

SUPPLEMENTARY MATERIAL for

Halimane diterpenoids: sources, structures, nomenclature and biological activities

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CONTENT:

Structures of norderivatives (norclerodanes/norhalimanes)

(Figures S15-S16)

Table including natural source, activities and references. (Table S7)

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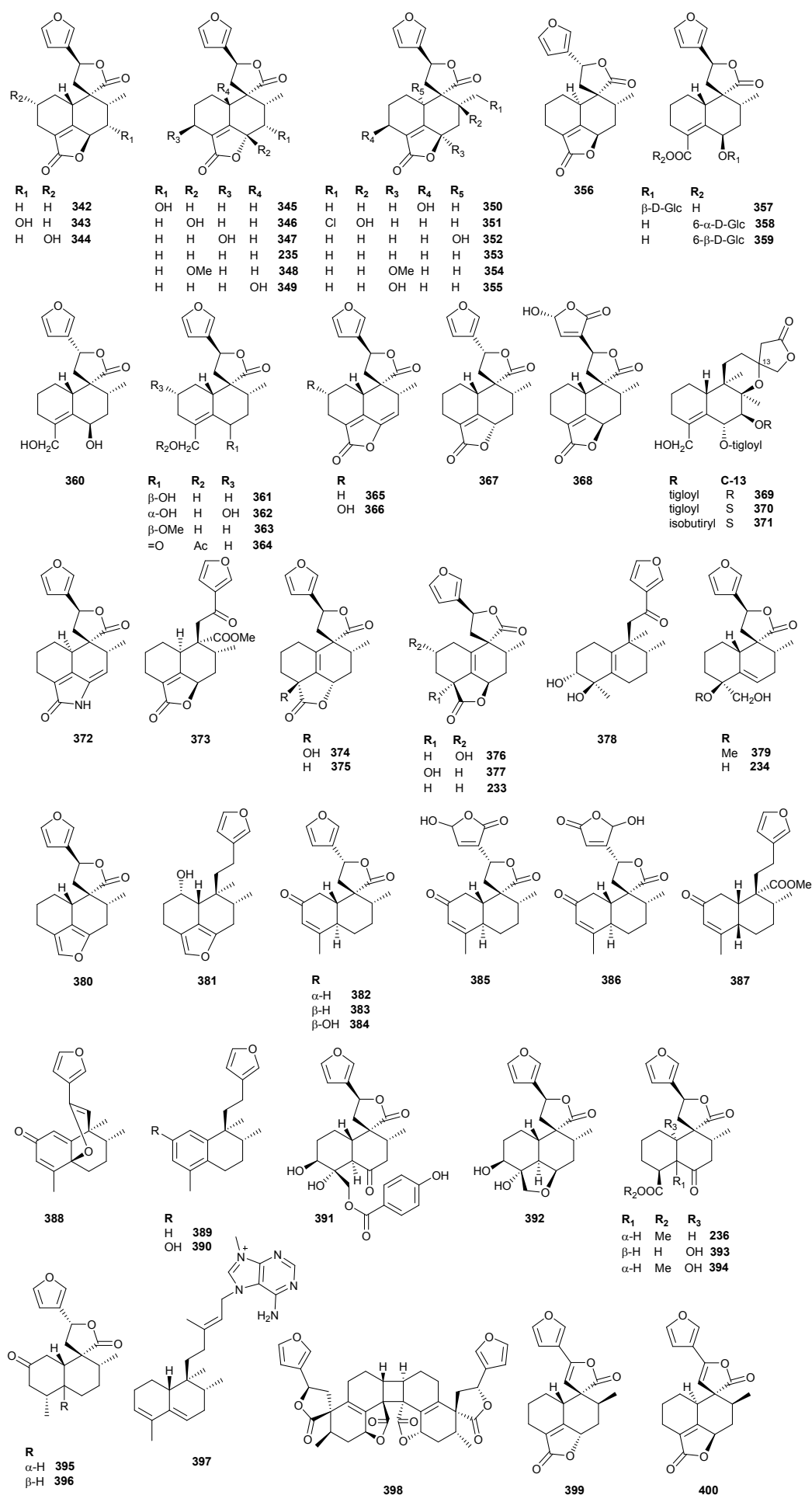


