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Molecular and Proteomics Analysis of Glucosyltransferases from *Gymnema sylvestre* R.Br. Playing a Pivotal Role in Sterol Metabolism

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Keywords Diabetes mellitus; Glucosyltransferase; *Gymnema sylvestre* R.Br.; Triterpene Glycoside; Sterol Glycosides Biosynthesis.

ABSTRACT: Sterol glycosyltransferases are important class of enzymes, catalyzes glucosylation of triterpenoids and steryl glucosides formation *in planta*. The addition of a carbohydrate moiety to secondary metabolites enhances several biological properties as food additives and as key drugs or drug-derivatives in pharmacological studies. *Gymnema sylvestre* R.Br. a pharmacologically important antidiabetic herb, attributed to the presence of bioactive triterpene glycosides. Although some information regarding pharmacology and phytochemical profiles of the plant is available, no attempts have been made so far to decipher the biosynthetic pathway and key enzymes involved in biosynthesis of steryl glucosides. The presentation discusses the identification and catalytic characterization of a glucosyltransferase, catalyzing biosynthesis of steryl glycosides. The full length cDNA (2572 bp) contained an open reading frame of 2106 nucleotides, was heterologously expressed in bacterial expression system and the recombinant protein encoded a polypeptide of 77 kiloDalton as observed on SDS-PAGE. The GsSGT was expressed in *Escherichia coli* and biochemical characterization of the recombinant enzyme suggested its key role in the biosynthesis of steryl glucosides with catalytic preference for C-3 hydroxyl group of sterols. This SGT from *G. sylvestre* R.Br. is unique as it possesses the capacity to glucosylate different kinds of sterols present in lower organisms like bacteria and fungi to higher organisms (plants and animals). This study highlights significant possibilities focusing on sterol metabolism and its evolution from microbes to higher organisms and would further aim at pathway engineering of sterol metabolism.

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