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Identification and characterization of a novel type III polyketide synthase from *Aegle marmelos* Correa: A step towards metabolic engineering

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Quinolones are anthranilic acid-derived alkaloids that are largely or completely restricted to plants of Rutaceae. In our studies, a type III polyketide synthase named as quinolone synthase (QNS) was identified and characterized from *A. marmelos*, which is involved in the biosynthesis of quinolone alkaloid. The reaction involves decarboxylative condensation of malonyl-CoA with N-methylantraniloyl-CoA to form an intermediate, which spontaneously cyclize by amide formation to yield 4-hydroxy-2(1H)-quinolone. Measurement of steady-state kinetic parameters demonstrates that the catalytic efficiency of QNS was several-fold higher for larger 'acyl-coenzyme A' substrates as compared with smaller precursors. Molecular modeling studies suggested that QNS might have emerged by the gain of function (by the substitution of simply two active site residues) mutation from a structurally homologous CHS type III protein. The catalytic and structural importance of active site residues, as predicted by our structural model, was investigated by performing site-directed mutagenesis. The modeling and mutagenesis studies provide an insight into the structural mechanism for the enzyme that could be used to generate pharmaceutically important products.

Biography

EV Soniya is a Senior Scientist at Plant Disease Biology & Biotechnology Division, Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram, Kerala, India. She has published several research articles in reputed high impact journals and has wrote book chapters in the Plant biology

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