

Supplementary Information

The chemical and biological properties of natural resorcylic acid lactones

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Table S1. Original sources of RALs.

Cmpds	Name	Producing species	Ref.
RAL₁₀:			
1	3 <i>R</i> , 5 <i>R</i> -sonnerlactone	Unidentified Zh6-B1	27
		<i>Chaetosphaeronema hispidulum</i>	28
2	3 <i>R</i> , 5 <i>S</i> -sonnerlactone	<i>Chaetosphaeronema hispidulum</i>	9, 28
		Unidentified Zh6-B1	27
3	(<i>R</i>)-2,4-dihydroxy-7-methyl-7,8,9,10,11,12-hexahydro-6-oxa-benzocyclodecen-5-one	<i>Chaetosphaeronema hispidulum</i>	9
4–6	hispidulactones A–C		
7	hispidulactone F	<i>Chaetosphaeronema hispidulum</i>	28
8	relgro	<i>Fusarium</i> sp.	29, 30
9	10'-oxorelgro		
10–12	podospins A–C	<i>Podospira</i> sp.	13
RAL₁₂:			
13	(3 <i>R</i>)-de- <i>O</i> -methyllasiodiplodin	<i>Chaetosphaeronema hispidulum</i>	9
		<i>Lasiodiplodia theobromae</i>	33, 63, 86
		<i>Syncephalastrum racemosum</i>	34
		<i>Fusarium solani</i>	35
		<i>Trichoderma</i> sp. and <i>Acinetobacter johnsonii</i>	36
		<i>Arnebia euchroma</i>	39, 40
		<i>Anthocleista grandiflora</i>	41
		<i>Osbeckia opipara</i>	42
		<i>Areca catech</i>	43
		<i>Durio zibethinus</i>	44
		<i>Cibotium barometz</i>	45
		<i>Macroptilium lathyroides</i>	46
		<i>Ficus auriculata</i>	47
		<i>Abelmoschus sagittifolius</i>	48
		<i>Illicium difengpi</i>	49
		<i>Lasiodiplodia</i> sp.	77, 90
		Unidentified No. ZZ36	78
14	(3 <i>R</i>)-lasiodiplodin	<i>Lasiodiplodia theobromae</i>	33, 86
		<i>Syncephalastrum racemosum</i>	34
		<i>Trichoderma</i> sp. and <i>Acinetobacter johnsonii</i>	36
		<i>Chaetomium globosum</i>	38
		<i>Osbeckia opipara</i>	42
		<i>Macroptilium lathyroides</i>	46
		<i>Ficus auriculata</i>	47
		<i>Abelmoschus sagittifolius</i>	48
		<i>Annona dioica</i>	50
		<i>Caesalpinia minax</i>	51
		<i>Ampelopsis japonica</i>	52
		<i>Dendrobium sinense</i>	53
		<i>Pholidota yunnanensis</i>	54
		<i>Euphorbia antiquorum</i> L.	55
		<i>Sarocladium kiliense</i>	68
		<i>Lasiodiplodia</i> sp.	77, 90
		Unidentified No. ZZ36	78
15	(3 <i>S</i>)- <i>trans</i> -resorcylicide	<i>Penicillium</i> sp.	69
		<i>Penicillium</i> sp. SC2193	70
		<i>Acremonium zeae</i>	71

(Continued 1)

