

Supplementary Information

Table S1. Collecting locations, sources and names of marine fungi.

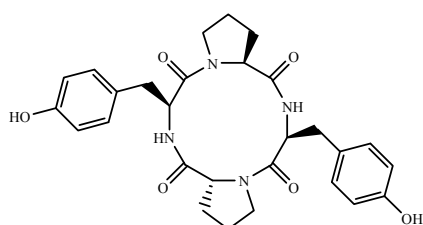
Site	Location	Fungal name	Source	Ref.
1	South China Sea	<i>Engyodontium album</i> DFFSCS021	sediment	[42]
2	Sedot-Yam, Israel	<i>Aspergillus tubingensis</i> OY907	sponge	[61]
3	the South China Sea	<i>Emericella</i> sp. SCSIO 05240	sediment	[52]
4	Cicia, Lau group, Fiji Islands	<i>Penicillium</i> sp. FF001	water	[105]
5	Adriatic Sea nearby Rovinj (Istrian Peninsula, Croatia)	<i>Bartalinia robillardoides</i> LF550	Water	[75,76]
6	a reef wall, Fijiislands	ascomycete Super 1F1-09	sponge	[87]
7	Praia Dura, Ubatuba vicinity, Sao Paulo state, Brazil	<i>Phomopsis longicolla</i>	alga	[109]
8	Punta di Fetovaia, Isle of Elba	<i>Talaromyces</i> sp. LF458	sponge	[72]
9	South China Sea	193 culturable fungal	animals	[10]
10	Playa del Ingles (Gomera, Spain)	<i>Microsphaeropsis</i> sp. <i>Seimatosporium</i> sp.	other plant	[58]
11	Adriatic Sea	<i>Aspergillus</i> sp.	sponge	[20,71]
12	Greenland Sea	<i>Trichoderma</i> sp. MF106	water	[24]
13	Helgoland	<i>Stachybotrys</i> sp. MF347	driftwood	[23]
14	Dafeng harbor in the city of Yancheng, Jiangsu Province, China.	<i>Penicillium citrinum</i> Salicorn 46	other plant	[112]
15	the Xisha Islands of China	<i>Aspergillus sydowii</i> ZSDS1-F6	sponge	[99]
16	the Lianyungang sea area, Jiangsu Province of China	<i>Aspergillus flavus</i> OUCMDZ-2205	animals	[17]
17	the Bohai Sea, China	<i>Aspergillus versicolor</i> MF359	sponge	[51]
18	the Similan Islands, Phang Nga Province, Thailand	<i>Aspergillus similanensis</i> sp. nov. KUFA 0013	sponge	[47]
19	Prince Edward Island	<i>Neosetophoma samarorum</i> RKDO834 fungus RKDO795 <i>Phaeosphaeria spartinae</i> RKDO785	water	[102]
20	Hainan Island, P. R. China	<i>Penicillium</i> sp. MA-37	mangrove	[78,79]
21	Wenchang, Hainan, China	<i>Penicillium adametzioides</i> AS-53	sponge	[114]
22	Hainan Sanya National Coral Reef Reserve, China	<i>Neosartorya pseudofischeri</i>	animals	[86]
23	Trang province, Thailand	<i>Diaporthaceae</i> sp. PSU-SP2/4	sponge	[21]
24	Leizhou Peninsula, Guangdong Province, China	<i>Phomopsis</i> sp. K38 <i>Alternaria</i> sp. E33	mangrove	[13]
25	the shore of Bridge End, Shetlan Islands, UK	<i>Penicillium</i> sp. AF3-117C	alga	[106]
26	Okinawa, Japan	<i>Aspergillus</i> sp. OPMF00272	animals	[43]
27	the coast of Qingdao, P. R. China	<i>Eurotium cristatum</i> EN-220	alga	[91]
28	Daya Bay, Shenzhen City, Guangdong Province	<i>Aspergillus flavipes</i> AIL8	mangrove	[70]
29	Putian saltern, Fujian Province of China.	<i>Aspergillus flocculosus</i> PT05-1	sediment	[33]
30	Weizhou coral reef in the South China Sea	<i>Aspergillus elegans</i> ZJ-2008010	coral	[34]
31	the South China Sea	<i>Xylariaceae</i> sp. SCSGAF0086	coral	[123]
32	Yongxing Island in the South China Sea	<i>Pestalotiopsis</i> sp. ZJ-2009-7-6	coral	[81]
33	Taiwan Strait, China	<i>Penicillium</i> sp. ML226	mangrove	[80]
34	Pearl River in South China Sea	<i>Penicillium pinophilum</i> SD-272	sediment	[31]
35	the South China Sea	<i>Nigrospora</i> sp. No. 1403	mangrove	[56,57,119]
36	the German Wadden Sea	<i>Calcarisporium</i> sp. KF525	water	[73]
37	Arvoredo Island in the Arvoredo Biological Marine Reserve	<i>Penicillium</i> sp. F37	sponge	[104]
38	Zhoushan Island	<i>Aspergillus ustus</i> cf-42	alga	[45]
39	Qingdao's first beach, Shandong province of China	<i>Eurotium herbariorum</i> HT-2	alga	[18]

Table S1. Cont.

