Biological Activity of Natural Sesquiterpenoids containing a *gem*-Dimethylcyclopropane Unit

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Abbreviations: The following structural abbreviations are used in this review:

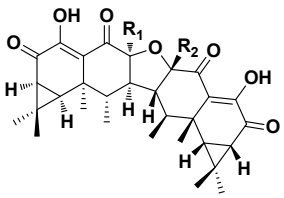
iBu= Isobutyryl
Cinn= Cinnamoyl
COX= Cyclooxygenase
CYP3A4= Cytochrome P450 3A4
Glc= Glucose
HIV-RTase= Human immunodeficiency virus reverse transcriptase
PTP1B= Protein tyrosine phosphatase 1B
Tig= Tiglate

1. Aristolanes (structures 1-50)

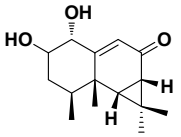
Nº	Compound	Species	Biological activities	References
1	aurisin A	***Anthracophyllum* sp., *Neonothopanus nambi***	antimalarial, antimicrobial, cytotoxic	1, 2
2	aurisin G	***Anthracophyllum* sp., *Neonothopanus nambi***	antimalarial, cytotoxic	1, 2
3	aurisin K	***Anthracophyllum* sp., *Neonothopanus nambi***	antimalarial, antimicrobial, cytotoxic	1, 2
4	nambinone C	***Neonothopanus nambi***	cytotoxic	2
5	rulepidadiol B	***Russula lepida***	-	3
6	axinysone A	***Anthracophyllum* sp., *Axinyssa isabela***	cytotoxic	1, 4
7	axinysone B	***Anthracophyllum* sp., *Axinyssa isabela***	-	1, 4
8	anthracophyllone	***Anthracophyllum* sp.,**	cytotoxic	1
9	kanshone F	***Nardostachys chinensis***	-	5
10	axinysone C	***Axinyssa isabela***	-	4
11	axinysone D	***Axinyssa isabela***	-	4
12	axinynitrile A	***Axinyssa isabela***	-	4
13	(+)-aristolone	***Russula lepida***	-	6
14	axinysone E	***Axinyssa isabela***	antitumoral	4
15	debilon	***Aristolochia debilis, Nardostachys chinensis***	cytostatic, cytotoxic	7, 8, 9, 10
16	1(10)-aristolen-2-one	***Nardostachys jatamansi***	-	11
17	9α-hydroperoxy-1(10)-aristolenone	***Aristolochia debilis***	-	7
18	nardoaristolone A	***Nardostachys chinensis***	protective effects on myocardial injury	12
19	kanshone C	***Nardostachys chinensis***	antihepatotoxic	13, 14
20	(+)-9-aristolene	***Calypogeia muelleriana***	antifouling	15, 16
21	8β-methoxyaristol-9-ene	***Reboulia hemisphaerica***	-	17
22	*ent*-aristol-9-en-8α-ol	***Reboulia hemisphaerica***	-	17
23	8α-methoxyaristol-9-ene	***Reboulia hemisphaerica***	-	17
24	(4*R*,5*S*,6*R*,7*S*)-aristol-9-en-3-one	***Lemnalia humesi***	-	18
25	(3*S*,4*R*,5*S*,6*R*,7*S*)-aristol-9-en-3-ol	***Lemnalia humesi***	-	18
26	compound 26	***Aristolochia debilis***	-	7
27	compound 27	***Aristolochia debilis***	-	7
28	compound 28	***Aristolochia debilis, Nardostachys chinensis***	-	7, 19
29	atrata-phloroglucinol A	***Dryopteris atrata***	-	20

30	atrata-phloroglucinol B	***Dryopteris atrata***	-	20
31	rulepidol	***Russula lepida, Valeriana officinalis***	-	21, 22, 23
32	aristol-9-en-1-one	***Laurencia similis***	-	24
33	compound 33	***Nardostachys chinensis***	-	19
34	9-aristolen-1α-ol	***Nardostachys jatamansi,Aristolochia peltato-deltoidea***	-	11, 25
35	kanshone G	***Nardostachys chinensis***	-	5
36	gansongone	***Nardostachys chinensis***	-	26, 27
37	rulepidadiol	***Russula lepida***	-	3, 28
38	lepidamine	***Russula lepida***	-	29
39	compound 39	***Aristolochia debilis***	-	7, 30
40	β-gurjunene	***Valeriana* sp., *Aristolochia* sp.**	-	31, 32, 33
41	calarenol	***Nardostachys jatamansi***	-	34, 35
42	aristolan-10-ol-9-one	***Laurencia similis***	-	24, 36
43	aristolan-8-en-1-one	***Laurencia similis***	-	24, 36
44	compound 44	***Aristolochia debilis***	-	7
45	compound 45	***Nardostachys chinensis***	-	19
46	compound 46	***Nardostachys chinensis***	-	19
47	aristolan-1α-bromo-9β,10β-epoxide	***Laurencia similis***	-	37
48	(-)-calarene	***Jungermannia infusca, Calypogeia muelleriana, Petroselinum sativum, Aristolochia* sp., *Parerythropodium fulvum fulvum***	-	15, 38, 39, 40, 41, 4
49	1(10),8-aristoladiene	***Reboulia hemisphaerica, Russula lepida***	-	3, 17, 43
50	β-(-)-1,10-epoxyaristolane	***Scytalium splendens***	-	44

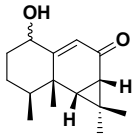
Table 1. The occurrence and biological activity of aristolanes 1-50



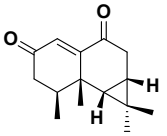
1 R_1= R_2= OH (aurisin A)
2 R_1= OH, R_2= OMe (aurisin G)
3 R_1= OH, R_2= H (aurisin K)



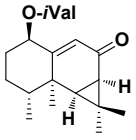
4 β-OH (nambinone C)
5 α-OH (rulepidadiol B)



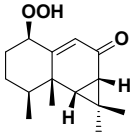
6 α-OH (axinysone A)
7 β-OH (axinysone B)



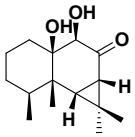
8 (anthracophyllone)



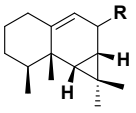
9 (kanshone F)



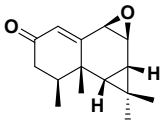
10 (axinysone C)



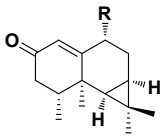
11 (axinysone D)



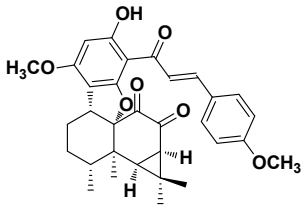
12 R= α-CN (axinynitrile A)
13 R= =O ((+)-aristolone)



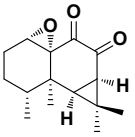
14 (axinysone E)



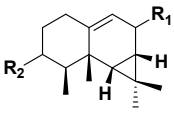
15 R= OH (debilon)
16 R= H
17 R= OOH



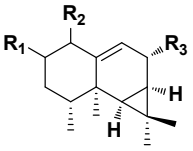
18 (nardoaristolone A)



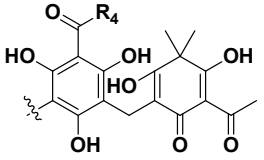
19 (kanshone C)

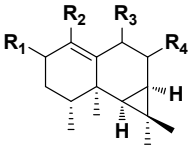


20 R_1= R_2= H ((+)-9-aristolene)
21 R_1= β-OCH_3, R_2= H
22 R_1= β-OH, R_2= H
23 R_1= α-OCH_3, R_2= H
24 R_1= H, R_2= =O
25 R_1= H, R_2= β-OH



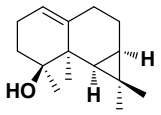
A=



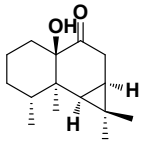


26 R_1= H, R_2= α-OH, R_3= =O
27 R_1= R_2= R_3= H
28 R_1= R_2= H, R_3= =O
29 R_1= R_2= H, R_3= ***A*** (R_4= CH_3)
(atrata-phloroglucinol A)
30 R_1= R_2= H, R_3= ***A*** (R_4=$CH_2CH_2CH_3$)
(atrata-phloroglucinol B)
31 R_1= α-OH, R_2= H, R_3= =O (rulepidol)
32 R_1= R_3= H, R_2= =O
33 R_1= H, R_2= β-isopentyloxy, R_3= =O
34 R_1= R_3= H, R_2 = α-OH