Figure S15. Norhalimenes

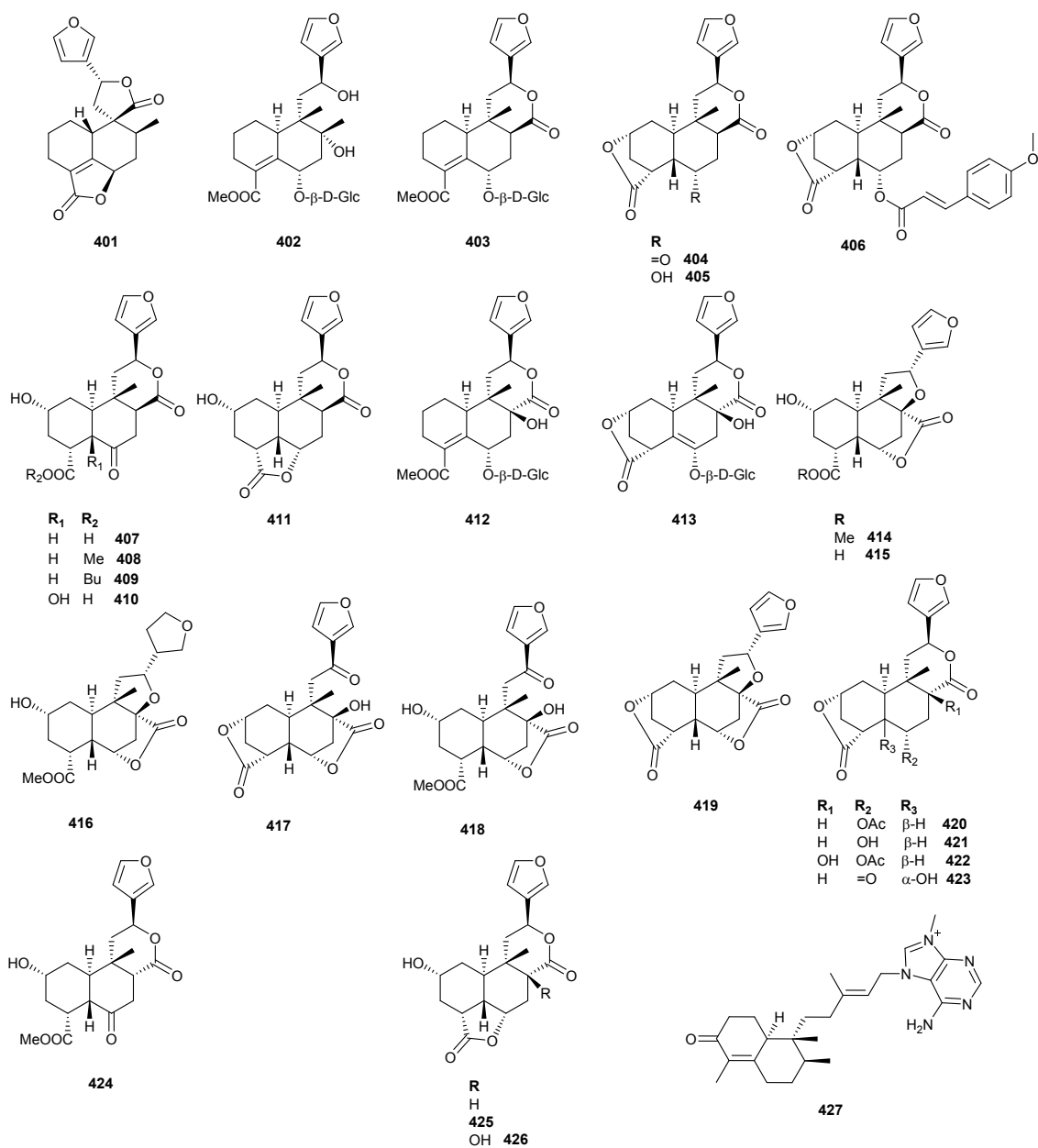


Figure S15 (cont.)