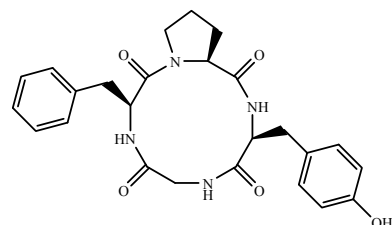
40	Naozhou Island, Guangxi Province, China	<i>Metarhizium anisopliae</i> mxh-99	sponge	[116]
41	Gokasyo Gulf, Mie Prefecture, Japan	<i>Emericella varicolor</i> GF10	sediment	[97]
42	Qingdao coastline of Shandong Province	<i>Aspergillus versicolor</i> EN-7	alga	[55]
43	Hainan Island, China	121 fungal isolates	coral	[7]
44	Wenchang county in Hainan Province	endophytic fungus A1	mangrove	[85]
45	Hainan Island, China	<i>Eurotium rubrum</i> G2	mangrove	[68]
46	Iriomote Island in Okinawa, Japan	<i>Beauveria bassiana</i> TPU942	sponge	[103]
47	Qionghai, Hainan, China	<i>Aspergillus</i> sp. HDf2	animals	[60]
48	Danzhou, Hainan Province of China	<i>Penicillium commune</i> 518	coral	[64]
49	Wenchang, Hainan province of China	<i>Aspergillus flavus</i> 092008	mangrove	[74]
50	South Sulawesi, Indonesia	<i>Daldinia eschscholzii</i> KT32	alga	[63]
51	Guangxi Zhuang Autonomous Region of China	<i>Nigrospora</i> sp. MA75	mangrove	[48]
52	Red Sea at Safaga coasts, Egypt	<i>Alternaria alternata</i> D2006	coral	[113]
53	Bertioga	<i>Diaporthe phaseolorum</i> 41.1	mangrove	[89]
54	the state of Sao Paulo	<i>Diaporthe phaseolorum</i> 41.1	mangrove	[89]
55	Pingtian Island, China	<i>Aspergillus versicolor</i>	alga	[96]
56	Wenchang County in Hainan Province (China)	<i>Scyphiphora hydrophyllacea</i> A1	mangrove	[44]
57	Weizhou coral reef in the South China Sea	<i>Aspergillus</i> sp. ZJ-2008004	sponge	[41]
58	Similan Islands, Phangnga Province, Thailand	<i>Trichoderma aureoviride</i> PSU-F95	coral	[53]
59	south Sinai, Egypt	<i>Aspergillus versicolor</i>	alga	[54]
60	La Jolla shore, San Diego, USA	<i>Asteromyces cruciatus</i> 763	alga	[14]
61	Qingdao	<i>Eurotium cristatum</i> EN-220	alga	[19]
62	Chorao Island, along the Mandovi estuary of Goa, India	<i>Penicillium chrysogenum</i> MTCC 5108	mangrove	[122]
63	Florida, US	<i>Leucostoma persoonii</i>	mangrove	[108]
64	Hainan, China	<i>Aspergillus niger</i> MA-132	mangrove	[117]
65	Putian Saltern of Fujian Province of China	<i>Aspergillus terreus</i> PT06-2	sediment	[29]
66	Weizhou Island of southern China sea	<i>Penicillium chrysogenum</i> QEN-24S	alga	[62]
67	Jiaozhou Bay, China	<i>Spicaria elegans</i> KLA-03	sediment	[83]
68	GeoMun Island, Yeosu, Korea	<i>Aspergillus flavu</i>	alga	[35]
69	Wenchang, Hainan province of China	<i>Wallemia sebi</i> PXP-89	mangrove	[25]
70	Dongzhai mangrove, Hainan, China	<i>Fusarium</i> sp. DZ-27	mangrove	[115]
71	Mandovi estuary, Goa, India	<i>Microdochium nivale</i>	other plant	[107]
72	Weizhou Island of southern China sea	<i>Penicillium chrysogenum</i> QEN-24S	alga	[90]
73	Osaka University	<i>Trichoderma</i> sp.	sponge	[37,38]
74	the coast of Zhanjiang, Guangdong province	<i>Aspergillus</i> sp. No. FSY-01 and FSW-02	mangrove	[28,118]
75	Yantai, China	<i>Aspergillus oryzae</i>	alga	[16]
76	Coast of Jeju Island, Korea	<i>Aspergillus versicolor</i>	water	[101]
77	Greifswalder Bodden, Baltic Sea, Germany	<i>Lophiostoma</i> sp. 226	driftwood	[120]
78	Sakhalin Bay (Sea of Okhotsk),	<i>Myceliophthora lutea</i>	sediment	[84]
79	South China Sea coast	fungus E33 and K38	mangrove	[49,50]
80	South China Sea	<i>Trichoderma koningii</i>	sediment	[59]
81	coral reef at Palau	The fungus 98F134	sponge	[94]
82	Pulau Tinggi, Malaysia	<i>Fusarium proliferatum</i>	sponge	[98]
83	GeoMun Island, Yeosu, Korea	<i>Fusarium tricinctum</i>	alga	[66]
84	Tinggi Island, Malaysia	<i>Paecilomyces</i> sp.	sponge	[36]
85	Dalian, China	<i>Aspergillus unguis</i> DLEP2008001	other plant	[100]
86	London Island of Kongsfjorden of NyAlesund District (altitude of 100m) of Arctic	<i>Eutypella</i> sp. D-1	soil	[46]

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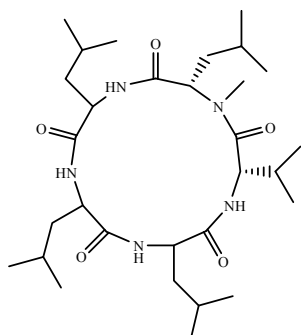
87	Zhoushan Island	<i>Aspergillus ustus</i> cf-42	alga	[40]
88	Xisha Islands coral reef of the South China Sea	<i>Aspergillus versicolor</i> strain ATCC 9577	coral	[30]
89	Hainan Island in the South China Sea	<i>Alternaria tenuissima</i> EN-192	mangrove	[111]
90	the coast of Atami-shi, Shizuoka Prefecture, Japan	<i>Stagonosporopsis cucurbitacearum</i>	sponge	[26]
91	Xisha Islands coral reef in the South China Sea	<i>Aspergillus</i> sp. XS-20090066	coral	[82]
92	South China Sea, Sanya Hainan Province, China	<i>Penicillium</i> sp. SCSGAF 0023	coral	[93]
93	Yokji Island, Gyeongnam Province Korea	<i>Dothideomycete</i> sp.	alga	[88]
94	Gagu-do, Korea	<i>Acremonium strictum</i>	sponge	[69]
95	the southern China Sea	<i>Penicillium commune</i> QSD-17	sediment	[77]
96	Sakhalin Bay (the Sea of Okhotsk	<i>Aspergillus versicolor</i> (Vuill.) Tirab.	animals	[110]
97	South China Sea coast	<i>Aspergillus</i> sp.	mangrove	[65]
98	Waikiki Beach, Honolulu, Hawaii.	<i>Aspergillus</i> sp.	soil	[32]
99	South China Sea	<i>Penicillium commune</i> SD-118	sediment	[95]
100	Van Phong Bay (South China Sea)	<i>Penicillium citrinum</i>	coral	[121]