35 R_1= R_3= β-OH, R_2= R_4= H (kanshone G)
36 R_1= R_2= R_4= H, R_3= =O (gansogone)
37 R_1= =O, R_2= R_3= R_4= β-OH (rulepidadiol)
38 R_1= R_3= R_4= =O, R_2= NH_2 (lepidamine)
39 R_1= =O, R_2= R_4= H, R_3= α-OOH
40 R_1= R_2= R_3= R_4= H (β-gurjunene)



41 (calarenol)



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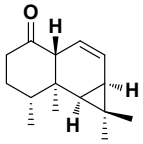

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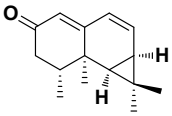

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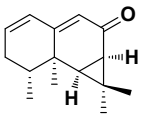

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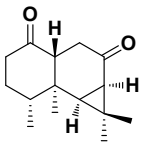

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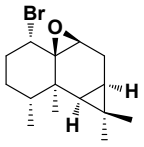

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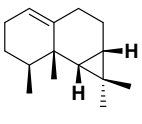
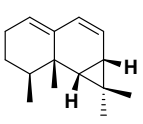


48 (calarene)



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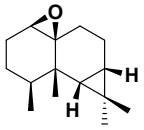

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Figure 1. Structures of aristolanes 1-50

2. Aromadendranes (structures 51-190)

Nº	Compound	Species	Biological activities	References
51	spathulenol	***Eucalyptus spathulata, Parerythrodium fulvum, Salvia sclarea, Aristolochia argentina, Caesalpinia pulcherrima, Saussurea cauloptera, Taonia lacheana***	antibacterial, repellent	33, 45, 46, 47, 48, 49, 50
52	(-)-alloaromadendrene	***Valeriana* sp., *Aristolochia* sp.**	antifeedant	32, 33, 51, 52
53	pittosporanoside A1	***Pittosporum tobira***	repellent	53
54	pittosporanoside A2	***Pittosporum tobira***	repellent	53
55	(+)-10(*R*)-isothiocyanato alloaromadendrane	***Acanthella cavernosa, Phyllidiella pustulosa***	antifouling	16, 54
56	(+)-axiothiocyanate-2 = epipolasin B	***Acanthella cavernosa, Axinella cannabina, Epipolasis kushimotoensis***	antifouling	16, 55, 56, 57, 58
57	alloaromadendrane-10*β*,14-diol	***Dysoxylum densiflorum, Chisocheton penduliflorus, Duguetia grabriuscula***	antimicrobial, cytotoxic	59, 60, 61, 62
58	alloaromadendrane-10*α*,14-diol	***Chisocheton penduliflorus***	antimicrobial	60
59	macrocarpal A	***Eucalyptus* sp.**	antibacterial, brain modulator, cytotoxic, inhibitor HIV-RTase	63, 64, 65, 66, 67
60	macrocarpal B	***Eucalyptus* sp.**	antibacterial, brain modulator, cytotoxic, inhibitor HIV-RTase	63, 65, 66, 67, 68
61	macrocarpal C	***Eucalyptus* sp.**	antibacterial, inhibitor HIV-RTase	63, 65, 66, 68
62	10*α*-isothiocyano alloaromadendrane	***Acanthella pulcherrima, Axinella cannabina***	antimicrobial	55, 69
63	1-isocyanoaromadendrane	***Acanthella pulcherrima, Acanthella acuta***	antimicrobial	69, 70
64	halichonadin F	***Halichondria* sp.**	antimicrobial	71
65	(−)-4*β*-*N*-methenetauryl-10*β*-methoxy-1*β*,5*β*,6*α*,7*α*-aromadendrane	***Melitodes squamata***	antibacterial	72
66	ledol	***Hebeloma longicaudum, Lepicolea ochroleuca, Renealmia chrysotrycha, Valeriana wallichii, Taubauma gioi***	antifungal	73, 74, 75, 76, 77, 78, 79
67	viridiflorol	***Hebeloma longicaudum, Calypogeia***	antifungal	15, 73, 78, 79, 80

		muelleriana, Valeriana, Bazzania trilobata		
68	alloaromadendrane-4β,10α-diol	***Ambrosia peruviana***	allelopathic, fungistatic	81
69	(-)-alloaromadendrane-4β,10β-diol	***Caragana intermedia***	antifungal	82, 83
70	millecrone B	***Leminda millecra***	antimicrobial	84
71	(-)-cyclocolorenone	***Dipterocarpus kerrii***	antimicrobial, phytotoxic	85, 86
72	15-hydroxyspathulenol	***Plectranthus fruticosus***	-	87
73	3-acetoxyspathulenol	***Parerythrodium fulvum***	-	45
74	euglobal-V	***Eucalyptus incrassata***	antiinflammatory, antiviral	88, 89
75	arvoside B	***Calendula arvensis***	antiviral	90, 91
76	(-)-ledol-β-*D*-fucopyranoside-2'-*O*-acetate	***Calendula arvensis***	antiviral	90, 91
77	(-)-ledol-β-*D*-fucopyranoside-2'-*O*-methylbutyrate	***Calendula arvensis***	antiviral	90, 91
78	(-)-ledol-β-*D*-fucopyranoside-2'-*O*-4-methylsenecioate	***Calendula arvensis***	Antiviral	90, 91
79	(-)-ledol-β-*D*-fucopyranoside-2'-*O*-isobutyrate	***Calendula arvensis***	antiviral	90, 91
80	(-)-ledol-β-*D*-fucopyranoside-2'-*O*-tigliate	***Calendula arvensis***	antiviral	90, 91
81	eucalyptin A	***Eucalyptus globulus***	cytotoxic	92
82	eucalyptal D	***Eucalyptus globulus***	cytotoxic	93
83	epipolasinthiourea-B	***Epipolasis kushimotoensis***	cytotoxic	56
84	psiguadial A	***Psidium guajava***	inhibitor of the growth of human hepatoma cells	94
85	psidial B	***Psidium guajava***	activity to enzyme PTP1B	95
86	lochmolin A	***Sinularia lochmodes***	COX inhibitor	96
87	lochmolin B	***Sinularia lochmodes***	COX inhibitor	96
88	lochmolin C	***Sinularia lochmodes***	COX inhibitor	96
89	lochmolin D	***Sinularia lochmodes***	COX inhibitor	96
90	lochmolin E	***Sinularia lochmodes***	-	96
91	lochmolin F	***Sinularia lochmodes***	-	96
92	compound 92	***Chloranthus elatior***	-	97
93	compound 93	***Chloranthus elatior***	-	97
94	(–)-4α,10β-aromadendranediol	***Taonia* sp., *Melitodes squamata, Sinularia maxima, Brasilia sickii***	-	50, 72, 98, 99
95	(+)-4β,10β-aromadendranediol	***Melitodes squamata***	-	72
96	compound 96	***Clavularia inflata***	-	100
97	compound 97	***Clavularia inflata***	-	100
98	(-)-*ent*-3β-hydroxyspathulenol	***Clavularia inflata, Lepicolea ochroleuca***	-	74, 100
99	globulol	***Hebeloma longicaudum, Pellia epiphylla, Calypogeia***	allelopathic	15, 78, 101, 1 103, 104

		muelleriana, Angelica sylvestris, Valeriana officinalis		
100	tanzanene	***Uvaria tanzaniae***	-	105
101	*epi*-globulol	***Humulus lupulus***	-	106
102	(+)-11-*epi*-spathulenol	***Taonia lacheana***	-	50
103	(+)-aromadendrene	***Renealmia chrysotrycha***	-	75
104	compound 104	***Sinularia maxima***	-	98
105	axisonitrile-2	***Axinella cannabina***	-	107
106	aromadendrane 4*β*,10*β*-diol	***Aristolochia heterophylla***	-	108
107	compound 107	***Doellingeria scaber***	-	109
108	compound 108	***Salvia palaestina***	-	110
109	compound 109	***Salvia palaestina***	-	110
110	14-acetoxyviridiflorol	***Pulicaria paludosa***	-	111
111	compound 111	***Wyethia arizonica***	-	112
112	10*α*-isocyano alloaromadendrane	***Axinella cannabina***	-	55
113	10*α*-formamido alloaromadendrane	***Axinella cannabina***	-	55
114	dysodensiol F	***Dysoxylum densiflorum***	-	113
115	9-acetoxy-10-hydroxyaromadendrane	***Tylimanthus renifolius***	-	114
116	hebelodendrol	***Hebeloma longicaudum***	-	101
117	(+)-10-oxoviridiflorol	***Helichrysum albirosulatum***	-	115
118	(+)-4*β*-*N*-methenetauryl-10*β*-methoxy-1*β*,5*α*,6*β*,7*β*-aromadendrane	***Melitodes squamata***	-	72
119	(-)-palustrol	***Lepicolea ochroleuca***	-	74
120	1-hydroxy alloaromadendrene	***Laurencia subopposita, Cassinia subtropica***	-	116, 117
121	3,3,11-trimethyl-7-methylenetricyclo [6.3.0.0^{2,4}] undecane-5,11-diol	***Parthenium argentatum***	-	118
122	guayulin C	***Parthenium argentatum***	-	119
123	guayulin D	***Parthenium argentatum***	-	119
124	sesquivarodiol	***Sideritis varoi* ssp. *cuatrecasasii***	-	120
125	4*β*-hydroxy-9*β*-acetoxyaromadendrene	***Sideritis varoi* ssp. *cuatrecasasii***	-	120
126	8*α*-benzoyloxy spathulenol	***Ferulago antiochia***	-	121
127	5*α*-hydroxy-*α*-gurjunene	***Helichrysum nudifolium***	-	115
128	5*α*-acetoxy-*α*-gurjunene	***Helichrysum nudifolium***	-	115
129	5*β*-acetoxy-*α*-gurjunene	***Helichrysum nudifolium***	-	115
130	(-)-*epi*-*α*-gurjunene	***Myroxylon balsamum***	-	122
131	(-)-α-gurjunene	***Gurjon balsam***	-	123
132	aromadendrane epoxide	***Humulus lupulus***	-	106