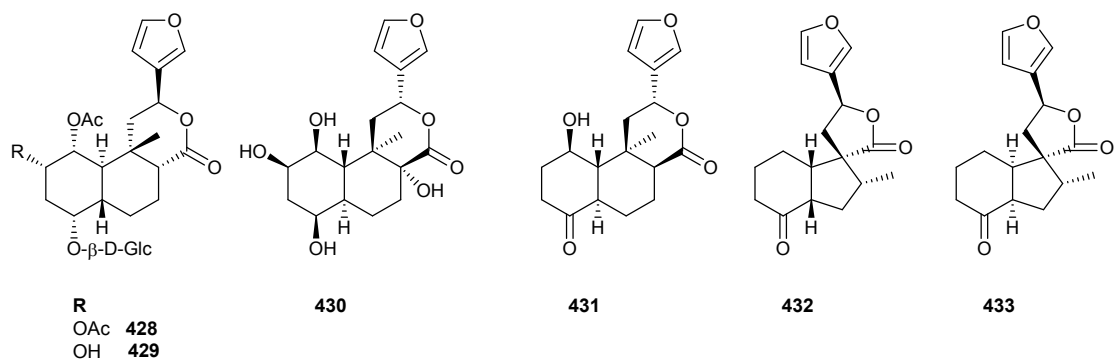


Figure S16. Di- and trinorhalimenes

Table S7. Norhalimenes

	NATURAL SOURCE	ACTIVITY	REF.
Norderivatives			
Teuchamaedryn A (Teuflin), 342	<i>Teucrium chamaedrys</i> <i>T. flavum</i>	Hepatotoxic	<i>J. Chem. Soc. Perkin Trans. I</i> , 1979, 1915-1917 <i>Phytochemistry</i> , 1983, 22 , 723-725 <i>Eur. J. Gastroenterol. Hepatol.</i> , 2006, 18 , 681-683 <i>Basic Clin. Pharmacol. Toxicol.</i> , 2011, 109 , 521-526.
6-Epi-teucrin A, 343	<i>Teucrium chamaedrys</i>		<i>Phytochemistry</i> , 1983, 22 , 723-725.
Teucrin H4, 344	<i>Teucrium hircanicum</i>		<i>Phytochemistry</i> , 1978, 17 , 1967-1973.
Teucrin A, 345	<i>Teucrium chamaedrys</i>	Hepatotoxic	<i>Phytochemistry</i> , 1983, 22 , 723-725 <i>Chem. Res. Toxicol.</i> , 1994, 7 , 850-856 <i>Eur. J. Gastroenterol. Hepatol.</i> , 2006, 18 , 681-683 <i>J. Gastroenterol. Hepatol.</i> , 2008, 23 , 366-373 <i>Basic Clin. Pharmacol. Toxicol.</i> , 2011, 109 , 521-526 <i>Chem. Res. Toxicol.</i> , 2013, 26 , 6-25.
Teucvisin C, 346	<i>Teucrium viscidum</i>		<i>Chem. Pharm. Bull.</i> , 2014, 62 , 472-476.
Isoteuflidin, 347	<i>Teucrium chamaedrys</i>		<i>Phytochemistry</i> , 1984, 23 , 1465-1469.
Teucvin (Mallotucin A), 235	<i>Teucrium viscidum</i> Mallotus repandus <i>Teucrium chamaedrys</i>		<i>J. Chem. Soc. Chem. Commun.</i> , 1973, 793-794 <i>J. Chem. Soc. Perkin Trans. I</i> , 1974, 1547-1555 <i>Heterocycles</i> , 1976, 5 , 227-232 <i>Phytochemistry</i> , 1983, 22 , 723-725 <i>Planta Med.</i> , 2009, 75 , 262-267.
348	<i>C. crassifolius</i>		<i>J. Org. Chem.</i> , 1991, 56 ,