Cmpds	Name	Producing species	Ref.
16	(3 <i>S</i>)- <i>cis</i> -resorcylicide	<i>Penicillium</i> sp.	69
		<i>Penicillium</i> sp. SC2193	70
		<i>Acremonium zeae</i>	71
		<i>Talaromyces rugulosus</i>	72
17	(3 <i>R</i> , 7 <i>S</i>)-7-hydroxydihydroresorcylicide	<i>Penicillium</i> sp.	70, 74
18	(3 <i>R</i>)-5-oxo-lasiodiplodin	<i>Trichoderma</i> sp. and <i>Acinetobacter johnsonii</i>	36
		<i>Lasiodiplodia theobromae</i>	57
19	(3 <i>R</i> , 5 <i>S</i>)-5-hydroxylasiodiplodin	<i>Lasiodiplodia theobromae</i>	57
		<i>Sarocladium kiliense</i>	68
		<i>Lasiodiplodia</i> sp.	77
20	(3 <i>R</i> , 5 <i>R</i>)-5-hydroxylasiodiplodin	<i>Lasiodiplodia theobromae</i>	57
		<i>Lasiodiplodia</i> sp.	77
21	(3 <i>R</i> , 5 <i>R</i>)-5-hydroxy-de- <i>O</i> -methyllasiodiplodin	<i>Lasiodiplodia theobromae</i>	75
22	(3 <i>R</i> , 4 <i>S</i>)-4-hydroxylasiodiplodin		
23	(3 <i>R</i> , 6 <i>R</i>)-6-hydroxy-de- <i>O</i> -methyllasiodiplodin		
24	(3 <i>R</i> , 6 <i>S</i>)-6-hydroxylasiodiplodin	<i>Lasiodiplodia theobromae</i>	76
25	(<i>E</i>)-9-etheno-lasiodiplodin	<i>Trichoderma</i> sp. and <i>Acinetobacter johnsonii</i>	36
		<i>Lasiodiplodia</i> sp.	77
		Unidentified No. ZZ36	78
26	ozoroalide	<i>Ozoroa insignis</i>	79
27	dihydroresorcylicide	<i>Glomastix</i> sp.	10
		<i>Acremonium zeae</i>	71, 82
28	(3 <i>S</i> , 7 <i>R</i>)-7-hydroxydihydroresorcylicide	<i>Penicillium</i> sp.	70, 74
29	(3 <i>S</i> , 7 <i>S</i>)-7-hydroxydihydroresorcylicide	<i>Acremonium zeae</i>	71, 82
		<i>Talaromyces rugulosus</i>	72
30	(3 <i>S</i> , 7 <i>S</i>)-7-methoxydihydroresorcylicide	<i>Penicillium</i> sp.	70, 74
31	(3 <i>S</i> , 7 <i>R</i>)-7-methoxydihydroresorcylicide	<i>Talaromyces rugulosus</i>	72
32	(5 <i>S</i> , 6 <i>S</i>)-dihydroxylasiodiplodin	<i>Pseudallescheria ellipsoidea</i>	83
33	(5 <i>S</i>)-hydroxylasiodiplodin		
34	(5 <i>R</i>)-hydroxylasiodiplodin	<i>Trichoderma</i> sp. and <i>Acinetobacter johnsonii</i>	36
		<i>Botryosphaeria rhodina</i>	84
		<i>Lasiodiplodia</i> sp.	85
35	(3 <i>R</i> , 5 <i>S</i>)-5-hydroxy-de- <i>O</i> -methyllasiodiplodin	<i>Syncephalastrum racemosum</i>	34
36	(3 <i>R</i>)-6-oxo-de- <i>O</i> -methyllasiodiplodin	<i>Syncephalastrum racemosum</i>	34
		Unidentified No. ZZ36	78
37	(3 <i>S</i> , 6 <i>R</i>)-6-hydroxylasiodiplodin	<i>Sarocladium kiliense</i>	68
38	(<i>E</i>)-9-etheno-de- <i>O</i> -methyl-lasiodiplodin	<i>Lasiodiplodia theobromae</i>	86
39	(3 <i>R</i> , 4 <i>R</i>) 4-hydroxy-de- <i>O</i> -methyl-lasiodiplodin	<i>Ficus auriculata</i>	47
		<i>Lasiodiplodia theobromae</i>	86
40	(<i>R</i>)-6-oxolasiodiplodin	<i>Chaetomium globosum</i>	38
		<i>Ficus auriculata</i>	47
41–43	ficusines A–C	<i>Ficus auriculata</i>	47
44	13-hydroxyhydroresorcylicide	<i>Saccharicola bicolor</i>	87
45	12-hydroxyhydroresorcylicide		
46	(<i>R</i>)-dihydroresorcylicide	<i>Penicillium</i> sp.	83
47	(<i>R</i>)- <i>cis</i> -resorcylicide	<i>Penicillium brocae</i>	88
48	(10 <i>R</i> , 14 <i>R</i>)-10-hydroxydihydroresorcylicide		
49	(13 <i>S</i> , 14 <i>R</i>)-13-hydroxydihydroresorcylicide		
50	7-hydroxy-14-de- <i>O</i> -methyl-lasiodiplodin	<i>Fusarium solani</i>	35