133	alloaromadendrane epoxide	***Hypericum japonicum***	-	124
134	hiiranepoxide	***Neolitsea hiiranensis***	-	125
135	tridensenone	***Parerythrodium fulvum, Bazzania japonica***	-	45, 126, 127
136	squamulosone	***Phebalium squamulosum, Hyptis verticillata***	-	128, 129
137	(+)-isospathulenol	***Salvia sclarea***	-	130
138	(2*S*,4*R*,5*S*,6*R*,7*R*)-2-hydroxy-1(10)-aromadendren-14-oic acid 2,14-lactone	***Landolphia dulcis***	-	131
139	(2*S*,4*R*,5*S*,6*R*,7*R*,9*S*)-2,9-dihydroxy-1(10)-aromadendren-14-oic acid 2,14-lactone	***Landolphia dulcis***	-	131
140	compound 140	***Erigeron acer***	-	132
141	10*β*-hydroxy-$\Delta^{1(2)}$-aromadendrene	***Laurencia subopposita***	-	116
142	(+)-8(9)-aromadendrene	***Myroxylon balsamum***	-	122
143	viridiflorol-*β*-*D*-fucopyranoside	***Calendula persica***	-	133
144	viridiflorol-*β*-*D*-chinovopyranoside	***Calendula persica***	-	133
145	viridiflorol-*β*-*D*-fucopyranoside-2'-*O*-4-methylsenecioate	***Calendula persica***	-	133
146	viridiflorol-*β*-*D*-fucopyranoside-2'-*O*-senecioate	***Calendula persica***	-	133
147	fissistigmatin D	***Fissistigma bracteolatum***	-	134
148	(-)-6(7)-alloaromadendrene	***Myroxylon balsamum***	-	122
149	1(8),10(11)-aromadendradiene	***Myroxylon balsamum***	-	122
150	1(11),7(8)-aromadendranediene	***Myroxylon balsamum***	-	122
151	fulfulvene	***Parerythropodium fulvum fulvum***	-	42
152	(+)-aromadendra-1(10),4-dien-15-al-3-one	***Mandevilla pentlandiana***	-	135
153	*ent*-spathulenol	***Calypogeia muelleriana, Plagiochila, Schistochila, Heteroscyphus, Jackiela javanica***	-	15, 38, 136
154	compound 154	***Clavularia koellikeri***	-	137
155	*ent*-4*β*-hydroxy-10*α*-methoxyaromadendrane	***Lepicolea ochroleuca***	-	74
156	pipelol A	***Piper elongatum***	-	138
157	compound 157	***Sinularia maxima***	-	98
158	alloaromadendranediol	***Sinularia maxima***	-	98
159	*ent*-4*β*,10*α*-dihydroxyaromadendrane	***Plagiochila ovalifolia***	-	139
160	(-)-10(14)-aromadendrene	***Calypogeia***	-	15

		muelleriana		
161	(+)-10(14)-alloaromadendrene	***Calypogeia muelleriana***	-	15
162	compound 162	***Hexabranchus sanguineus, acanthella acuta***	-	140, 141
163	1-isocyanoallo aromadendrane	***Acanthella acuta, Phyllidiella pustulosa***	-	141, 142
164	compound 164	***Hexabranchus sanguineus, Acanthella* sponges**, ***Phyllidiella pustulosa***	-	140, 141, 142
165	axamide-2	***Hexabranchus sanguineus, Acanthella acuta, Axinella cannabina***	-	58, 140, 141
166	(+)-*α*-gurjunene	***Calypogeia muelleriana***	-	15
167	(+)-4,5-dehydroviridiflorol	***Calypogeia muelleriana***	-	15
168	1-hydroxyaroma dendr-4-en-3-one	***Heteroscyphus coalitus***	-	143
169	1*α*-hydroxy-(+)-cyclocolorenone	***Nephthea* sp., *Porella* sp.**	-	144, 145
170	(+)-cyclocolorenone	***Nephtea chabrolii, Plagiochila acanthophylla, Bazzania tridens***	-	146, 147, 148
171	compound 171	***Clavularia koellikeri***	-	137
172	alloaromadendra-4(15),10(14)-diene	***Saccogyna viticulosa***	-	149
173	aromadendra-4(15),10(14)-dien-1-ol	***Saccogyna viticulosa***	-	149
174	compound 174	***Heteroscyphus coalitus***	-	150
175	1,2-dehydro-3-oxo-*β*-gurjunene	***Calypogeia azurea***	-	151
176	panotriol	***Heteroscyphus planus***	-	152
177	panotriol monoacetate	***Heteroscyphus planus***	-	152
178	panotriol diacetate	***Heteroscyphus planus***	-	152
179	(-)-*β*-spathulene	***Calypogeia muelleriana***	-	15
180	9-aromadendrene	***Calypogeia muelleriana***	-	15
181	9-alloaromadendrene	***Calypogeia muelleriana***	-	15
182	aromadendra-4,10(14)-diene	***Mylia taylorii, Mylia nuda***	-	153
183	aromadendra-4,9-diene	***Mylia taylorii, Mylia nuda***	-	153
184	(-)-ledene	***Calypogeia muelleriana***	-	15
185	(+)-3-hydroxyledene	***Calypogeia muelleriana***	-	15
186	compound 186	***Xenia novae-britanniae***	-	154
187	aromadendra-1(10),4(15)-diene	***Mylia taylorii, Mylia nuda***	-	153
188	aromadendra-1(10),3-diene	***Plagiochila asplenioides***	-	155

189	(-)-aromadendran-5-ol	***Conocephalum conicum***	-	156
190	plagiospirolide E	***Plagiochila moritziana***	-	157