			6595-6600 <i>Fitoterapia</i> , 2016, 108 , 81-86.
Crassifolin G, 349	<i>C. crassifolius</i>		<i>J. Nat. Prod.</i> , 2012, 75 , 2188-2192.
Teucrin H1 (Teuflidin), 350	<i>Teucrium chamaedrys</i> <i>T. hircanicum</i> <i>T. flavum</i>		<i>Phytochemistry</i> , 1978, 17 , 1967-1973 <i>J. Chem. Soc. Perkin Trans. I</i> , 1978, 1080-1083 <i>J. Chem. Soc. Perkin Trans. I</i> , 1979, 1915-1917 <i>Phytochemistry</i> , 1984, 23 , 1465-1469.
Teupernin D, 351	<i>Teucrium pernyi</i>		<i>Chem. Pharm. Bull.</i> , 1992, 40 , 2193-2195.
Teucvisin D, 352	<i>Teucrium viscidum</i>		<i>Chem. Pharm. Bull.</i> , 2014, 62 , 472-476.
Teucvidin, 353	<i>T. viscidum</i> <i>Teucrium chamaedrys</i>		<i>Tetrahedron</i> , 1975, 31 , 841-848 <i>Phytochemistry</i> , 1983, 22 , 723-725.
Cracroson B, 354	<i>Croton crassifolius</i>		<i>Fitoterapia</i> , 2016, 108 , 81-86.
Cracroson F, 355	<i>Croton crassifolius</i>	Low cytotoxic	<i>Phytochemistry</i> , 2018, 145 , 103-110.
12-Epi-teucvidin, 356	<i>Teucrium kotschyannum</i>		<i>Phytochemistry</i> , 1989, 28 , 2763-2768 <i>Magn. Reson. Chem.</i> , 2004, 42 , 605-616.
Chamaedryoside A, 357	<i>Teucrium chamaedrys</i>		<i>Magn. Reson. Chem.</i> , 2009, 47 , 1007-1012.
Chamaedryoside B, 358	<i>Teucrium chamaedrys</i>		<i>Magn. Reson. Chem.</i> , 2009, 47 , 1007-1012.
Chamaedryoside C, 359	<i>Teucrium chamaedrys</i>		<i>Magn. Reson. Chem.</i> , 2009, 47 , 1007-1012.
12-Epi-montanin B, 360	<i>Teucrium maghrebinum</i>		<i>J. Nat. Prod.</i> , 2000, 63 , 1029-1031.
Montanin B, 361	<i>Teucrium montanum</i>	Low hepatotoxic	<i>Tetrahedron Lett.</i> , 1978, 19 , 2025-2026 <i>Phytochemistry</i> , 2011, 72 , 2037-2044.
Syspirensin A, 362	<i>Teucrium chamaedrys</i>		<i>J. Nat. Prod.</i> , 1996, 59 , 457-460.
Teupolin IX, 363	<i>Teucrium polium</i>	Low hepatotoxic	<i>Phytochemistry</i> , 2011, 72 , 2037-2044.
Teucorymbin, 364	<i>Teucrium corymbosum</i>		<i>Phytochemistry</i> , 1995, 40 , 1481-1483.