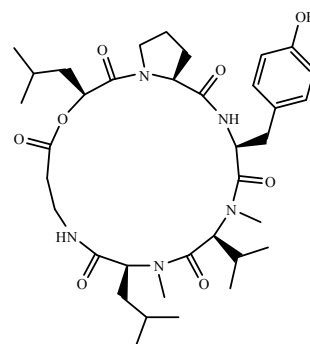
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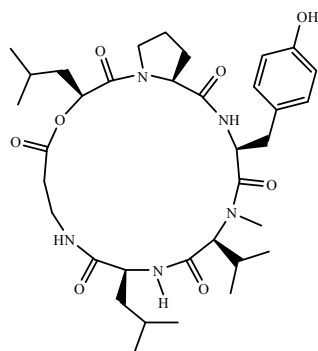
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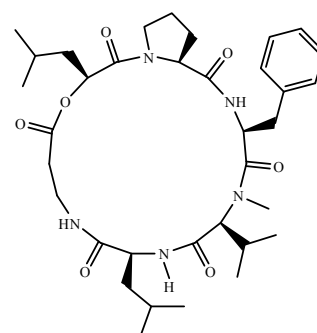
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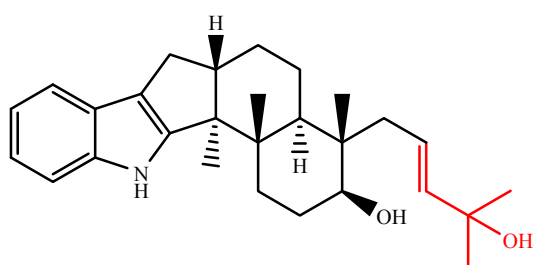


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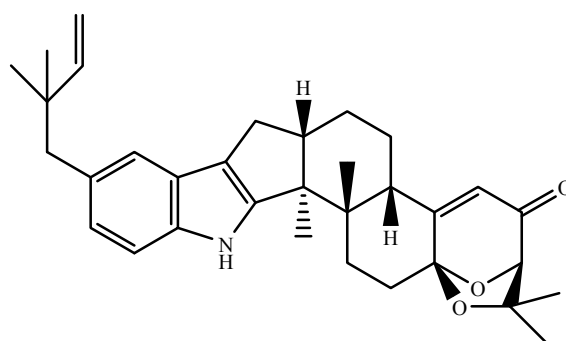


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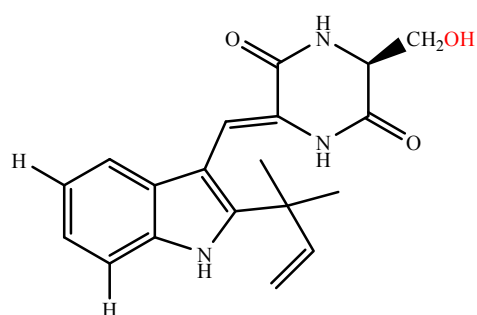
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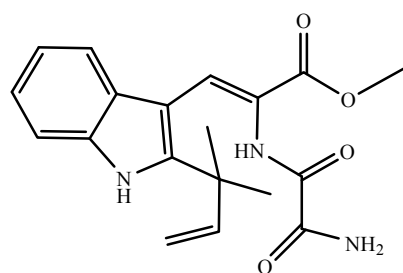
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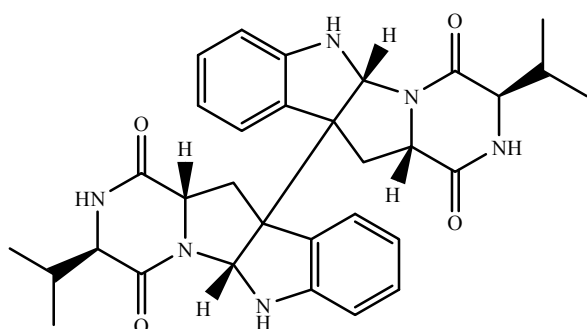
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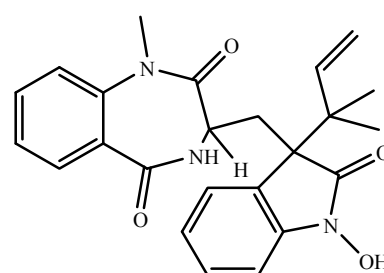
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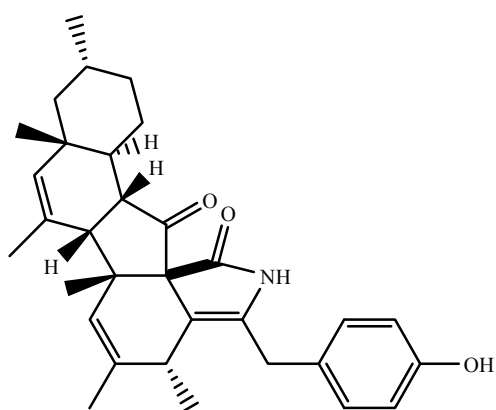
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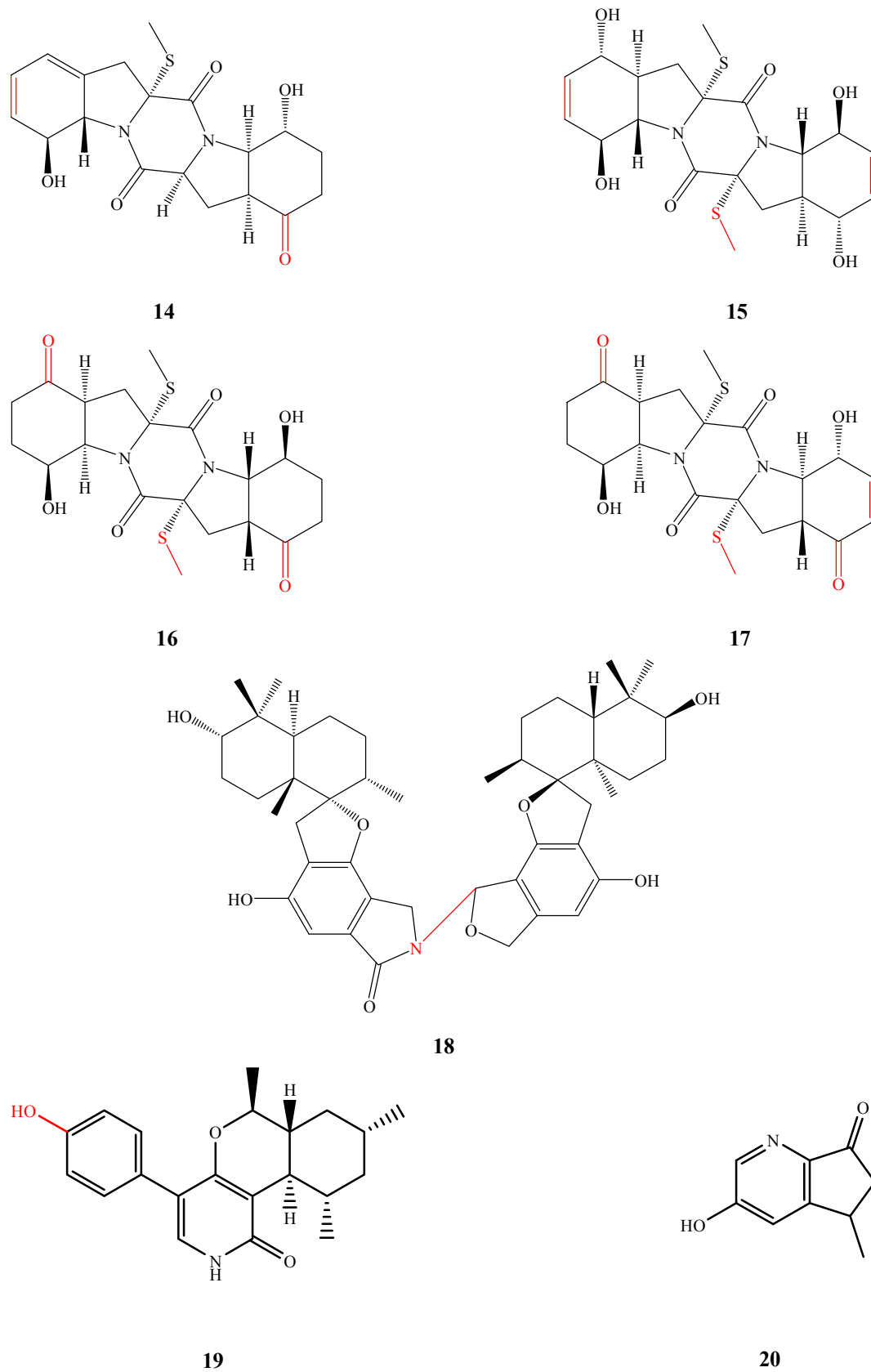
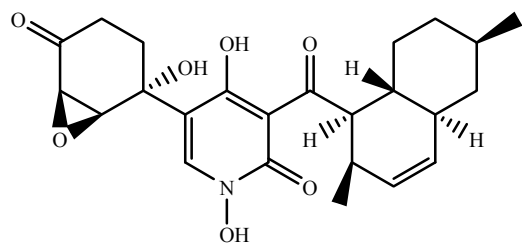
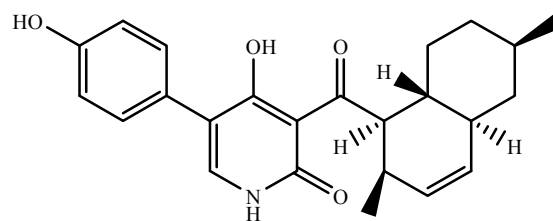