Table 2. The occurrence and biological activity of aromadendranes 51-190

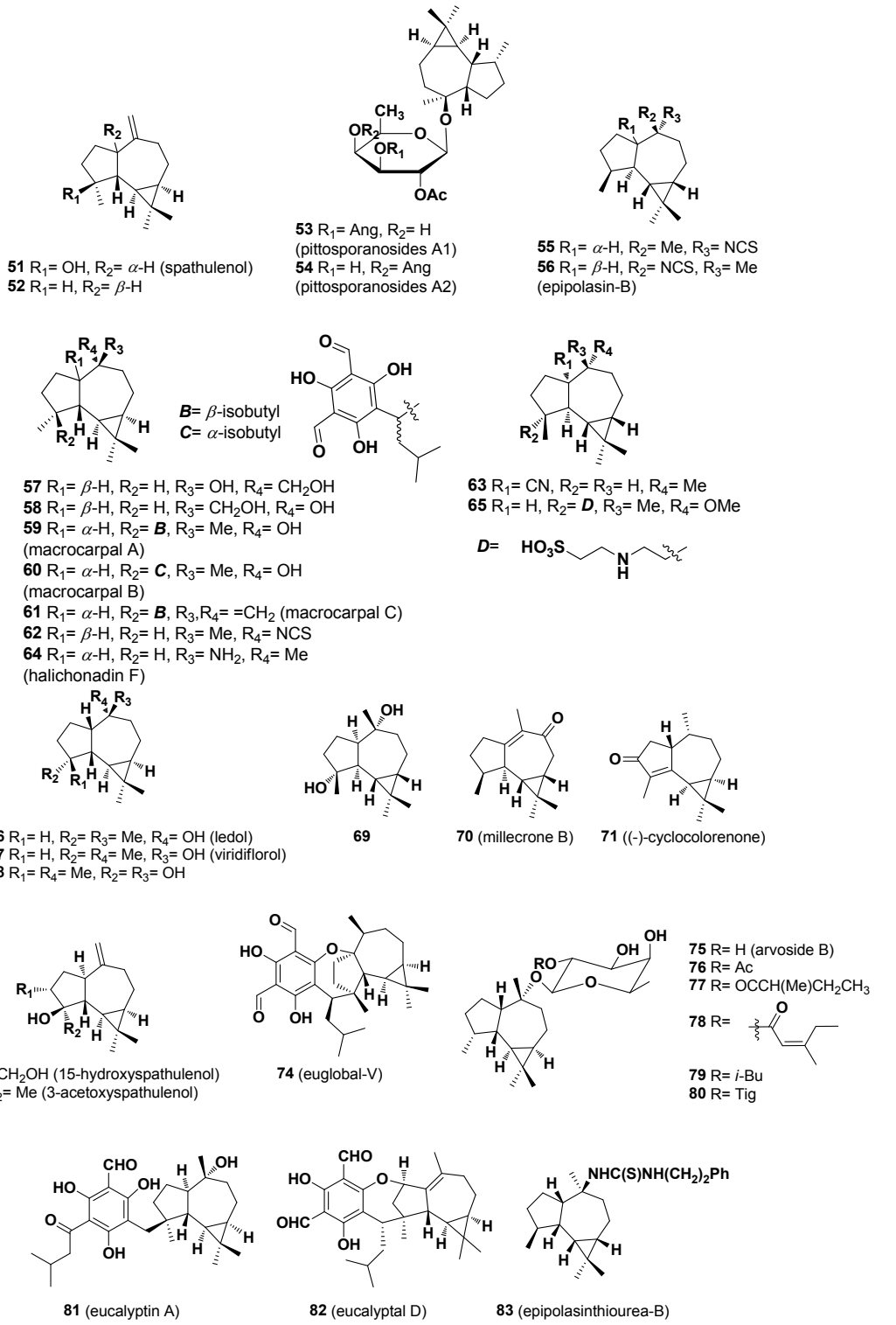
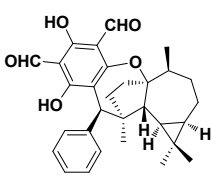
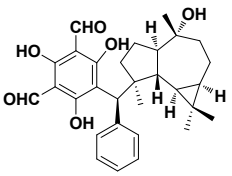


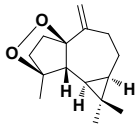
Figure 2. Structures of aromadendranes 51-83



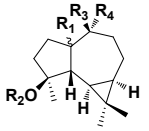
84 (psiguadial A)



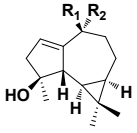
85 (psidial B)



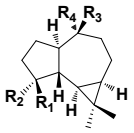
86 (lochmolin A)



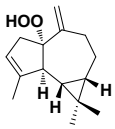
87 R_1= α-H, R_2= Et, R_3= Me, R_4= OH (lochmolin B)
89 R_1= β-OOH, R_2= H, R_3,R_4= =CH_2 (lochmolin D)
90 R_1= α-OOH, R_2= H, R_3,R_4= =CH_2 (lochmolin E)



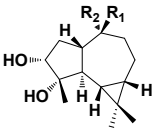
88 R_1= OOH, R_2= Me (lochmolin C)
91 R_1= Me, R_2= OH (lochmolin F)



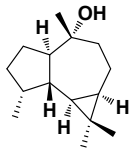
92 R_1= R_3= OH, R_2= Me, R_4= CH_2OH
93 R_1= R_4= OH, R_2= Me, R_3= CH_2OH
94 R_1= R_4= OH, R_2= R_3= Me
95 R_1= R_3= Me, R_2= R_4= OH



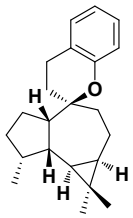
96



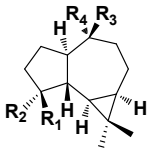
97 R_1= Me, R_2= OH
98 R_1,R_2= =CH_2



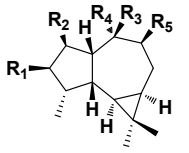
99 (globulol)



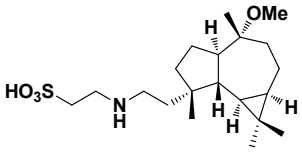
100 (tanzanene)



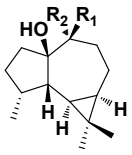
101 R_1= H, R_2= R_4= Me, R_5= OH (*epi*-globulol)
102 R_1= Me, R_2= OH, R_3,R_4= =CH_2
103 R_1= H, R_2= Me, R_3,R_4= =CH_2
104 R_1= OH, R_2= R_3= Me, R_4= OMe
105 R_1= H, R_2= R_3= Me, R_4= CN
106 R_1= OH, R_2= R_4= Me, R_3= OH
107 R_1= R_4= Me, R_2= R_3= OH
108 R_1= OAc, R_2= Me, R_3,R_4= =CH_2
109 R_1= OTig, R_2= Me, R_3,R_4= =CH_2



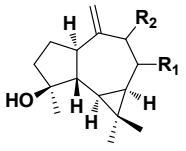
110 R_1= R_2= R_5= H, R_3= OH, R_4= CH_2OAc
111 R_1= R_2= R_5= H, R_3= OH, R_4= CH_2OH
112 R_1= R_2= R_5= H, R_3= Me, R_4= CN
113 R_1= R_2= R_5= H, R_3= Me, R_4= NHCHO
114 R_1= =O, R_2= R_5= H, R_3= OH, R_4= CH_2OH (dysodensiol F)
115 R_1= R_2= H, R_3= OH, R_4= Me, R_5= OAc
116 R_1= R_2= R_4= OH, R_3= Me, R_5= H (hebelodendrol)
117 R_1= =O, R_2= R_5= H, R_3= OH, R_4= Me



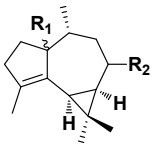
118



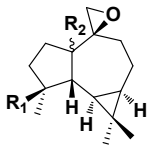
119 R_1= Me, R_2= H (palustrol)
120 R_1,R_2= =CH_2



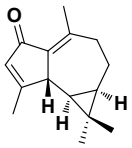
121 R_1= H, R_2= α-OH
122 R_1= α-OCinn, R_2= H
123 R_1= α-*p*-$OCOC_6H_4OMe$, R_2= H
124 R_1= H, R_2= β-OH
125 R_1= H, R_2= β-OAc
126 R_1= α-OBz, R_2= H



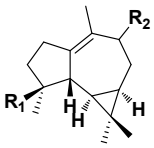
127 R_1= β-H, R_2= α-OH
128 R_1= β-H, R_2= α-OAc
129 R_1= β-H, R_2= β-OAc
130 R_1= α-H, R_2= H
131 R_1= β-H, R_2= H ((-)-α-gurjunene)



132 R_1= H, R_2= α–H
133 R_1= H, R_2= β-H
134 R_1= OH, R_2= α–H (hiiranepoxide)

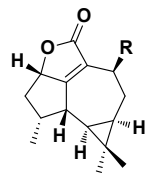


135 (tridensenone)

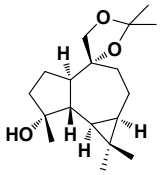


136 R_1= H, R_2= =O (squamulosone)
137 R_1= OH, R_2= H

Figure 3. Structures of aromadendranes 84-137



138 R= H
139 R= OH



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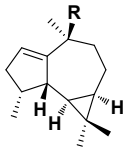
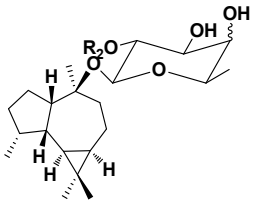
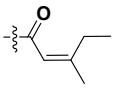


141 R= OH
142 R= H

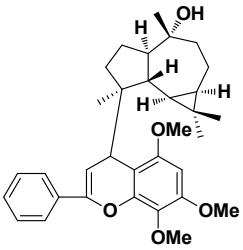


143 β-OH, R_1= H
144 α-OH, R_1= H

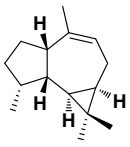
145 β-OH, R_1=



146 β-OH, R_1=



147 (fissistigmatin D)



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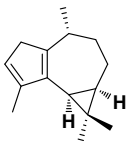

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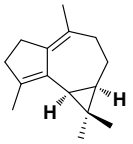

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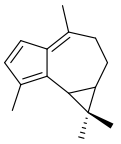
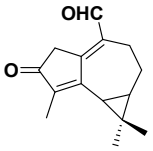


151 (fulfulvene)



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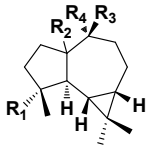
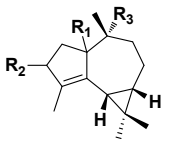
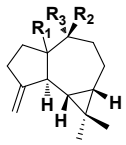


