Supplementary Materials

Bacterial Transformation of Adamantane and Its Derivatives: Regioselectivity and Biocatalytic Approaches

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Table.S1. Cytochrome P450 Enzymes in Adamantane and Camphor Metabolism: Comparative Characteristics

Enzyme Name/Class	Source	Substrate	Product	Observed Regioselectivity	Cofactors	Reference
P−450cam	*Pseudomonas putida*	Adamantane	1-adamantanol	1-position (100%)	NADH, putidaredoxin, putidaredoxin reductase	[19]
P−450LM2	Rabbit liver	Adamantane	1-adamantanol, 2-adamantanol	1-position (91%), 2-position (9%)	NADPH, NADP+, isocitrate, $MGCL_2$, dilauroylglyceryl-3-phosphorylcholine	[19]
Cytochrome P-450 (presumably)	*Streptomyces griseoplanus* AC122	Adamantane	1-adamantanol, 2-adamantanol	1-position (89%), 2nd position (11%)	Not explicitly specified, but the P-450 system is required (inhibited by 1-aminobenzotriazole	[59]

Enzyme Name/Class	Source	Substrate	Product	Observed Regioselectivity	Cofactors	Reference
					imedione)	
CYP109B1 (cytochrome P450)	*Escherichia coli* BL21(DE3) with plasmid pET-109B1-CamA-CamB	N-(2-adamantyl)-benzamide	N-(5-hydroxy-2-adamantyl)-benzamide	5-position of adamantane	NADPH, recovery system (CamA-CamB)	[76]
CYP109FK (fusion protein)	*Escherichia coli* BL21(DE3) with modified plasmid	N-(2-adamantyl)-benzamide	N-(5-hydroxy-2-adamantyl)-benzamide	5-position of adamantane	integrated reduction domain	[76]
CYP109FK mutants (I77F, I77W, M105I, etc.)	*Escherichia coli* BL21(DE3) with modified plasmid	N-(2-adamantyl)-benzamide	N-(5-hydroxy-2-adamantyl)-benzamide	5-position of adamantane	integrated reduction domain	[76]
P450cam (CYP101A1)	*Pseudomonas putida*	Camphor	5-exo-hydroxycamphora	no data is provided	NADH, putidaredoxin (Pdx), putidaredoxin reductase (Pdr)	[77]
CYP101D1	*Novosphingobium aromaticivorans,* although the protein itself was obtained by heterologous expression in *E. coli.*	Camphor	5-exo-hydroxycamphora	no data is provided	no data is provided	[77]
P450cam mutants	*E. coli* (recombinant)	Camphor	5-exo-hydroxycamphora	no data is provided	NADH, putidaredoxin (Pdx), putidaredoxin	[77]

Enzyme Name/Class	Source	Substrate	Product	Observed Regioselectivity	Cofactors	Reference
(L358A, K178G, L358A/K178G, L358A/K178G/ D182N)					reductase (Pdr)	
P450cam (CYP101A1)	*Pseudomonas putida*	Camphor	5-exo-hydroxycamphora	no data is provided	NADH, putidaredoxin (Pdx), putidaredoxin reductase (Pdr)	[77]
Цитохром P-450cam (CYP101)	*Pseudomonas putida PpG1*	D-camphor	5-exo-hydroxycamphora	no data is provided	NADH, putidaredoxin (CamB), NADH-putidaredoxin reductase (CamA)	[62]
5-exo-hydroxycamphor dehydrogenase (FdeH)	*Pseudomonas putida PpG1*	5-exo-hydroxycamphora	no data is provided	no data is provided	no data is provided	[62]
Cytochrome P-450cam (CYP101)	*Pseudomonas putida* PpG1 (CAM)	Adamantane	1-adamantanol	1-position	NADH, putidaredoxin (CamB), NADH-putidaredoxin reductase (CamA)	[63]

Enzyme Name/Class	Source	Substrate	Product	Observed Regioselectivity	Cofactors	Reference
Cytochrome P-450cam (CYP101)	*Pseudomonas putida* PpG1 (CAM)	Adamantanon	5-hydroxyadamanthanone-2	5-position	NADH, putidaredoxin (CamB), NADH-putidaredoxin reductase (CamA)	[63]