Biotransformation of Isoflavone Using Enzymatic Reaction

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The roles of cytochrome P450 monooxygenases (CYPs) from *Streptomyces* which is called as treasure islands for natural products of medicine and antibiotics are not well understood. Substrate specificity study on CYPs may give a solution for elucidation their roles. Based on homology sequence information, the CYP105D7 of a soluble cytochrome P450 known as heme protein from *Streptomyces avermitilis* MA4680 was expressed using the T7 promoter of the bacterial expression vector pET24ma, over-expressed in *Escherichia coli* system and characterized. Engineered whole cell system for daidzein hydroxylation was constructed using exogenous electron transport system from ferredoxin reductase (PdR) and ferredoxin (Pdx). Also, in vitro reaction study showed CYP105D7 to catalyze daidzein into 7,3',4'-trihydroxyisoflavone using NADH-dependent-reducing equivalents of redox partner from Pseudomonas putida. The hydroxylated position was confirmed by GC-MS analysis. The purified CYP105D7 enzyme hydroxylated daidzein at 3' position of B ring, resulting in 7,3,'4' trihydroxyisoflavone. The turnover number of the enzyme was 0.69 μmol 7,3,'4'-trihydroxyisoflavone produced per μmol P450 per min.