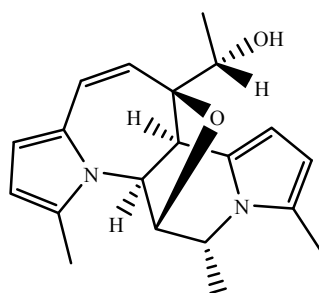
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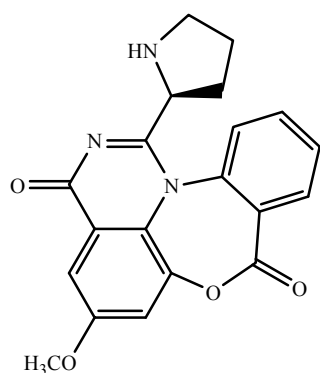
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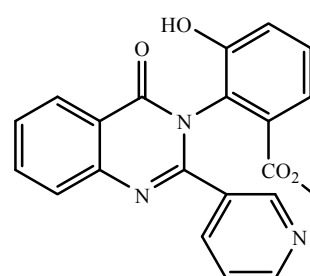
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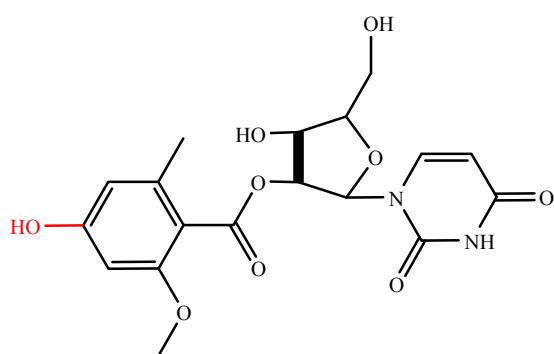
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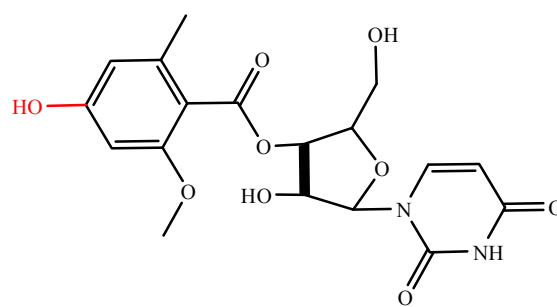
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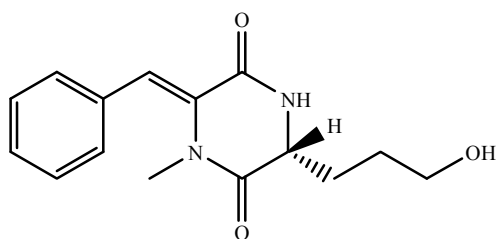


