



Research article

Diversity and antimicrobial activity of the tropical ant-derived actinomycetes isolated from Thailand

Tuangrat Tunvongvinis¹, Weeyawat Jaitrong², Yudthana Samung³, Somboon Tanasupawat^{1,*}, Wongsakorn Phongsopitanun^{1,4,*}

¹ Department of Biochemistry and Microbiology, Faculty of Pharmaceutical Sciences, Chulalongkorn University, Bangkok 10330, Thailand

² Office of Natural Science Research, National Science Museum, 39, Moo 3, Khlong 5, Khlong Luang, Pathum Thani 12120, Thailand

³ Department of Medical Entomology, Faculty of Tropical Medicine, Mahidol University, Bangkok 10400, Thailand

⁴ Natural Products and Nanoparticles Research Units (NP2), Chulalongkorn University, Bangkok 10330, Thailand

* **Correspondence:** Email: wongsakorn.p@chula.ac.th; somboon.t@chula.ac.th.

Table S1. 16S rRNA gene sequence similarity and antimicrobial activity of the actinomycete isolates.

Ant species	Isolate number	Accession no.	Closest actinobacterial type strain	Similarity %	Antimicrobial activity (mm.)																	
					BS	SA	KR	E C	P A	SE	MR SA	K P	K A	S T	S	SP	CA	CG	CG A	CT	CP	CP S
<i>Harpegnathos venator</i>	HPV01	OQ559526	<i>Streptomyces rochei</i>	99.88%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	HPV02	OQ557939	<i>Amycolatopsis thermalba</i>	99.88%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	HPV04	OQ561248	<i>Nocardia cyriacigeorgica</i>	100.00%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	HPV06	OQ568319	<i>Streptomyces bikiniensis</i>	99.72%	-	-	17.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Acanthomyrmex ferox</i>	AC01	OQ559570	<i>Streptomyces exfoliates</i>	100.00%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	AC03	OQ557820	<i>Streptomyces rochei</i>	99.67%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	AC04	OQ557751	<i>Streptomyces rochei</i>	99.90%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Aphaenogaster feae</i>	AF01	OQ565413	<i>Nocardia neocaledoniensis</i>	98.68%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	AF03	OQ558840	<i>Streptomyces rochei</i>	99.91%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Anochetus graeffei</i>	AG02	OQ557750	<i>Streptomyces bikiniensis</i>	99.89%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	AG03	OQ561212	<i>Nocardia grenadensis</i>	98.25%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	AG04	OQ559525	<i>Streptomyces parvulus</i>	100.00%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	AG05	OQ561189	<i>Streptomyces parvulus</i>	99.47%	19.60	-	22.20	-	-	19.40	20.70	-	-	-	-	18.60	-	-	24.50	-	-	-
	AG06	OQ559661	<i>Streptomyces bikiniensis</i>	99.20%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	AG07	OQ559504	<i>Streptomyces atriruber</i>	99.77%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Ant species	Isolate number	Accession no.	Closet actinobacterial type strain	Similarity %	Antimicrobial activity (mm.)																		
					BS	SA	KR	E C	P A	SE	MR SA	K P	K A	S T	S	SP	CA	CG	CG A	CT	CP	CP S	
<i>Camponotus lasiselenae</i>	CL01	OQ561249	<i>Streptomyces xylanilyticus</i>	99.35%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	CL02	OQ561251	<i>Streptomyces olivaceus</i>	99.79%	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	CL05	OQ561252	<i>Streptomyces olivaceus</i>	99.07%	17.50	-	16.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	CL10	OQ561253	<i>Streptomyces olivaceus</i>	99.93%	11.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	CL11	OQ565676	<i>Streptomyces olivaceus</i>	99.24%	15.00	-	9.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	CL12	OQ564377	<i>Streptomyces costaricanus</i>	100.00%	17.50	15.50	20	-	-	14.30	11.40	-	-	-	-	12.70	11.50	10.80	15.55	10.40	-	11.70	
	CL13	OQ559423	<i>Streptomyces xylanilyticus</i>	99.74%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	CL14	OQ559568	<i>Streptomyces olivaceus</i>	99.89%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	CL15	OQ559566	<i>Streptomyces tendae</i>	100.00%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	CL17	OQ565633	<i>Streptomyces murinus</i>	100.00%	19.00	18.00	23.00	-	-	15.35	15.65	-	-	-	-	15.50	9.50	-	12.00	9.40	-	10.20	
	CL18	OQ561295	<i>Streptomyces olivaceus</i>	99.52%	18.00	-	16.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	CL19	OQ561296	<i>Streptomyces olivaceus</i>	99.86%	17.50	-	15.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	CL20	OQ561298	<i>Streptomyces costaricanus</i>	100.00%	19.00	20	25.00	-	-	18.60	16.20	-	-	-	-	18.10	-	-	16.25	-	-	-	
	CL23	OQ557997	<i>Streptomyces olivaceus</i>	99.93%	16.00	-	11.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	CL25-3	ON520696	<i>Streptomyces aculeolatus</i>	99.84%	8.70	-	-	-	-	10.50	8.55	-	-	-	-	-	-	-	-	-	-	-	-
	CL27-1	OQ561299	<i>Streptomyces diacarni</i>	99.92%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	CL27-2	ON520694	<i>Streptomyces tendae</i>	100.00%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	CL30	OQ559392	<i>Streptomyces olivaceus</i>	99.89%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	<i>Centromyrmex feae</i>	CF01	OQ560998	<i>Streptomyces zaomyceticus</i>	99.81%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	<i>Ectomyrmex astutus</i>	EA01	ON514566	<i>Nocardia asteroides</i>	99.92%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