Teuscorolide, 365	<i>Teucrium scorodonia</i>		<i>Phytochemistry</i> , 1982, 21 , 2567-2569.
2-Hydroxyteuscorolide, 366	<i>Teucrium scorodonia</i>		<i>Phytochemistry</i> , 1983, 22 , 727-731.
12-Epi-teucvin, 367	<i>Teucrium flavum</i> subesp. <i>glaucum</i>		<i>J. Org. Chem.</i> , 1984, 49 , 1789-1793.
Teuponin, 368	<i>Teucrium japonicum</i>		<i>Phytochemistry</i> , 1991, 30 , 4175-4177.
Scutefolide A ₁ , 369	<i>Scutellaria coleifolia</i> (Syn. of <i>S. violacea</i> var. <i>sikkimensis</i>)		<i>Phytochemistry</i> , 2015, 116 , 298-304.
Scutefolide A ₂ , 370	<i>Scutellaria coleifolia</i> (Syn. of <i>S. violacea</i> var. <i>sikkimensis</i>)		<i>Phytochemistry</i> , 2015, 116 , 298-304.
Scutefolide B ₁ , 371	<i>Scutellaria coleifolia</i> (Syn. of <i>S. violacea</i> var. <i>sikkimensis</i>)		<i>Phytochemistry</i> , 2015, 116 , 298-304.
Cracroson C, 372	<i>Croton crassifolius</i>		<i>Fitoterapia</i> , 2016, 108 , 81-86.
Crotoeurin C, 373	<i>Croton euryphyllus</i>	Promote NGF-mediated neurite outgrowth on PC12	<i>Bioorg. Med. Chem. Lett.</i> , 2015, 25 , 1329-1332.
Cracroson A, 374	<i>Croton crassifolius</i>		<i>Fitoterapia</i> , 2016, 108 , 81-86.
Crassifolin H, 375	<i>Croton crassifolius</i>		<i>Fitoterapia</i> , 2016, 108 , 81-86.
Isoteucrin H4, 376	<i>Teucrium oxylepis</i>		<i>Phytochemistry</i> , 1991, 30 , 4079-4082 <i>Magn. Reson. Chem.</i> , 2004, 42 , 605-616.
Teucvisin E, 377	<i>Teucrium viscidum</i>		<i>Chem. Pharm. Bull.</i> , 2014, 62 , 472-476.
Isoteuflin, 233	<i>Croton crassifolius</i> <i>Teucrium canadense</i>		<i>Phytochemistry</i> , 1989, 28 , 3539-3541 <i>Fitoterapia</i> , 2016, 108 , 81-86.
378	<i>Croton hovarum</i>		<i>Phytochemistry</i> , 1997, 45 , 379-381.
Teupolin VII, 379	<i>Teucrium polium</i>	Low hepatotoxic	<i>Phytochemistry</i> , 2011, 72 , 2037-2044.
Teupolin VIII, 234	<i>Teucrium polium</i>	Low hepatotoxic	<i>Phytochemistry</i> , 2011, 72 , 2037-2044.
Montanin A, 380	<i>Teucrium montanum</i>		<i>Tetrahedron Lett.</i> , 1978, 19 , 2025-2026.
Difuranofruticol, 381	<i>Teucrium fruticans</i>		<i>Phytochemistry</i> , 2005, 66 , 2298-2303.
<i>Trans</i> -Dehydrocrotonin, 382	<i>Croton cajucara</i>	Antiulcer Hepatotoxic Insect growth inhibition	<i>Ciencia Cultura</i> , 1979 <i>J. Org. Chem.</i> , 1984, 49 , 1789-1793 <i>Phytochemistry</i> , 1991,

			30 , 2545-2546 <i>Hum. Exp. Toxicol.</i> , 2004, 23 , 455-461 <i>J. Braz. Chem. Soc.</i> , 2014, 25 , 629-638.
<i>Cis</i> -Dehydrocrotonin, 383	<i>Croton cajucara</i>	Insect growth inhibition	<i>Phytochemistry</i> , 1991, 30 , 2545-2546.
5 β -Hydroxy- <i>cis</i> -dehydrocrotonin, 384	<i>Croton schiedeanus</i>		<i>Phytochemistry</i> , 2003, 62 , 551-555.
Cajucarinolide, 385	<i>Croton cajucara</i>	PLA2 inhibitor (anti-inflammatory)	<i>Planta Med.</i> , 1992, 58 , 549-551.
Isocajucarinolide, 386	<i>Croton cajucara</i>	PLA2 inhibitor (anti-inflammatory)	<i>Planta Med.</i> , 1992, 58 , 549-551.
Cajucar B, 387	<i>Croton cajucara</i>		<i>Chem. Pharm. Bull.</i> , 1990, 38 , 701-705 <i>Nat. Prod. Rep.</i> , 2016, 33 , 1166-1226.
Crassin E, 388	<i>Croton crassifolius</i>	Not cytotoxic	<i>J. Nat. Prod.</i> , 2017, 80 , 254-260.
Crassifolin N, 389	<i>Croton crassifolius</i>		<i>Phytochemistry</i> , 2016, 122 , 270-275.
390	<i>Croton cortesianus</i>		<i>Phytochemistry</i> , 1992, 31 , 4363-4365.
Fatimanone, 391	<i>Teucrium yemense</i>		<i>J. Nat. Prod.</i> , 2017, 80 , 1900-1908.
Fatimanol D, 392	<i>Teucrium yemense</i>		<i>J. Nat. Prod.</i> , 2017, 80 , 1900-1908.
Crotoeurin B, 236	<i>Croton euryphyllus</i>	Promote NGF-mediated neurite outgrowth on PC12	<i>Bioorg. Med. Chem. Lett.</i> , 2015, 25 , 1329-1332.
393	<i>Croton crassifolius</i>	Low cytotoxic	<i>Phytochemistry</i> , 2018, 145 , 103-110.
394	<i>Croton crassifolius</i>		<i>Phytochemistry</i> , 2018, 145 , 103-110.
<i>t</i> -Crotonin, 395	<i>Croton cajucara</i>		<i>Phytochemistry</i> , 1989, 28 , 1667-1669.
Crotonin, 396	<i>Croton cajucara</i> <i>Croton lucidus</i>		<i>J. Chem. Soc. C: Organic</i> , 1968, 2781-2785 <i>Phytochemistry</i> , 1989, 28 , 1667-1669.
Gelasine B, 397	<i>Agelas sp</i>		<i>Aus. J. Chem.</i> , 2010, 63 , 915-921.
Crotoeurin A, 398	<i>Croton euryphyllus</i>	Promote NGF-mediated neurite	<i>Bioorg. Med. Chem. Lett.</i> , 2015, 25 , 1329-1332.