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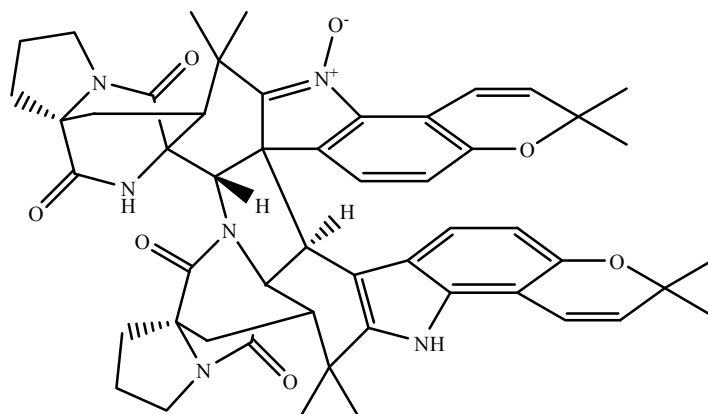


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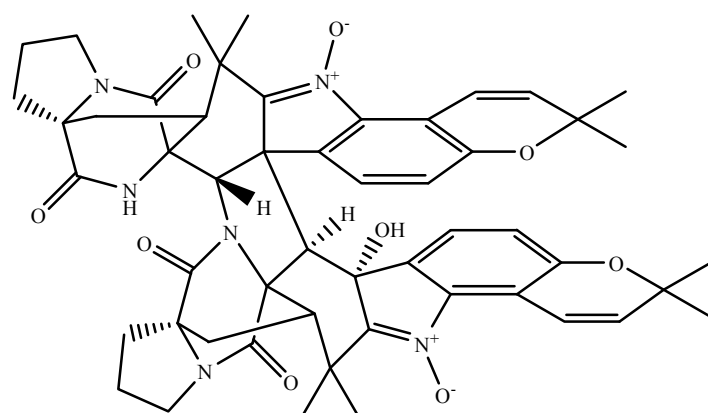
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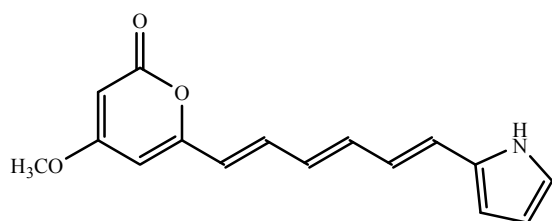
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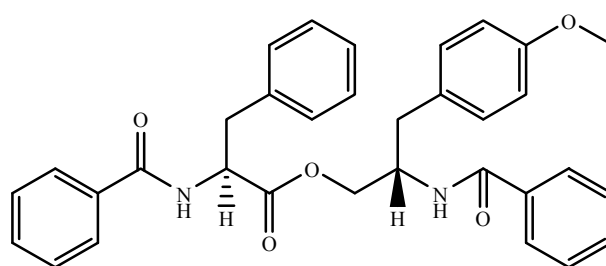
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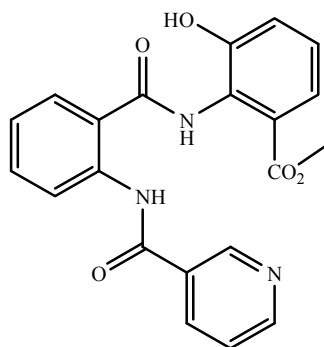


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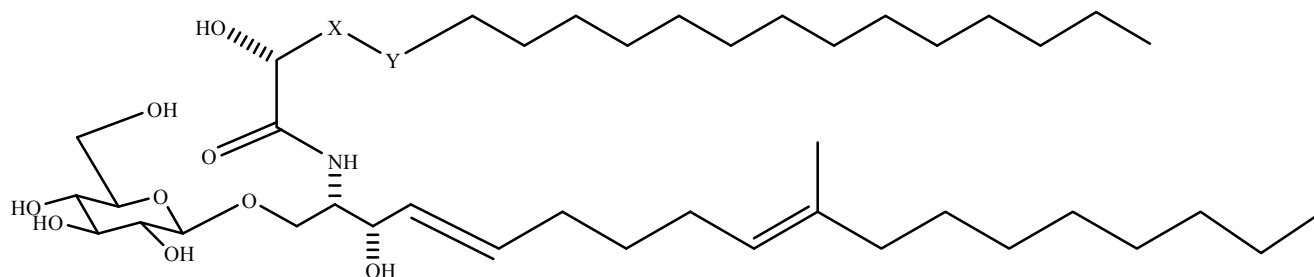


