

Supplemental Table S1

“Biotechnological production of limonene in microorganisms”

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Table S1 Plant limonene synthases

Plant species	GenBank accession nos.	Plant family	Stereo isomer ^a	Reference	Used in microbes (reference)
<i>Eleutherococcus trifolius</i>	KJ126717	<i>Araliaceae</i>		Huang KF, Lee YR, Tseng YH, Wang SY, Chu FH (2015) <i>Holzforschung</i> 69(2):163-171	
<i>Cannabis sativa</i>	DQ839404	<i>Cannabaceae</i>	(-)	Guennewich N, Page JE, Kutchan TM (2007) <i>Nat Prod Commun</i> 2:223-232	
<i>Arabidopsis thaliana</i>	At3g25810	<i>Cruciferae</i>		Chen F, Tholl D, D'Auriaa JC, Farooqb A, Pichersky E, Gershenzon J (2003) <i>Plant Cell</i> 15(2):481-94.	
<i>Oryza sativa</i>	Os04g27340	<i>Graminae</i>		Lee GW, Lee S, Chung MS, Jeong YS, Chung BY (2015) <i>Protoplasma</i> 252(4):997-1007	
<i>Mentha arvensis</i>	JX555963	<i>Lamiaceae</i>		Wang H, Yu X, Li W, Liang C, Liu Y (2013) <i>Gene</i> 524:246-252	
<i>Mentha cardiaca</i>	JX555964-5	<i>Lamiaceae</i>		Wang H, Yu X, Li W, Liang C, Liu Y (2013) <i>Gene</i> 524:246-252	
<i>Mentha haplocalyx</i>	JX555966-9	<i>Lamiaceae</i>		Wang H, Yu X, Li W, Liang C, Liu Y (2013) <i>Gene</i> 524:246-252	
<i>Mentha rotundifolia</i>	JX555970-1	<i>Lamiaceae</i>		Wang H, Yu X, Li W, Liang C, Liu Y (2013) <i>Gene</i> 524:246-252	
<i>Mentha spicata</i>	JX555972-5; JN587785; AR036109-15; L13459; Q40322	<i>Lamiaceae</i>		Wang H, Yu X, Li W, Liang C, Liu Y (2013) <i>Gene</i> 524:246-252; Curto MA, Puppo P, Ferreira D, Nogueira M, Meimberg H (2012) <i>Mol. Phylogenet. Evol.</i> 63(3):758-767; Croteau RB, Colby SM (199) US patent 5871988 A; Colby SM, Alonso WR, Katahira EJ, McGarvey DJ, Croteau R (1993) <i>J Biol Chem</i> 268(31):23016-23024	<i>Escherichia coli</i> (Carter OA, Peters RJ, Croteau R (2003) <i>Phytochem</i> 64:425-433; Alonso-Gutierrez J, Chan R, Batth TS, Adams PD, Keasling JD, Petzold CJ, Lee TS (2013) <i>Metab eng</i> 19:33-41; Willrodt C, David C, Cornelissen S, Buhler B, Julsing MK, Schmid A (2014) <i>Biotech J</i> 9:1000-1012; Dunlop MJ, Dossani Z, Szmidi H, Chu HC, Lee TS, Keasling JD, Hadi MZ, Mukhopadhyay A (2011) <i>Mol Syst Biol</i> 7:487) <i>Saccharomyces cerevisiae</i> (Behrendorff JB, Vickers CE, Chrysanthopoulos P, Nielsen LK (2013) <i>Microb cell fact</i> 12:76) <i>Synechococcus</i> sp. PCC 7002 (Davies FK, Work VH, Beliaev AS, Posewitz MC (2014) <i>Front Bioeng Biotech</i> 2:21)