153 R_1= OH, R_2= β-H, R_3,R_4= CH_2 (*ent*-spathulenol)
154 R_1= OH, R_2= β-H, R_3,R_4= =O
155 R_1= OH, R_2= β-H, R_3= OMe, R_4= Me
156 R_1= R_3= OH, R_2= β-H, R_4= CH_2OH (pipelol A)
157 R_1= OH, R_2= α-H, R_3= OMe, R_4= Me
158 R_1= R_3= OH, R_2= α-H, R_4= Me

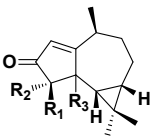
159 R_1= R_3= OH, R_2= β-H, R_4= Me
160 R_1= H, R_2= β-H, R_3,R_4= $=CH_2$
161 R_1= H, R_2= α-H, R_3,R_4= $=CH_2$
162 R_1= R_4= H, R_2= β-NHCHO, R_3= Me
163 R_1= R_4= H, R_2= β-NC, R_3= Me
164 R_1= R_4= H, R_2= β-NCS, R_3= Me
165 R_1= H, R_2= β-H, R_3= NHCHO, R_4= Me



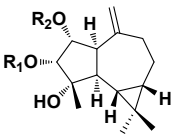
166 R_1= α-H, R_2= R_3= H
167 R_1= α-H, R_2= H, R_3= OH
168 R_1= β-OH, R_2= =O, R_3= H
169 R_1= α-OH, R_2= =O, R_3= H
170 R_1= α-H, R_2= =O, R_3= H



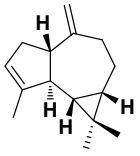
171 R_1= β-H, R_2= Me, R_3= OH
172 R_1= α-H, R_2,R_3= $=CH_2$
173 R_1= β-OH, R_2,R_3= $=CH_2$



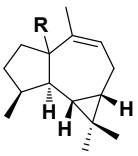
174 R_1= Me, R_2= H, R_3= β-OH
175 R_1,R_2= $=CH_2$, R_3= α-H



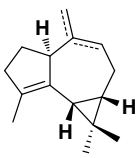
176 R_1= R_2= H
177 R_1= H, R_2= Ac
178 R_1= R_2= Ac



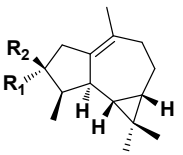
179



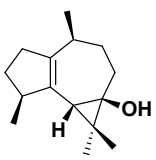
180 R= β-H
181 R= α-H



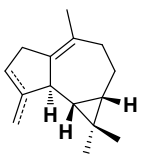
182 $\Delta^{10(14)}$
183 Δ^{9}



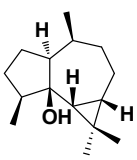
184 R_1= R_2= H
185 R_1= OH, R_2= H



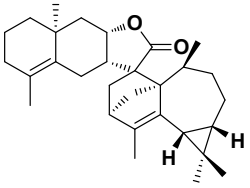
186



187 Δ^{4}
188 $\Delta^{4(15)}$



189



190 (plagiospirolide E)

Figure 4. Structures of aromadendranes 138-190

3. *ent*-1,10-Secoaromadendranes (structures 191-195)

Nº	Compound	Species	Biological activities	References
191	1,10-dioxotayloriane	***Lepicolea ochroleuca***	-	74
192	(-)-taylorione	***Mylia tayllorii*, *Mylia nuda***	-	153
193	α-taylorione	***Mylia tayllorii*, *Mylia nuda***	-	153
194	(-)-3-acetoxytaylorione	***Mylia tayllorii*, *Mylia nuda***	-	153
195	bytaylorione	***Mylia taylorii***	-	158

Table 3. The occurrence and biological activity of *ent*-1,10-secoaromadendranes 191-195

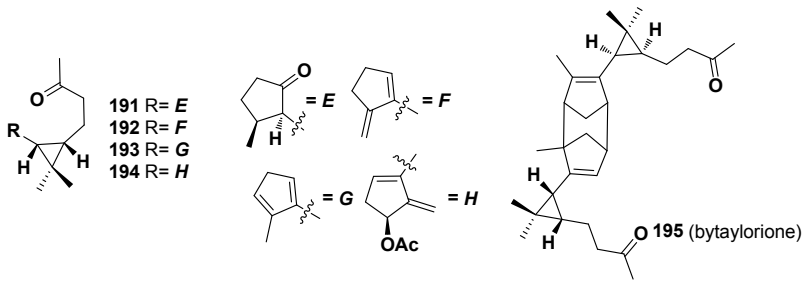


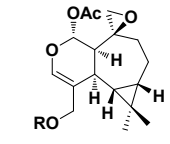
Figure 5. Structures of *ent*-1,10-secoaromadendranes 191-195

4. 2,3-Secoaromadendranes (structures 196-226)

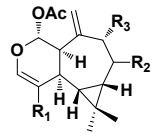
Nº	Compound	Species	Biological activities	References
196	plagiochiline A	***Plagiochila fruticosa*, *Plagiochila bursata***	allelopathic, antifeedant, cytotoxic, pungent substance	159, 160, 161, 1 163, 164,165
197	plagiochiline I	***Plagiochila yokogurensis***	-	159
198	plagiochiline C = (+)-ovalifoliene	***Plagiochila* sp.**	antiplatelet, plant-growth inhibitor	161, 166, 167, 1 169, 170, 171,
199	plagiochiline L	***Heteroscyphus planus***	-	172
200	plagiochiline M	***Heteroscyphus planus*, *Plagiochila bursata***	insecticidal	160, 172
201	plagiochiline H	***Plagiochila* sp.**	-	159
202	compound 202	***Plagiochila* sp.**	-	159
203	(+)-6α-acetoxyovalifoliene	***Plagiochila semidecurrens***	-	170
204	4-*O*-deacetylplagiochiline C	***Heteroscyphus planus***	-	152
205	compound 205	***Plagiochila bursata***	-	160
206	compound 206	***Plagiochila bursata***	-	160
207	plagiochilal B	***Plagiochila fruticosa***	neurotrophic	161, 162, 173
208	*ent*-2,3-diacetoxy-10α,15α-epoxy-2,3-secoalloaromandendra-4(14)-ene	***Heteroscyphus planus***	-	152
209	plagiochiline J	***Plagiochila fruticosa***	-	161
210	plagiochiline K	***Plagiochila fruticosa***	-	161
211	plagiochilide	***Plagiochila fruticosa***	-	161, 173
212	(+)-ovalifolienal	***Plagiochila***	plant-growth	170

		semidecurrens	inhibitor	
213	(+)-ovalifolienalone	***Plagiochila semidecurrens***	plant-growth inhibitor	169, 170
214	(+)-ovalimethoxy I	***Plagiochila semidecurrens***	plant-growth inhibitor	170
215	(+)-ovalimethoxy II	***Plagiochila semidecurrens***	plant-growth inhibitor	170
216	plagiochiline N	***Plagiochila ovalifolia***	-	139
217	plagiochiline Q	***Plagiochila cristata***	-	174
218	plagiochiline W	***Plagiochila asplenioides***	-	155
219	plagiochiline X	***Plagiochila asplenioides***	-	155
220	isoplagiochilide	***Plagiochila elegans***	-	175
221	acetoxyisoplagiochilide	***Plagiochila ovalifolia***	-	139
222	9,10-dihydroovalifolienal	***Plagiochila adianthoides***	-	174
223	(+)-hanegoketrial	***Plagiochila hattoriana, Plagiochila semidecurrens***	-	161, 169
224	(+)-hanegokedial	***Plagiochila* sp.**	-	159
225	furanoplagiochilal	***Plagiochila yokogurensis***	-	161
226	compound 226	***Agrocybe salicacola***	-	176

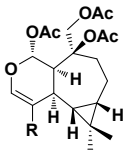
Table 4. The occurrence and biological activity of 2,3-secoaromadendranes 196-226



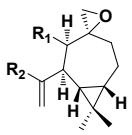
196 R= Ac (plagiochiline A)
197 R= H



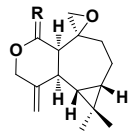
198 R_1= CH_2OAc, R_2= R_3= H (plagiochiline C)
199 R_1= COOH, R_2= R_3= H (plagiochiline L)
200 R_1= COOMe, R_2= R_3= H (plagiochiline M)
201 R_1= Me, R_2= R_3= H
202 R_1= CH_2OAc, R_2= OAc, R_3= H
203 R_1= CH_2OAc, R_2= H, R_3= OAc
(6α-acetoxyovalifoliene)
204 R_1= CH_2OH, R_2= R_3 = H
(4-*O*-deacetylplagiochiline C)