		outgrowth on PC12	
Isocrotocaudin, 399	<i>Croton caudatus</i>		<i>Phytochemistry</i> , 1978, 17 , 1777-1779.
Crotocaudin, 400	<i>Croton caudatus</i>		<i>Tetrahedron</i> , 1977, 33 , 2407-2414.
Isoteucvin, 401	<i>Croton jatrophioides</i>		<i>Planta Med.</i> , 2009, 75 , 262-267.
Amritoside A, 402	<i>Tinospora cordifolia</i> (Syn. of <i>T. sinensis</i>)		<i>Phytochemistry</i> , 2004, 65 , 2051-2055.
403	<i>Tinospora cordifolia</i> (Syn. of <i>T. sinensis</i>)		<i>Phytochemistry</i> , 1995, 38 , 447-449.
Diosbulbin D, 404	<i>Dioscorea bulbifera</i>	Hepatotoxic	<i>Justus Liebigs Ann. Chem.</i> , 1978, 834-838 <i>Justus Liebigs Ann. Chem.</i> , 1978, 818-833 <i>Phytochemistry</i> , 1984, 23 , 623-625 <i>Exp. Toxicol. Pathol.</i> , 2012, 64 , 611-618.
Diosbulbin E, 405	<i>Dioscorea bulbifera</i> <i>Dioscorea antaly</i>		<i>Justus Liebigs Ann. Chem.</i> , 1978, 834-838 <i>Justus Liebigs Ann. Chem.</i> , 1978, 818-833 <i>Phytochemistry</i> , 1984, 23 , 623-625 <i>Phytochemistry</i> , 2010, 71 , 1007-1013.
Diosbulbin I, 406	<i>Dioscorea bulbifera</i>		<i>Chem. Pharm. Bull.</i> , 2009, 57 , 625-627.
Diosbulbin L, 407	<i>Dioscorea bulbifera</i>	Low antitumour Not antifungal	<i>Phytochemistry</i> , 2010, 71 , 1174-1180.
Diosbulbin F, 408	<i>Dioscorea bulbifera</i>		<i>Justus Liebigs Ann. Chem.</i> , 1978, 834-838 <i>Justus Liebigs Ann. Chem.</i> , 1978, 818-833.
Diosbulbin H, 409	<i>Dioscorea bulbifera</i>		<i>Justus Liebigs Ann. Chem.</i> , 1978, 834-838 <i>Justus Liebigs Ann. Chem.</i> , 1978, 818-833.
Diosbulbin J, 410	<i>Dioscorea bulbifera</i>		<i>Chem. Pharm. Bull.</i> , 2009, 57 , 625-627.
Diosbulbin G, 411	<i>Dioscorea bulbifera</i> <i>Dioscorea antaly</i> .		<i>Justus Liebigs Ann. Chem.</i> , 1978, 834-838 <i>Justus Liebigs Ann. Chem.</i> , 1978, 818-833 <i>Phytochemistry</i> , 2010, 71 , 1007-1013.
Cordioside, 412	<i>Tinospora cordifolia</i> (Syn. of <i>T.</i>		<i>Phytochemistry</i> , 1995,