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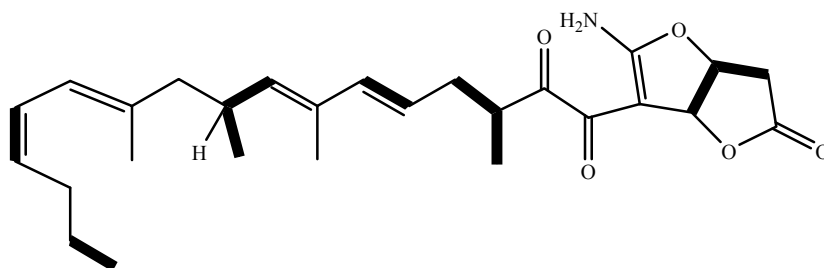
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34: X-Y=CH₂CH₂
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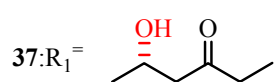
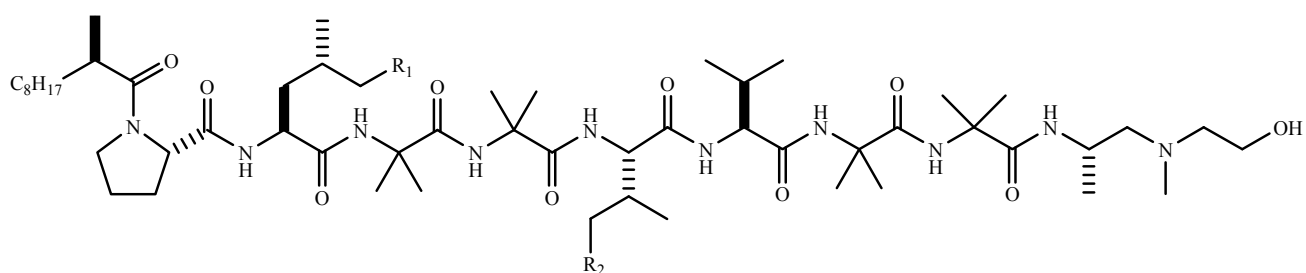
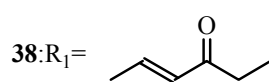
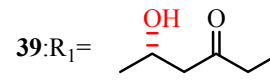
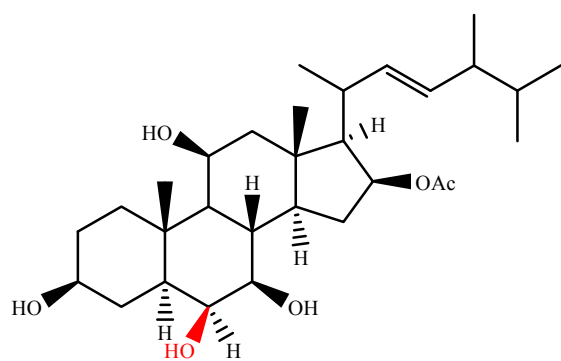
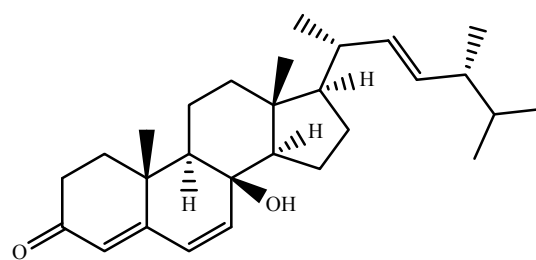
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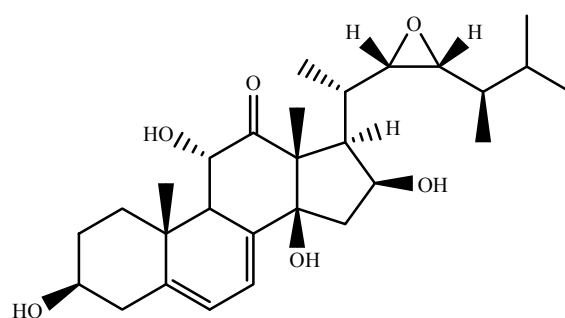
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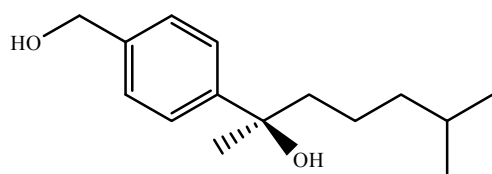
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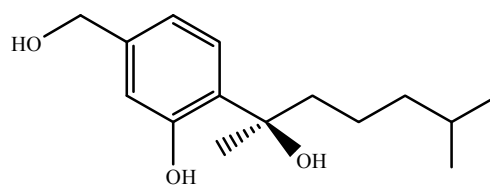
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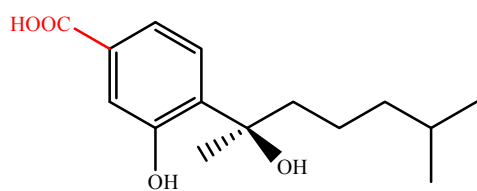
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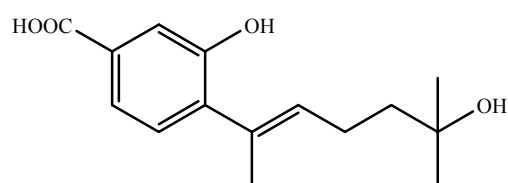
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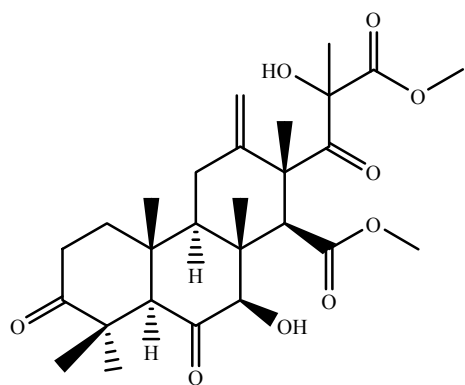


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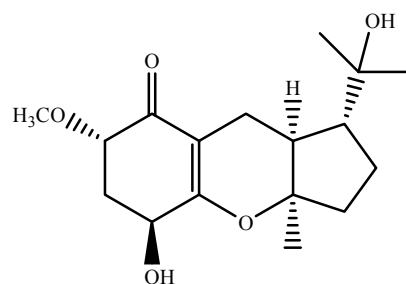


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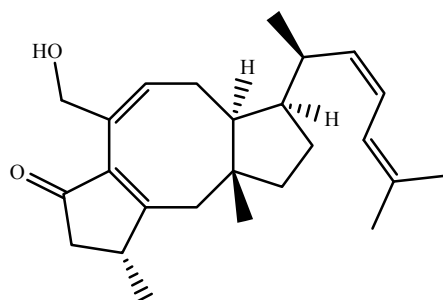
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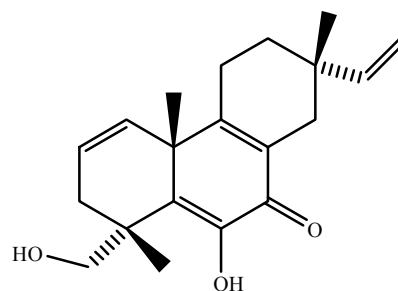
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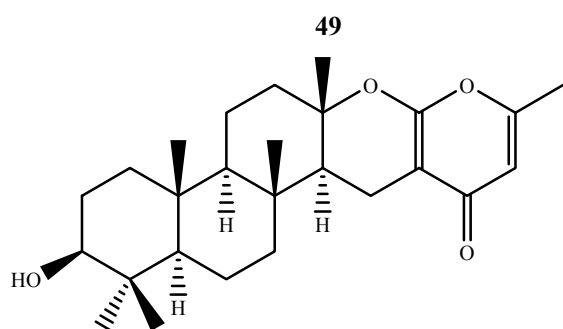
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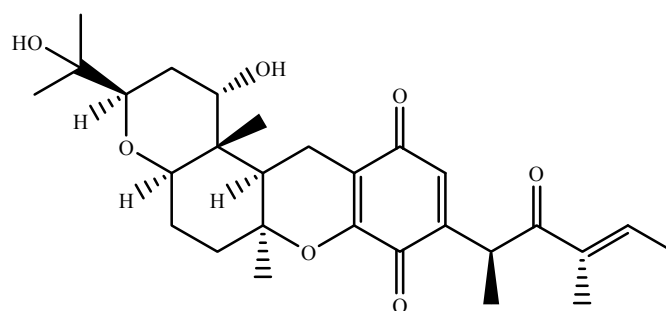
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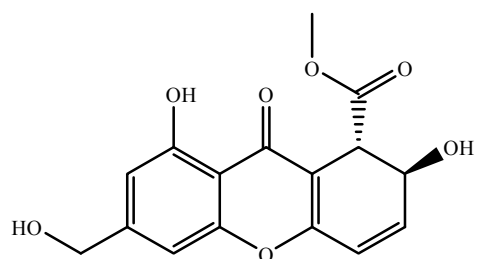
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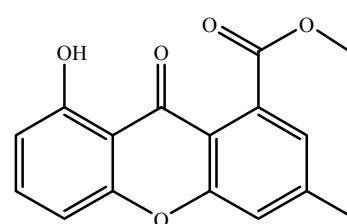
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Figure S1. Cont.