(Continued 2)

Cmpds	Name	Producing species	Ref.
51–55	penicimenolides A–E	<i>Penicillium</i> sp.	83
56	(11 <i>S</i>)-methoxyresorcylic		
57	(11 <i>R</i>)-methoxyresorcylic		
58	(3 <i>R</i> , 4 <i>S</i> , 6 <i>R</i>)-4, 6-dihydroxy-de- <i>O</i> -methyllasiodiplodin	<i>Cinnamomum cassia</i>	89
59	7-oxolasiodiplodin	<i>Lasiodiplodia</i> sp.	85
60	15-methoxy-3-methyl-3,4,5,6,7,8,9,10-octahydro- <i>o</i> -1 <i>H</i> -benzo[<i>c</i>][1]oxacyclododecine-1,12,13-trione		
61	12 <i>E</i> , 15 <i>R</i> -5-hydroxy-3-methoxy-16-methyl-8,9,10,11,14,15-hexahydro-1 <i>H</i> -benzo[<i>c</i>][1]oxacyclodocecine-1-one	<i>Lasiodiplodia</i> sp.	90
62	(–)-(7 <i>S</i>)-7-hydroxylasiodiplodin	<i>Strychnos angustiflora</i>	91
63	(+)-(7 <i>R</i>)-7-hydroxylasiodiplodin		
64	(3 <i>R</i> , 7 <i>R</i>)-hydroxy-de- <i>O</i> -methyllasiodiplodin	<i>Trichoderma</i> sp. and <i>Acinetobacter johnsonii</i>	36
65	(3 <i>R</i>)-7-oxo-de- <i>O</i> -methyllasiodiplodin		
66	(3 <i>R</i>)-5-oxo-de- <i>O</i> -methyllasiodiplodin		
67	(3 <i>S</i>)-6-oxo-de- <i>O</i> -methyllasiodiplodin	<i>Trichoderma</i> sp. and <i>Acinetobacter johnsonii</i>	36
		Unidentified No. ZZF36	78
68	lasiodiplactone A	<i>Lasiodiplodia theobromae</i>	92
69	(3 <i>S</i> , 7 <i>S</i>)-7- <i>O</i> - <i>n</i> -butylresorcylic	<i>Talaromyces rugulosus</i>	72
70	(3 <i>S</i> , 7 <i>R</i>)-7- <i>O</i> - <i>n</i> -butylresorcylic		
71–72	talarodilactones A–B		
73	monocillin VII-1	<i>Pochonia chlamydosporia</i>	93
74	ilyoresorcy K	<i>Ilyonectria</i> sp.	95
75	colletoresorcylic lactone	<i>Colletotrichum gloeosporioides</i>	96
76	cochliomycin H	<i>Curvularia</i> sp. ZYX-Z-4	97
RAL₁₃:			
77–78	Unnamed	<i>Aigialus parvus</i>	98
79–90	podomycins A–L	<i>Podospora</i> sp.	99
RAL₁₄:			
91	radicicol	<i>Monocillium nordinii</i>	3
		<i>Humicola fuscoatra</i> NRRL 22980	7
		<i>Ilyonectria</i> sp.	95
		<i>Nectria radicola</i>	100
		<i>Cylindrocarpon radicola</i>	103
		<i>Verticillium chlamydosporium</i>	105
		<i>Humicola</i> sp.	106
		<i>Chaetomium chiversii</i>	107
		<i>Pochonia chlamydosporia</i> var. <i>chlamydosporia</i>	108, 122
		<i>Trichobotrys effusa</i>	109
		<i>Neocosmospora</i> sp.	110
		<i>Humicola fuscoatra</i>	124
		<i>Ilyonectria mors-panacis</i>	130
92	monocillin I	<i>Colletotrichum graminicola</i>	8
		<i>Paecilomyces</i> sp.	94
		<i>Ilyonectria</i> sp.	95
		<i>Colletotrichum gloeosporioides</i>	96
		<i>Humicola</i> sp.	106
		<i>Chaetomium chiversii</i>	107
		<i>Monocillium nordinii</i>	117, 125