<i>Mentha canadensis</i>	JX555976; JX555966-9	<i>Lamiaceae</i>		Wang H, Yu X, Li W, Liang C, Liu Y (2013) Gene 524:246-252	
<i>Mentha suaveolens</i>	JX555970-1	<i>Lamiaceae</i>		Wang H, Yu X, Li W, Liang C, Liu Y (2013) Gene 524:246-252	
<i>Mentha gracilis</i>	JX555964-5	<i>Lamiaceae</i>		Wang H, Yu X, Li W, Liang C, Liu Y (2013) Gene 524:246-252	
<i>Perilla frutescens</i>	KM015220; D49368	<i>Lamiaceae</i>	(-)	Jongedijk E, Cankar K, Ranzijn J, van der Krol S, Bouwmeester H, Beekwilder J Yeast 32(1):159-171; Yuba A, Yazaki K, Tabata M, Honda G, Croteau R (1996) Arch Biochem Biophys 332(2):280-287	<i>Saccharomyces cerevisiae</i> (Jongedijk E, Cankar K, Ranzijn J, van der Krol S, Bouwmeester H, Beekwilder J Yeast 32(1):159-171)
<i>Perilla citriodora</i>	AF233894	<i>Lamiaceae</i>		Ito M, Kiuchi F, Yang LL, Honda G (2000) Biol Pharm Bull 23(3):359-362	
<i>Lavandula angustifolia</i>	DQ263740	<i>Lamiaceae</i>	mainly (+)	Landmann C, Schwab W (2007) Arch Biochem Biophys 465(2):417-429	
<i>Schizonepeta tenuifolia</i>	AF282875	<i>Lamiaceae</i>		Maruyama T, Ito M, Kiuchi F, Honda G (2001) Biol Pharm Bull 24(4):373-377	<i>Synechocystis</i> sp. PCC 6803 (Kiyota et al., 2014 J Biotechnol 185; 1-7)
<i>Micromeria lanata</i>	JN587786	<i>Lamiaceae</i>		Curto MA, Puppo P, Ferreira D, Nogueira M, Meimberg H (2012) Mol. Phylogenet Evol 63(3):758-767	
<i>Agastache rugosa</i>	AY055214	<i>Lamiaceae</i>		Maruyama T, Saiki D, Ito M, Honda G (2002) Biol Pharm Bull 25:5, 661-665	
<i>Picea sitchensis</i>	DQ195275	<i>Pinaceae</i>		Byun-McKay A, Godard KA, Toudefallah M, Martin DM, Alfaro R, King J, Bohlmann K, Plant AL (2006) Plant Physiol 140(3):1009-1021	
<i>Picea abies</i>	AY473624	<i>Pinaceae</i>	mainly (-)	Martin DM, Faeldt J, Bohlmann J (2004) Plant Physiol 135(4):1908-1927	
<i>Abies grandis</i>	AF006193; AF326518	<i>Pinaceae</i>	(-)	Bohlmann J, Steele CJ, Croteau R (1997) J Biol Chem 272(35):21784-21792; Trapp SC, Croteau RB (2001) Genetics 158(2):811-832	
<i>Coffea arabica</i>	HE985292	<i>Rubiaceae</i>		Del Terra L, Lonzarich V, Asquini E, Navarini L, Graziosi G, Suggi Liverani F, Pallavicini A (2013) Phytochemistry 89:6-14	
<i>Citrus jambhiri</i>	AB266584	<i>Rutaceae</i>		Yamasaki Y, Akimitsu K 2007, J Plant Physiol 164(11):1436-1448	
<i>Citrus unshiu</i>	AB110636; AB110637	<i>Rutaceae</i>		Shimada T, Endo T, Fujii H, Hara M, Omura M (2004) Plant Sci. 166:49-58;	

				Shimada T, Endo T, Fujii H, Omura M 2005, Sci Hortic 105:507–512	
<i>Citrus limon</i>	AF514289; AF514287	<i>Rutaceae</i>	(+)	Lücker J, El Tamer MK, Schwab W, Verstappen FWA, van der Plas LHW, Bouwmeester HJ, Verhoeven HA (2002) Eur J Biochem 269:3160-3171	<i>Saccharomyces cerevisiae</i> (Jongedijk E, Cankar K, Ranzijn J, van der Krol S, Bouwmeester H, Beekwilder J Yeast 32(1):159-171; Behrendorff JB, Vickers CE, Chrysanthopoulos P, Nielsen LK (2013) Microb cell fact 12:76)
<i>Solanum habrochaites</i>	JN990693; NM_001247700	<i>Solanaceae</i>		Gonzales-Vigil E, Hufnagel DE, Kim J, Last RL Barry CS (2012) Plant J. 71(6): 921-935; Schilmiller AL, Schauvinhold I, Larson M, Xu R, Charbonneau AL, Schmidt A, Wilkerson C, Last R, Pichersky E (2009) P Natl Acad Sci USA 106:10865-10870	
<i>Solanum lycopersicum</i>	NM_001308378	<i>Solanaceae</i>		Falara V, Akhtar TA, Nguyen TT, Spyropoulou EA, Bleeker PM, Schauvinhold I, Matsuba Y, Bonini ME, Schilmiller AL, Last RL, Schuurink RC, Pichersky E (2011) Plant Physiol 157:2, 770-789	

^aStereo chemistry confirmed by experimental data