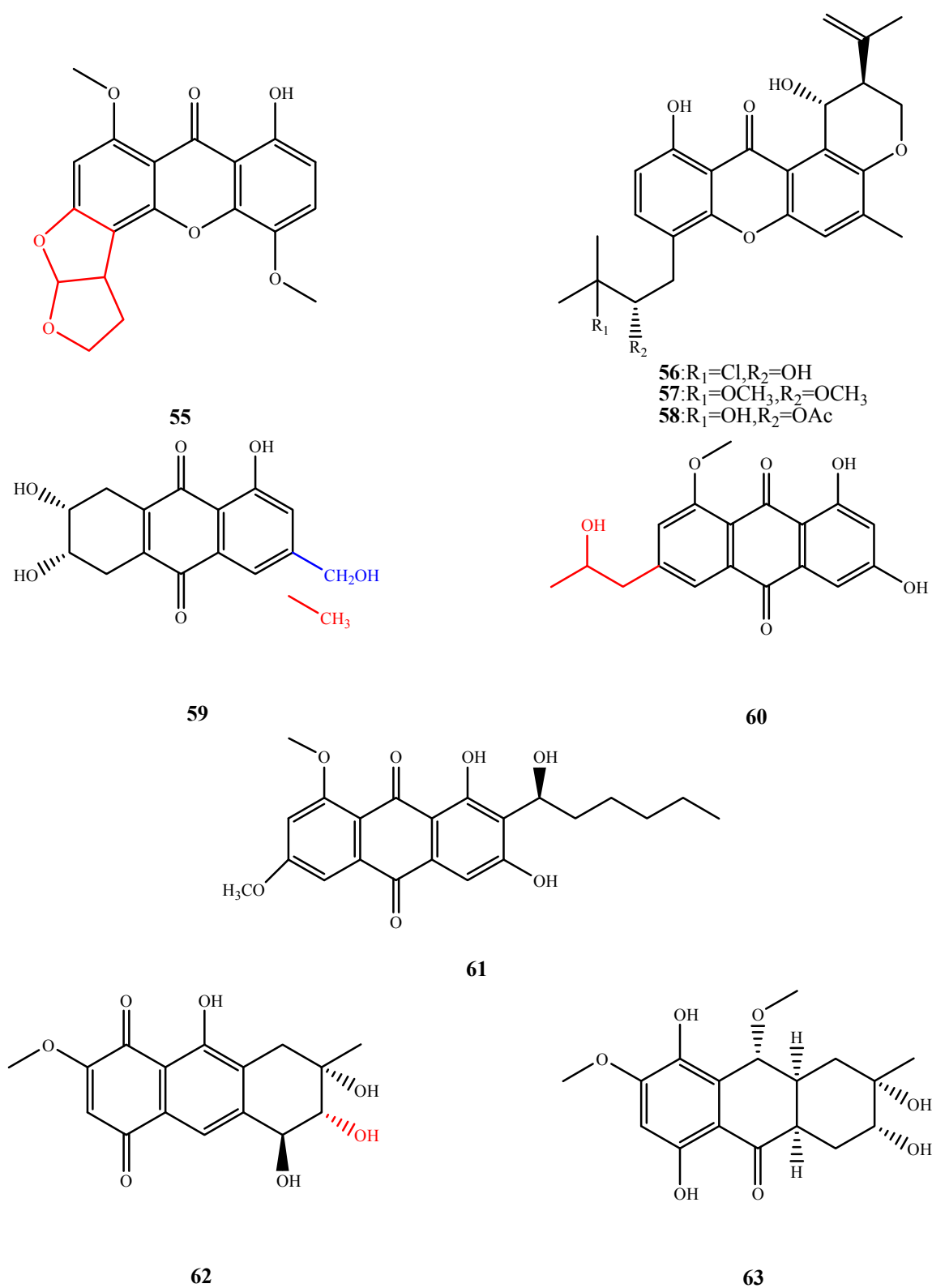
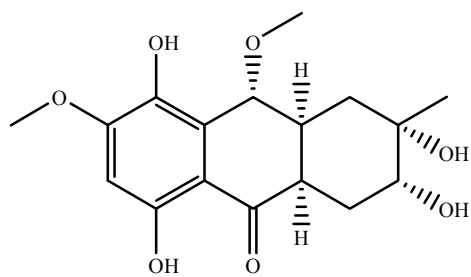
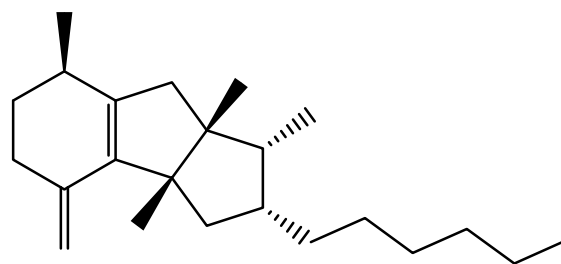


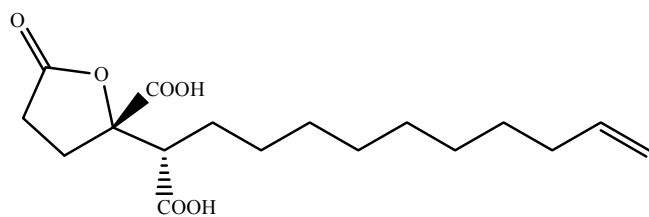
Figure S1. Cont.