(Continued 3)

Cmpds	Name	Producing species	Ref.
93–94	monocillins II–III	<i>Colletotrichum graminicola</i>	8
		<i>Pochonia chlamydosporia</i>	12
		<i>Paecilomyces</i> sp.	94
		<i>Ilyonectria</i> sp.	95
		<i>Monocillium nordinii</i>	117, 125
		<i>Ilyonectria mors-panacis</i>	130
95	monocillin IV	<i>Humicola fuscoatra</i> NRRL 22980	7
		<i>Paecilomyces</i> sp.	94
		<i>Ilyonectria</i> sp.	95
		<i>Neocosmospora</i> sp.	110
		<i>Monocillium nordinii</i>	117, 125
		<i>Ilyonectria mors-panacis</i>	130
96	monocillin V	<i>Monocillium nordinii</i>	117, 125
97	monorden analogue-1	<i>Humicola fuscoatra</i> NRRL 22980	7
		<i>Pochonia chlamydosporia</i>	108
98	aigialomycin E	<i>Aigialus parvus</i>	119
99	monorden B	<i>Humicola</i> sp.	106
100	monorden C (also named pochonin A)	<i>Pochonia chlamydosporia</i>	12
		<i>Humicola</i> sp.	106
101	monorden D (also named pochonin D)	<i>Pochonia chlamydosporia</i>	12
		<i>Paecilomyces</i> sp.	94
		<i>Humicola</i> sp.	106
		<i>Ilyonectria mors-panacis</i>	130
102	monorden E	<i>Humicola</i> sp.	106
103	pochonin B	<i>Pochonia chlamydosporia</i>	12
104	pochonin C	<i>Humicola fuscoatra</i>	124
105–106	pochonins E–F	<i>Pochonia chlamydosporia</i>	12, 108
107	monocillin II glycoside	<i>Pochonia chlamydosporia</i>	12
108–117	pochonins G–P	<i>Pochonia chlamydosporia</i>	108, 122
118	cryptosporiopsis A	<i>Cryptosporiopsis</i> sp.	123
119–121	neocosmosins A–C	<i>Neocosmospora</i> sp.	110
122	radicicol B	<i>Humicola fuscoatra</i>	124
		<i>Ilyonectria mors-panacis</i>	130
		<i>Humicola fuscoatra</i>	124
123–124	radicicols C–D	<i>Humicola fuscoatra</i>	124
125	lasicicol	<i>Trichoderma</i> sp. and <i>Acinetobacter johnsonii</i>	36
		<i>Lasiodiplodia theobromae</i>	63
		<i>Paecilomyces</i> sp.	94
		<i>Monocillium nordinii</i>	125
		<i>Monocillium nordinii</i>	125
126	nordinonediol	<i>Ilyonectria mors-panacis</i>	
		<i>Colletotrichum gloeosporioides</i>	
		<i>Lasiodiplodia</i> sp.	77, 95
		<i>Hyalodendriella</i> sp.	128
127	(R)-(-)-8,9-dihydrogreensporone C	<i>Lasiodiplodia</i> sp.	77, 95
128	hyalodendriellin C	<i>Hyalodendriella</i> sp.	128
129	hyalodendriellin E		
130–131	monocillins VI–VII	<i>Paecilomyces</i> sp.	94
132	dechloropochonin I		
133	4'-methoxymonocillin IV		
134	4'-hydroxymonocillin IV		
135	2'-hydroxymonocillin II		
136	(R)-zearalane or ilyoresorcy D	<i>Lasiodiplodia</i> sp.	90
		<i>Ilyonectria</i> sp.	95
137	monocillin VI-1 or ilyoresorcy D	<i>Pochonia chlamydosporia</i>	93, 95