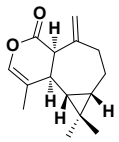
205 R= OAc
206 R= COOMe



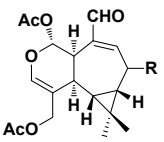
207 R_1= R_2= CHO
(plagiochilal B)
208 R_1= R_2= CH_2OAc



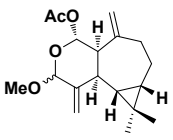
209 R= O (plagiochiline J)
210 R= α-OH, H (plagiochiline K)



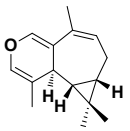
211 (plagiochilide)



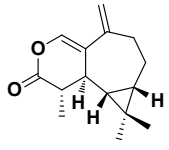
212 R= H ((+)-ovalifolienal)
213 R= =O ((+)-ovalifolienalone)



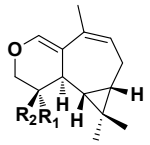
214 α-OMe ((+)-ovalimethoxy I)
215 β-OMe ((+)-ovalimethoxy II)



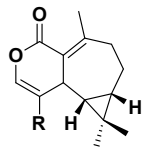
216 (plagiochiline N)



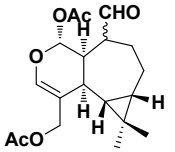
217 (plagiochiline Q)



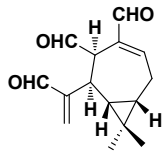
218 R_1= Me, R_2= H
(plagiochiline W)
219 R_1,R_2= $=CH_2$
(plagiochiline X)



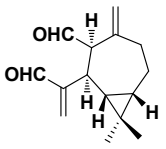
220 R= Me (isoplagiochilide)
221 R= CH_2OAc (acetoxyisoplagiochilide)



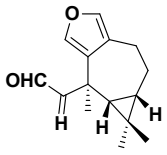
222



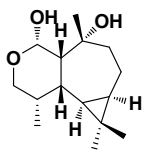
223 ((+)-hanegoketrial)



224 ((+)-hanegokedial)



225 (furanoplagiochilal)



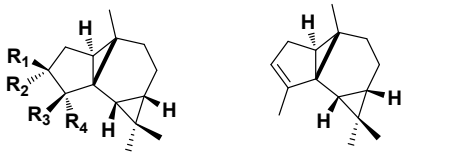
226

Figure 6. Structures of 2,3-secoaromadendranes 196-226

5. *ent*-5,10-Cycloaromadendranes

Nº	Compound	Species	Biological activities	References
227	(1*R**,5*S**,6*R**,7S*,10*S**)-myli-4(15)-ene	***Mylia tayllorii*, *Mylia nuda***	-	153
228	(-)-myliol	***Mylia tayllorii*, *Mylia nuda***	-	153
229	(-)-dihydromylione A	***Mylia tayllorii*, *Mylia nuda***	-	153, 177
230	(-)-(1*S*,5*R*,6*R*,7*S*,10*S*)-myli-4(15)-en-3-one	***Mylia tayllorii*, *Mylia nuda***	-	153
231	(+)-anastreptene	***Mylia tayllorii*, *Mylia nuda*, *Calypogeia muelleriana*, *Saccogyna viticulosa***	-	15, 149, 153, 17 179

Table 5. The occurrence and biological activity of *ent*-5,10-cycloaromadendranes 227-231



227 R_1= R_2= H, R_3,R_4= =CH_2 **231** (anastreptene)
228 R_1= OH, R_2= H, R_3,R_4= =CH_2
229 R_1,R_2= =O, R_3= H, R_4= CH_3
230 R_1,R_2= =O, R_3,R_4= CH_2

Figure 7. Structures of *ent*-5,10-cycloaromadendranes 227-231

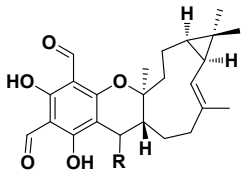
6. Lepidozanes and bicyclogermacranes

Nº	Compound	Species	Biological activities	References
232	euglobal-III	***Eucalyptus globulus*, *Eucalyptus incrassata***	antitumoral, antiviral, granulation inhibitor	88, 180, 181, 182
233	1,10-epoxy-14-hydroperoxy-4-lepidozene	***Actinia anthopleura pacifica***	cytotoxic	183
234	(-)-lepidozenol	***Actinia anthopleura pacifica***	cytotoxic	183
235	(-)-lepidozenal	***Actinia anthopleura pacifica*, *Lepidozea vitrea***	cytotoxic	183, 184
236	5-hydroperoxylepidoza-1(10),4(14)-diene	***Actinia anthopleura pacifica***	cytotoxic	183
237	lepidoza-1(10),4(14)-dien-5-ol	***Actinia anthopleura pacifica***	cytotoxic	183
238	1,10-epoxy-5-hydroperoxy-4(14)-1epidozene	***Actinia anthopleura pacifica***	cytotoxic	183

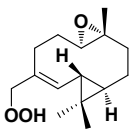
239	psiguadial C	***Psidium guajava***	cytotoxic	185
240	psiguadial D	***Psidium guajava***	cytotoxic	185
241	euglobal-IVb	***Eucalyptus globulus***	granulation inhibitor	182
242	euglobal-VII	***Eucalyptus globulus***	granulation inhibitor	182
243	(-)-isobicyclogermacrenal	***Lepidozia vitrea***	rice-growth inhibitor	186
244	heishuixiecaoline A	***Valeriana amurensis***	neuroprotective effect	187
245	heishuixiecaoline B	***Valeriana amurensis***	neuroprotective effect	187
246	euglobal-IX	***Eucalyptus globulus***	CYP3A4 inhibitor	188
247	heishuixiecaoline C	***Valeriana amurensis***	neuroprotective effect	187
248	volvalerenal C	***Valeriana officinalis var. latifolia, Valeiana amurensis***	-	187, 189
249	madolin A	***Valeriana officinalis var. latifolia, Aristolochia cucurbitafolia***	inhibitory activity on acetylcholinesterase	189, 190
250	partheniol	***Parthenium argentatum x P. tomentosa***	fungistatic	191
251	guayulin A	***Parthenium argentatum***	allergenic	192
252	valerianin E	***Valeriana fauriei***	antidepressant	193, 194
253	volvalerenal A	***Valeriana officinalis var. latifolia***	-	189
254	volvalerenal B	***Valeriana officinalis var. latifolia***	-	189
255	madolin B	***Aristolochia cucurbitafolia***	-	190
256	madolin C	***Aristolochia cucurbitafolia***	-	190
257	volvalerenal D	***Valeriana officinalis var. latifolia***	-	189
258	volvalerenal E	***Valeriana officinalis var. latifolia***	-	189
259	(+)-isobicyclogermacrenal	***Aristolochia manshuriensis***	-	195
260	volvalerenic acid A	***Valeriana officinalis var. latifolia***	-	189
261	volvalerenic acid B	***Valeriana officinalis var. latifolia***	-	189
262	madolin P	***Aristolochia kaempferi***	-	196
263	volvalerenic acid C	***Valeriana officinalis var. latifolia***	-	189
264	valerianin A	***Valeriana fauriei***	-	193

265	valerianin B	***Valeriana fauriei***	-	193
266	guayulin B	***Parthenium argentatum***	-	192
267	vladimenal	***Vladimiria souliei***	-	197
268	compound 268	***Verbesina subcordata***	-	198
269	euglobal-IVa	***Eucalyptus globulus***	-	182
270	(+)-3*β*-acetoxy bicyclogermacra-1(10)(*E*),4(*E*)-diene	***Chandonanthus hirtellus***	-	199
271	*ent*-bicyclogermacrene	***Plagiochila, Parerythropodium fulvum fulvum***	-	42, 159
272	3-acetoxy bicyclogermacrene	***Parerythropodium fulvum fulvum***	-	42, 200
273	3-hydroxy bicyclogermacrene	***Parerythropodium fulvum fulvum***	-	42, 200
274	compound 274	***Conocephalum japonicum***	-	201
275	compound 275	***Heteroscyphus planus***	-	152
276	atlanticol	***Plagiochila atlantica F. Rose.***	-	166
277	valeriene	***Valeriana pseudofficinalis***	-	202
278	compound 278	***Conocephalum japonicum***	-	201
279	compound 279	***Plagiochila ericicola***	-	174
280	(4*S*,5*S*,6*R*,7*R*)-5-methoxy-1(10)*E*-lepidozene	***Porella subobtusa***	-	203
281	(4*S**,5*S**,6*R**,7*R**)-1(10)(*E*)-lepidozen-5-ol	***Bryopteris filicina, Trocholejeunea sandvicensis***	-	204, 205
282	1,10-epoxy-4(14)-lepidozen-5-ol	***Actinia anthopleura pacifica***	-	183
283	(+)-lepidozene	***Lophogorgia ruberrima***	-	206