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					BS	SA	KR	E C	P A	SE	MR SA	K P	K A	S T	S	SP	CA	CG	CG A	CT	CP	CP S
<i>Echinopla striata</i>	EC01	OQ557514	<i>Streptomyces violaceus</i>	100.00%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EC03	OQ559327	<i>Streptomyces violaceus</i>	99.89%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Gnamptogenys coxalis</i>	GC01	OQ558001	<i>Streptomyces araujoniae</i>	99.72%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GC02	OQ559659	<i>Streptomyces rochei</i>	100.00%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Lioponera sp.</i>	LI01	OQ557493	<i>Amycolatopsis australiensis</i>	99.65%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	LI03	OQ559622	<i>Streptomyces tendae</i>	99.27%	7.5 0	-	10. 60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	LI04	OQ557483	<i>Streptomyces atriruber</i>	99.10%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Polyrhachis laevissima</i>	LKA01	ON514610	<i>Streptomyces tendae</i>	100.00%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	LKA04	OQ557998	<i>Streptomyces parvulus</i>	100.00%	19. 00	17. 25	23. 50	-	-	21. 00	18.7 0	-	-	-	-	18. 30	-	-	23. 00	-	-	-
	LKA08	OQ560484	<i>Streptomyces parvulus</i>	100.00%	13. 35	10	16. 30	-	-	10. 65	13.1 0	-	-	-	-	11. 45	-	-	10	-	-	-
<i>Odontomachus simillinus</i>	ODS04-1	OQ557462	<i>Streptomyces monticola</i>	99.76%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	ODS05-4	ON514556	<i>Streptomyces lichenis</i>	98.85%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	ODS09	OQ559565	<i>Streptomyces griseourubiginosus</i>	99.78%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	ODS10	OQ557452	<i>Streptomyces lusitanus</i>	99.65%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	ODS11	ON514608	<i>Micromonospora citrea</i>	99.71%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	ODS15	ON514562	<i>Nocardia thailandica</i>	100.00%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	ODS15-2	OQ559560	<i>Streptomyces tendae</i>	100.00%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	ODS18	OQ557448	<i>Streptomyces sioyaensis</i>	100.00%	-	-	11. 75	-	-	-	9.90	-	-	-	-	-	-	-	13. 30	23. 60	-	-
	ODS20	ON514585	<i>Streptomyces parvulus</i>	99.93%	14. 80	-	16. 15	-	-	10. 50	14.7 0	-	-	-	-	-	14. 00	-	-	18. 10	-	-
	ODS25	ON514559	<i>Streptomyces lusitanus</i>	98.07%	11. 70	-	-	-	-	8.2 0	12.7 5	-	-	-	-	-	8.4 5	-	-	-	-	-
ODS28	OQ559042	<i>Streptomyces marinus</i>	97.12%	-	-	-	-	-	-	-	-	-	-	-	8.5 5	-	-	-	-	-	-	

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					BS	SA	KR	E C	P A	SE	MR SA	K P	K A	S T	S	SP	CA	CG	CG A	CT	CP	CP S
<i>Parasyscia</i> sp.	PA01	OQ559326	<i>Streptomyces drozdowiczii</i>	100.00%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	PA02	OQ559126	<i>Streptomyces bacillaris</i>	100.00%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	PA03	OQ559115	<i>Streptomyces microflavus</i>	100.00%	8.65	-	10.00	-	-	11.75	10.00	-	-	-	-	-	-	-	12.50	-	-	-
	PA05	OQ559106	<i>Streptomyces bacillaris</i>	100.00%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	PA06	OQ559107	<i>Streptomyces ambofaciens</i>	99.56%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	<i>Diacamma orbiculatum</i>	RAB12	ON514568	<i>Streptomyces ardesiacus</i>	99.71%	14.40	13.70	-	-	-	16.75	14.55	-	-	-	-	-	-	-	-	-	-
RAB13		ON514567	<i>Streptomyces albidoflavus</i>	99.54%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RAB19		OQ561245	<i>Nocardia rhizosphaerihabitans</i>	99.04%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RCB08		OQ558000	<i>Streptomyces djakartensis</i>	99.00%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RCB10		ON519077	<i>Streptomyces drozdowiczii</i>	99.69%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RCB24		OQ558003	<i>Streptomyces viridiviolaceus</i>	99.75%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Stigmatomma reclinatam</i>	SR01	OQ559621	<i>Streptomyces ardesiacus</i>	99.51%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	STR09	OQ559556	<i>Streptomyces atriruber</i>	99.56%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Syscia chaladthanyakiji</i>	SY02	OQ559571	<i>Nocardia thailandica</i>	98.90%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Tetraponera nigra</i>	TEN01	OQ561246	<i>Streptomyces costaricanus</i>	100.00%	9.00	-	-	-	-	-	12.20	-	-	-	-	-	-	-	-	-	-	
<i>Tetraponera rufonigra</i>	TER04	ON515460	<i>Nocardia aurantia</i>	99.58%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Abbreviations: BA, *Bacillus subtilis*; SA, *Staphylococcus aureus*; KR, *Kocuria rhizophila*; EC, *Escherichia coli*; PA, *Pseudomonas aeruginosa*; SE, *Staphylococcus epidermidis*; MRSA, Methicillin-resistant *Staphylococcus aureus*; KP, *Klebsiella pneumoniae*; KA, *Klebsiella aerogenes*; ST, *Salmonella typhi*; S, *Shigella* sp.; SP, *Streptococcus pyogenes*; CA, *Candida albicans*; CG, *Candida glabrata*; CGA, *Candida guilliermondii*; CT, *Candida tropicalis*; *Candida parapsilosis*; CPS, *Candida pseudotropicalis*