(Continued 4)

Cmpds	Name	Producing species	Ref.
138	ilyoresorcy C	<i>Ilyonectria</i> sp.	95
139–144	ilyoresorcys E–J		
145	radicicol E	<i>Ilyonectria mors-panacis</i>	130
146–156	ilyomycins A–K	<i>Ilyonectria</i> sp.	131
157–158	colletogloeolactone A–B	<i>Colletotrichum gloeosporioides</i>	132
159	ilyomycin L	<i>Ilyonectria</i> sp.	133
160	monocillin VI glycoside	<i>Pochonia chlamydosporia</i>	134
161–168	ilyolactones A–H	<i>Ilyonectria</i> sp. FL-710	21
169	zearalenone	<i>Gibberella zeae</i>	135
		<i>Paecilomyces</i> sp.	173
		<i>Fusarium</i> sp.	177
170	5-formylzearalenone	<i>Gibberella zeae</i>	143
171	7'-dehydrozearalenone		
172	8'-hydroxyzearalenone		
173	8'- <i>epi</i> -hydroxyzearalenone		
174	6',8'-dihydroxyzearalene	<i>Fusarium</i> sp.	144
175	3' <i>a</i> -hydroxyzearalenone	<i>Fusarium</i> sp.	145
176	3' β -hydroxyzearalenone		
177	<i>cis</i> -zearalenone	<i>Fusarium</i> sp.	146
178	<i>cis-a</i> -zearalenol		
179	<i>trans-a</i> -zearalenol		
180	<i>cis-β</i> -zearalenol		
181	<i>trans-β</i> -zearalenol		
182	zearalanone		
183	<i>a</i> -zearalanol		
184	β -zearalanol		
185	LL-Z1640-1	Unidentified Lederle Culture Z1640	149
186	LL-Z1640-2	<i>Cochliobolus lunatus</i>	194
187	LL-Z1640-3		
188	LL-Z1640-4		
189	zeaenol	<i>Curvularia lunata</i>	155
190	(5 <i>E</i>)-7-oxozeaenol	<i>Curvularia lunata</i> Xenova fungus 20416	156
191	5,6-dihydro-5-methoxy-7-oxo-zeaenol		
192	14-methoxy-zearalenone	<i>Ascochyta</i> spp.	156
193	2,4-dimethoxyzearalenone	<i>Cunninghamella bainieri</i>	157
194	2-methoxyzearalenone		
195	hypothemycin	<i>Hypomyces trichothecoides</i>	11, 158
		<i>Aigialus parvus</i>	119
		<i>Coriolus versicolor</i>	159
		<i>Phoma</i> sp.	160, 174
196	7',8'-dihydrohypothemycin	<i>Hypomyces trichothecoides</i>	11, 158
197	L-783, 277	<i>Phoma</i> sp.	160
198	L-783, 290	<i>Phoma</i> sp.	161
199	Ro 09-2210	Unidentified FC2506	162
200	zearalenone-14- β -D-glucopyranoside	<i>Fusarium</i>	163–165
		<i>Arabidopsis thaliana</i>	168
201	zearalenone-14- <i>O</i> -sulfate	<i>Fusarium</i>	163–165

(Continued 5)