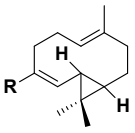
Table 6. The occurrence and biological activity of lepidozanes and bicyclogermacranes 232-283



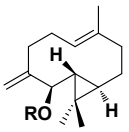
232 R= α-isobutyl (euglobal-III)



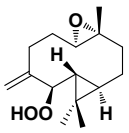
233



234 β-H_6, α-H_7, R= CH_2OH ((-)-lepidozenol)
235 β-H_6, α-H_7, R= CHO ((-)-lepidozenal)



236 R= OH
237 R= H



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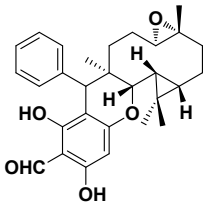
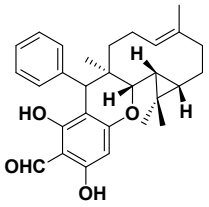
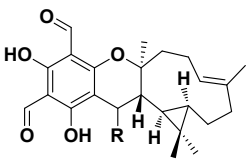


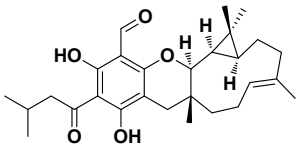
239 (psiguadial C)



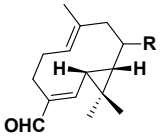
240 (psiguadial D)



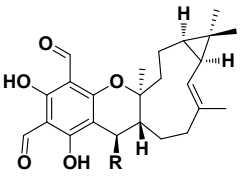
241 R= β-isobutyl (euglobal-IVb)



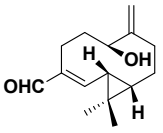
242 (euglobal-VII)



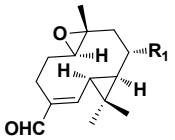
243 R= H ((-)-isobicyclogermacrenal)
244 R= β-OAc (heishuixiecaoline A)
245 R= α-OH (heishuixiecaoline B)



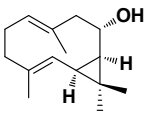
246 R= isobutyl (euglobal-IX)



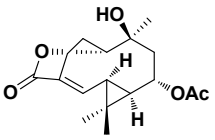
247 (heishuixiecaoline C)



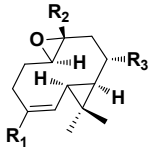
248 R_1= OAc (volvalerenal C)
249 R_1= H (madolin A)



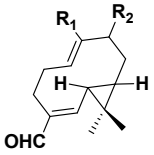
250 R= H (partheniol)
251 R= Cinn (guayulin A)



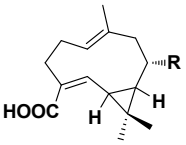
252 (valerianin E)



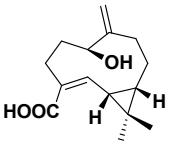
253 R_1= CHO, R_2= CH_2OAc, R_3= H (volvalerenal A)
254 R_1= R_2= CHO, R_3= H (volvalerenal B)
255 R_1= COOH, R_2= Me, R_3= H (madolin B)
256 R_1= R_3= H, R_2= Me (madolin C)



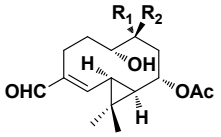
257 α-H_6, α-H_7, R_1= Me, R_2= α-OH (volvaleranals D)
258 β-H_6, α-H_7, R_1= CH_2OAc, R_2= H (volvaleranals E)
259 α-H_6, α-H_7, R_1= Me, R_2= H



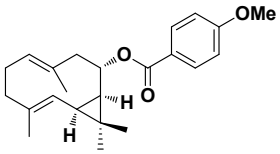
260 β-H_6, β-H_7, R= H (volvalerenic acid A)
261 β-H_6, β-H_7, R= OAc (volvalerenic acid B)
262 α-H_6, α-H_7, R= H (madolin P)



263 (volvalerenic acid C)



264 R_1 = CH_3, R_2= OH (valerianin A)
265 R_1,R_2= $=CH_2$ (valerianin B)



266 (guayulin B)

Figure 8. Structures of lepidozanes and bicyclogermacranes 232-266

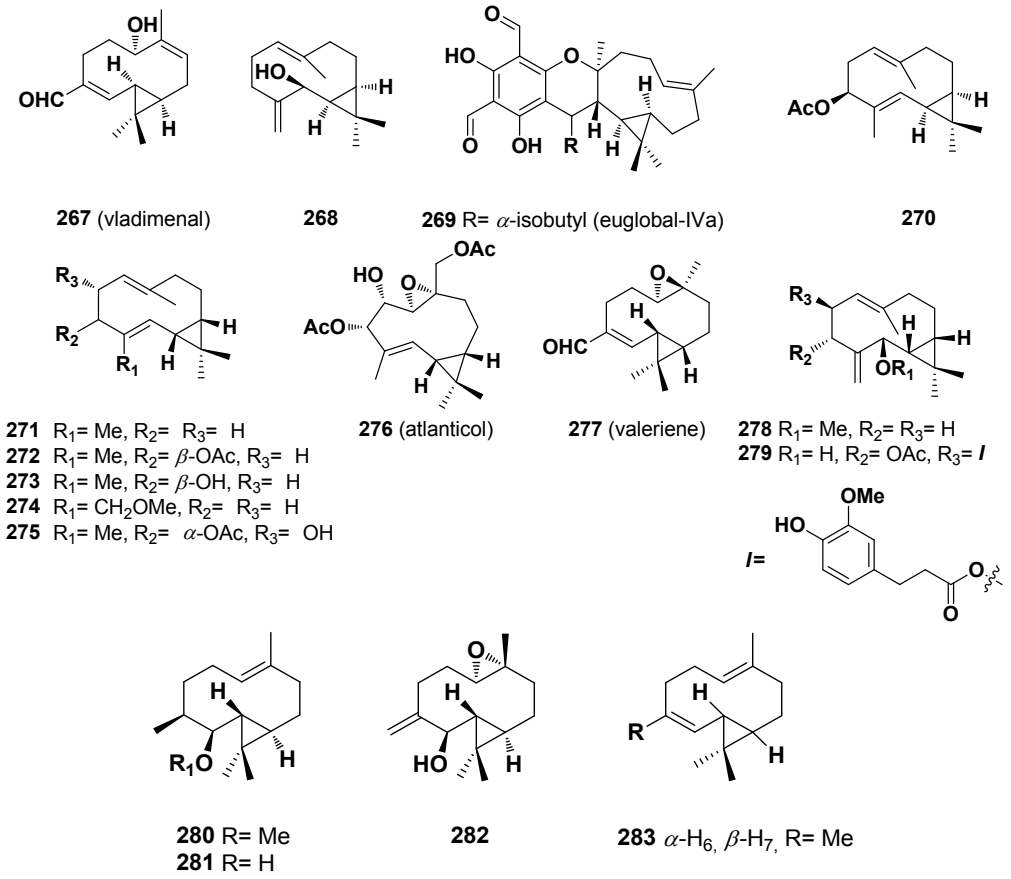


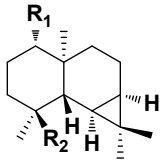
Figure 9. Structures of lepidozanes and bicyclogermacranes 267-283

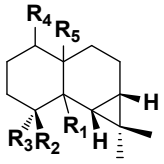
7. Maalianes

Nº	Compound	Species	Biological activities	References
284	compound 284	***Cadlina luteomarginata***	antifeedant, toxic against fish	207
285	epipolasin A	***Cadlina luteomarginata, Epipolasis kushimotoensis***	antifeedant, antimalarial, toxic against fish	56, 207, 208
286	epipolasinthiourea-A	***Epipolasis kushimotoensis***	cell growth inhibitor	56
287	maaliol	***Valeriana* sp.**	-	32
288	(1*S*,4*S*,5*S*,6*R*,7*R*,10*S*)-1,4-dihydroxymaaliane-1-*O*-*β*-*D*-glucopyranoside	***Ficus pumila* fruit**	-	209
289	compound 289	***Axinella cannabina***	-	210
290	compound 290	***Axinella cannabina***	-	210
291	compound 291	***Axinella cannabina***	-	210
292	(1*S*,4*S*,5*S*,6*R*,7*R*,10*S*)-1,4-dihydroxymaaliane	***Chloranthus elatior***	-	211
293	(1*R*)-bromo-*ent*-maaliol	***Neomeris annulata***	cytotoxic	212
294	compound 294	***Acanthella pulcherrima***	antimicrobial	69