	<i>sinensis</i>)		38 , 447-449.
Diosbulbinoside G, 413	<i>Dioscorea bulbifera</i>	Low antitumour Not antifungal	<i>Phytochemistry</i> , 2010, 71 , 1174-1180.
Diosbulbin A, 414	<i>Dioscorea bulbifera</i>		<i>Chem. Pharm. Bull.</i> , 1968, 16 , 2430-2435 <i>Justus Liebigs Ann. Chem.</i> , 1973, 978-992.
Diosbulbin C, 415	<i>Dioscorea bulbifera</i>	Hepatotoxic	<i>Chem. Pharm. Bull.</i> , 1968, 16 , 2430-2435 <i>Justus Liebigs Ann. Chem.</i> , 1973, 978-992.
Tetrahydrosbulbin A, 416	<i>Dioscorea bulbifera</i>		<i>Tetrahedron Lett.</i> , 1972, 13 , 1869-1872.
Diosbulbin O, 417	<i>Dioscorea bulbifera</i>	Not cytotoxic	<i>Chem. Pharm. Bull.</i> , 2014, 62 , 719-724.
Diosbulbin P, 418	<i>Dioscorea bulbifera</i>	Not cytotoxic	<i>Chem. Pharm. Bull.</i> , 2014, 62 , 719-724.
Diosbulbin B, 419	<i>Dioscorea bulbifera</i>	Hepatotoxic	<i>Chem. Pharm. Bull.</i> , 1968, 16 , 2430-2435 <i>Justus Liebigs Ann. Chem.</i> , 1973, 978-992 <i>Hum. Exp. Toxicol.</i> , 2011, 30 , 1333-1341 <i>Hum. Exp. Toxicol.</i> , 2014, 33 , 729-736.
8-Epi-diosbulbin E acetate, 420	<i>Dioscorea bulbifera</i>		<i>Phytochemistry</i> , 1984, 23 , 623-625.
8-Epi-diosbulbin E, 421	<i>Dioscorea antaly</i>		<i>Phytochemistry</i> , 2010, 71 , 1007-1013.
422	<i>Dioscorea bulbifera</i>		<i>Nat. Prod. Commun.</i> , 2011, 6 , 1069-1072.
Diosbulbin M, 423	<i>Dioscorea bulbifera</i>	Low antitumour Not antifungal	<i>Phytochemistry</i> , 2010, 71 , 1174-1180.
Diosbulbin K, 424	<i>Dioscorea bulbifera</i>	Low antitumour Not antifungal	<i>Phytochemistry</i> , 2010, 71 , 1174-1180.
8-Epi-diosbulbin G, 425	<i>Dioscorea antaly</i>		<i>Phytochemistry</i> , 2010, 71 , 1007-1013.
Diosbulbin N, 426	<i>Dioscorea bulbifera</i>	Not cytotoxic	<i>Chem. Pharm. Bull.</i> , 2014, 62 , 719-724.
Gelasine A, 427	<i>Agelas sp</i>		<i>Aus. J. Chem.</i> , 2010, 63 , 915-921.
Di-, trinorderivatives			
Tinosposinenside B, 428	<i>Tinospora sinensis</i>	α -glucosidase inhibition	<i>J. Nat. Prod.</i> , 2007, 70 , 1971-1976.
Tinosposinenside C, 429	<i>Tinospora sinensis</i>	α -glucosidase inhibition	<i>J. Nat. Prod.</i> , 2007, 70 , 1971-1976.
Malabarolide A, 430	<i>Tinospora malabarica</i>		<i>Tetrahedron Lett.</i> , 1988, 29 , 4241-4244.
Malabarolide B, 431	<i>Tinospora malabarica</i>		<i>Tetrahedron</i> , 1994, 50 ,

			12109-12112.
Crassin A, 432	<i>Croton crassifolius</i>	Not cytotoxic	<i>J. Nat. Prod.</i> , 2017, 80 , 254-260.
Crassin B, 433	<i>Croton crassifolius</i>	Not cytotoxic	<i>J. Nat. Prod.</i> , 2017, 80 , 254-260.