Cmpds	Name	Producing species	Ref.
202	α -zearalenol-4-glucoside	<i>Arabidopsis thaliana</i>	168
203	β -zearalenol-4-glucoside		
204	zearalenone-MalGlc		
205	α -zearalenol -MalGlc		
206	β -zearalenol-MalGlc		
207–210	aigialomycins A–D	<i>Aigialus parvus</i>	119
211	queenslondon	<i>Chrysosporium queenslandicum</i>	169
212	4- <i>O</i> -demethylhypothemycin	<i>Hypomyces subiculosus</i>	172
213	1',2'-epoxy aigialomycin D	<i>Hypomyces subiculosus</i>	172
		<i>Paecilomyces</i> sp.	173
214	Unnamed	<i>Hypomyces subiculosus</i>	172
215	5'- <i>O</i> -methylhypothemycin	<i>Phoma</i> sp.	174
216–218	caryosporomycins A–C	<i>Caryospora callicarpa</i>	175
219	8'-hydroxyzearalanone	<i>Penicillium</i> sp.	176
220	2'-hydroxyzearalanol		
221	5'-hydroxyzearalenol	<i>Fusarium</i> sp.	177
222	deoxy-aigialomycin C	<i>Cochliobolus lunatus</i>	179
223–229	hamigeromycins A–G	<i>Hamigera avellanea</i>	180, 181
230	89-250904-F1		
231	zearalenone-11, 12-oxide	<i>Fusarium graminearum</i>	182
232	zearalenone-11, 12-dihydrodiol		
233	10-oxo-zearalenone		
234–245	paecilomycins A–B, E–F, G–I	<i>Paecilomyces</i> sp.	173, 183,
	<i>trans</i> -7',8'-dehydrozearalenol		186, 187
	paecilomycins J–M		
246–248	paecilomycins N–P	<i>Paecilomyces</i> sp.	94
249	15- <i>O</i> -desmethyl-5Z-7-oxozeaenol	<i>Phoma</i> sp.	188
250	7- <i>epi</i> -zeaenol		
251	5'-hydroxyzearalenone	<i>Fusarium</i> sp.	30
252	5' β -hydroxyzearalenone	<i>Fusarium</i> sp.	31
253	7' β -hydroxyzearalenone		
254	9' α -hydroxyzearalenone		
255	5-bromozeaenol	<i>Curvularia lunata</i>	190
256	3,5-dibromozeaenol		
257–263	greensporones A–G	<i>Halenospora</i> sp.	191
264	8,9-dihydrogreensporone A		
265	dechlorogreensporone A		
266	<i>O</i> -desmethylgreensporone C		
267	8,9-dihydrogreensporone C		
268	8,9-dihydrogreensporone D		
269	dechlorogreensporone D		
270	dechlorogreensporone F		
271–277	cochliomycins A–G	<i>Cochliobolus lunatus</i>	179, 194,
			195
278	hyalodendriellin A	<i>Hyalodendriella</i> sp.	128
279	hyalodendriellin B		
280	hyalodendriellin D		
281	hyalodendriellin F		
282	paecilomycin N	<i>Hypomyces subiculosus</i>	196
283	aigialomycin I		
284	<i>O</i> -demethylated-zeaenol	<i>Curvularia crepinii</i>	197

(Continued 6)

Cmpds	Name	Producing species	Ref.
285–289	rhinoclactones A–E [*]	<i>Rhinocladiella similis</i>	198
290–291	rhinoclactone E [*] –F	<i>Rhinocladiella similis</i>	199
292	5 α , 6 β -acetone-aigialomycin B	<i>Penicillium ochrochloron</i>	200
293	4- <i>O</i> -desmethyl-aigialomycin B		
294	penochrochlactone C		
295	penochrochlactone D		
296–304	podospins D–L	<i>Podospira</i> sp.	13
305–306	ascarpins A–B	<i>Aspergillus</i> sp.	201
307	7'(Z)-zeaenol	<i>Cochliobolus lunatus</i>	202
308	chaetolactone A	<i>Chaetosphaeronema</i> sp.	203
309	4-methoxy- α -zearealenol		
310–312	curvulomycins A–C	<i>Curvularia lunata</i> GXIMD 02512	204
RAL₁₆:			
313–315	ilyoresorcy A	<i>Ilyonectria</i> sp.	95
	atrop-ilyoresorcy A		
	ilyoresorcy B		

^{*} Two distinct compounds sharing the same name “rhinoclactone E” are included in this table. Although their names are identical, their structures differ significantly. We retain the original name from their respective sources to maintain literature consistency.