295	(+)-γ-maaliane	***Calypogeia muelleriana***	-	15
296	(-)-maaliol	***Calypogeia muelleriana, Aristolochia longa, Plagiochila yokogurensis***	-	15, 41, 159
297	avermitilol	***Streptomyces avermitilis***	-	213
298	*ent*-4-*epi*-maaliol	***Plagiochila asplenioides***	-	155
299	(-)-maalian-5-ol	***Plagiochila ovalifolia, Lepidozea vitrea***	-	214, 215
300	(+)-maali-4(15)-en-1β-ol	***Mylia taylorii, Mylia nuda***	-	153
301	(+)-maali-1,3-diene	***Calypogeia muelleriana***	-	15
302	α-maaliane	***Calypogeia muelleriana***	-	15
303	compound 303	***Clavularia koellikeri***	-	137
304	compound 304	***Clavularia koellikeri***	-	137
305	madolin F	***Aristolochia heterophylla***	-	216, 217

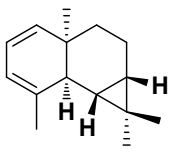
Table 7. The occurrence and biological activity of maalianes 284-305



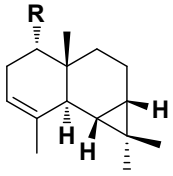


284 R_1= H, R_2= NC
285 R_1= H, R_2=NCS (epipolasin-A)
286 R_1= H, R_2= NHC(S)NH$(CH_2)_2$Ph (epipolasinthiourea-A)
287 R_1= H, R_2= OH (maaliol)
288 R_1= OGlc, R_2= OH
289 R_1= NC, R_2= H
290 R_1= NCS, R_2= H
291 R_1=HNCHO, R_2= H
292 R_1= R_2= OH

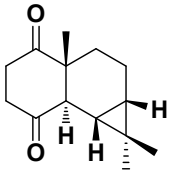
293 R_1= α-H, R_2= Me, R_3= OH, R_4= β-Br, R_5= β-Me ((1*R*)-bromo-*ent*-maaliol)
294 R_1= α-H, R_2= Me, R_3= NCS, R_4= H, R_5= β-Me
295 R_1= α-H, R_2,R_3= =CH_2, R_4= H, R_5= β-Me
296 R_1= α-H, R_2= Me, R_3= OH, R_4= H, R_5= β-Me
297 R_1= β-H, R_2= H, R_3= Me, R_4= α-OH, R_5= α-Me (avermitilol)
298 R_1= R_4= H, R_2= OH, R_3= Me, R_5= β-Me (*ent*-4-*epi*-maaliol)
299 R_1= α-OH, R_2= Me, R_3= R_4= H, R_5= β-Me
300 R_1= α-H, R_2,R_3= =CH_2, R_4= α-OH, R_5= β-Me



301



302 R= H
303 R= OAc
304 R= OH



305 (madolin F)

Figure 10. Structures of maalianes 284-305

8. Miscellaneous sesquiterpenoids

Nº	Compound	Species	Biological activities	References
306	prostantherol	***Prostanthera aff. Melissifolia, Prostranthera rotundifolia***	antimicrobial	218
307	eucalyptone	***Eucalyptus globulus***	antibacterial, glucan synthesis inhibitor	219, 220
308	halichonadin E	***Halichondria* sp.**	cytotoxic	221
309	anthoplalone	***Anthopleura pacifica***	cytotoxic	222
310	noranthoplone	***Anthopleura pacifica***	cytotoxic	222
311	neomeranol	***Neomeris annulata***	cytotoxic, phytotoxic	212
312	compound 312	***Clavularia inflata***	cytotoxic	100
313	(+)-vitrenal	***Lepidozia vitrea***	plant-growth inhibitor	223, 224, 225
314	nardoaristolone B	***Nardostachys chinensis***	protective effects on myocardial injury	12
315	kissoone A	***Valeriana fauriei***	-	226
316	kissoone B	***Valeriana fauriei***	activity on nerve growth	226
317	kissoone C	***Valeriana fauriei***	activity on nerve growth	226
318	compound 318	***Valeriana fauriei***	activity of nerve growth	227
319	kunzeanone C	***Kunzea ambigua***	ichthyotoxic	228
320	syriacine	***Salvia syriaca***	-	229
321	tridensene	***Bazzania tridens***	-	230
322	compound 322	***Gackstroemia genus***	-	231
323	(+)-nortaylorione	***Artemisia annua***	-	232
324	myltaylorione A	***Mylia taylorii***	-	158
325	myltaylorione B	***Mylia taylorii***	-	158
326	macrocarpal L	***Eucalyptus globulus***	-	233
327	ginsenoyne N	***Panax ginseng***	-	167
328	stearyl-glutinopallal	***Lactarius glutinopallens***	-	234
329	palmityl-glutimopallal	***Lactarius glutinopallens***	-	234
330	bicycloelemene	***Calypogeia muelleriana***	-	15
331	volvalerelactone A	***Valeriana officinalis***	-	235
332	volvalerelactone B	***Valeriana officinalis***	-	235

Table 8. The occurrence and biological activity of miscellaneous sesquiterpenoids 306-332

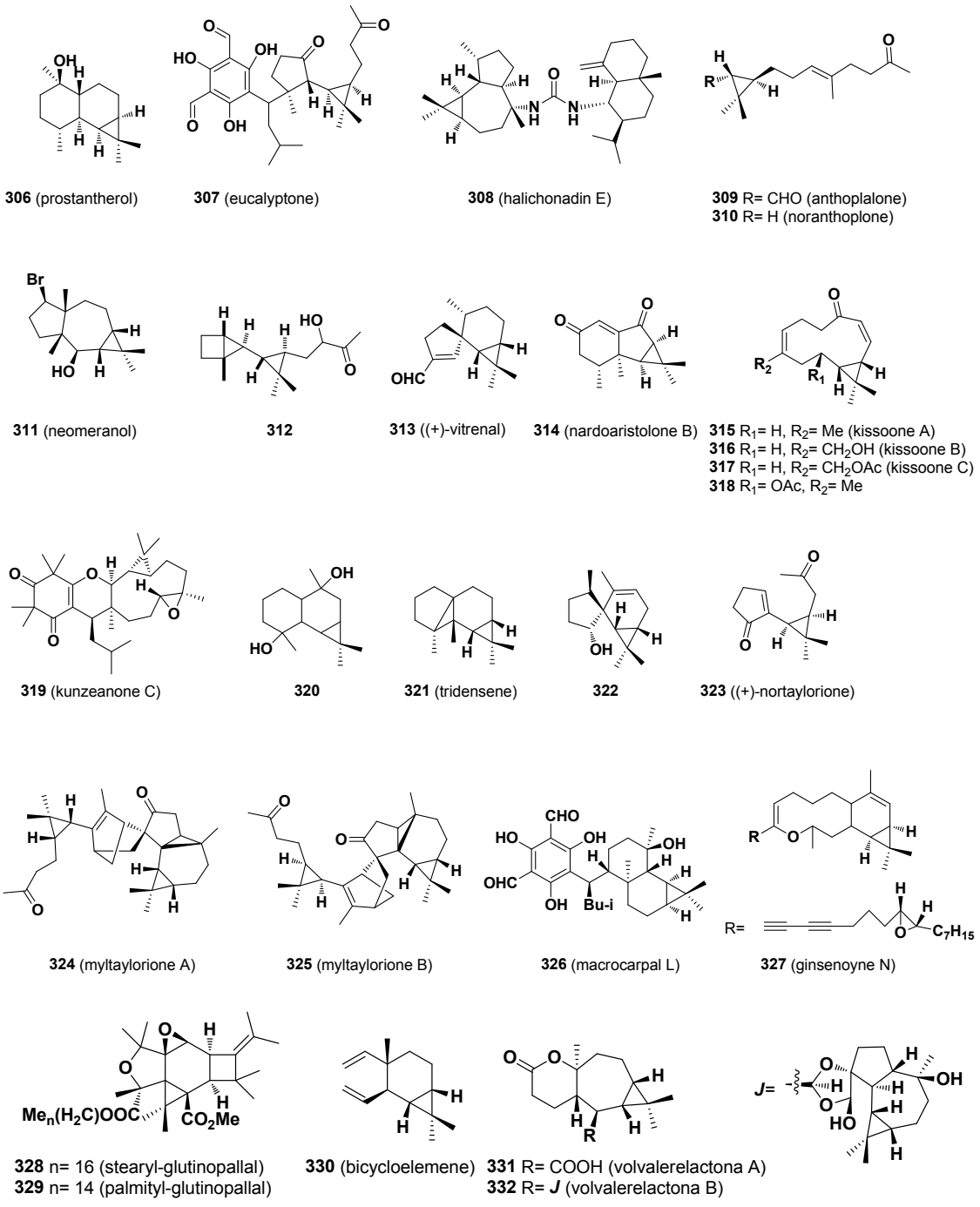


Figure 11. Structures of miscellaneous sesquiterpenoids 306-332

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