the University of Kerala and worked two years at Central Tuber Crops Research Institute, Sreekaryam, Thiruvananthapuram before joining Rajiv Gandhi Centre for Biotechnology. She is the Fellow of National Academy of Science, India. She is the INSA/DFG visiting Scientist in Max Planck Institute of Chemical Ecology, Jena, Germany. She organized the EMBO Conference in Plant Science in RGCB, Thiruvananthapuram. Her area of research is Characterisation of small functional non-coding RNAs and Type III polyketide synthases for exploiting its potential use in metabolic engineering. She has published more than 20 research articles in peer reviewed International Journals and presented her research works in so many international conferences. She wrote several chapters in the Plant biology field.