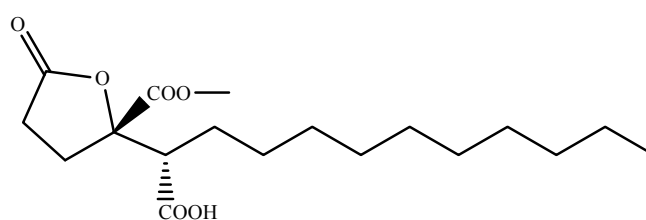
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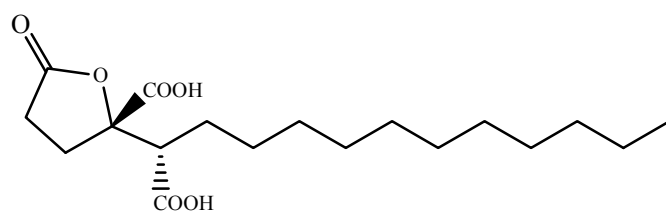
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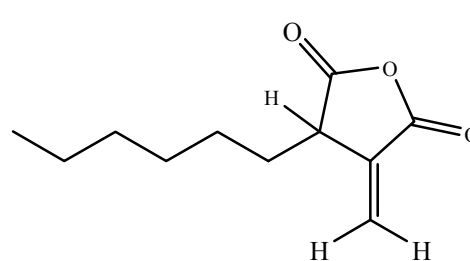
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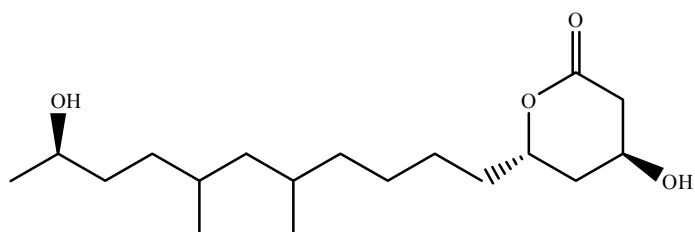
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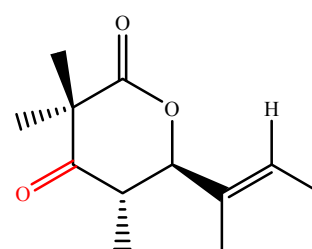
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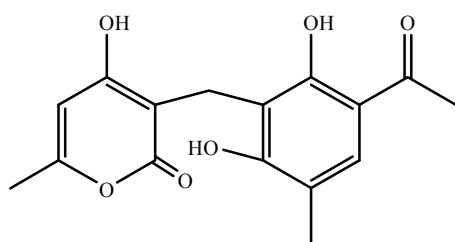
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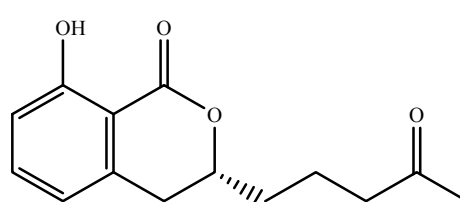
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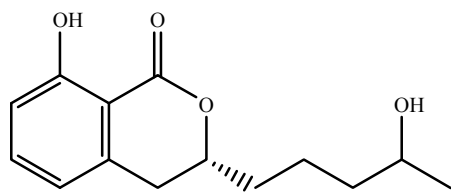


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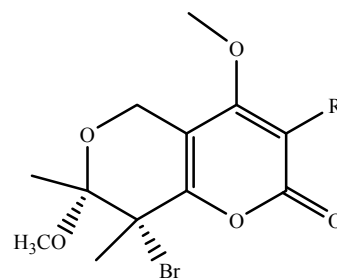


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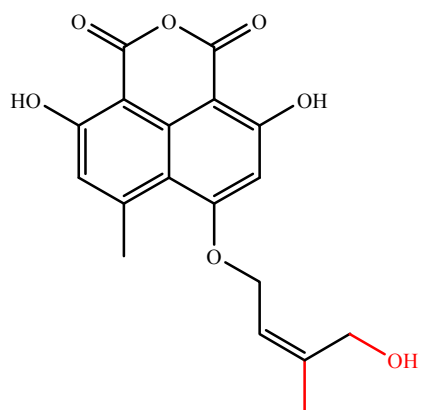
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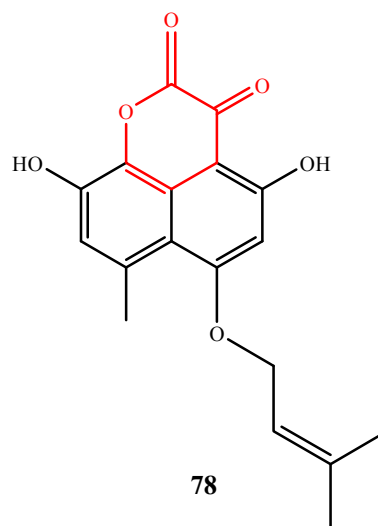
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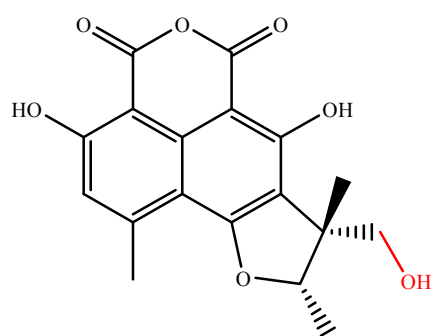
75:R=H 76:R=Br



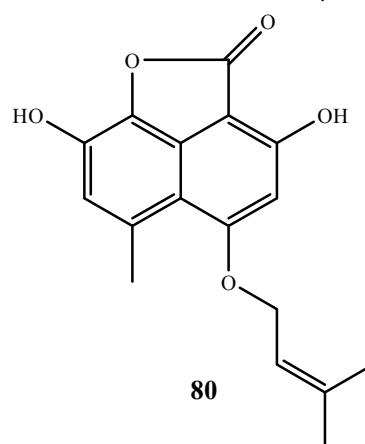
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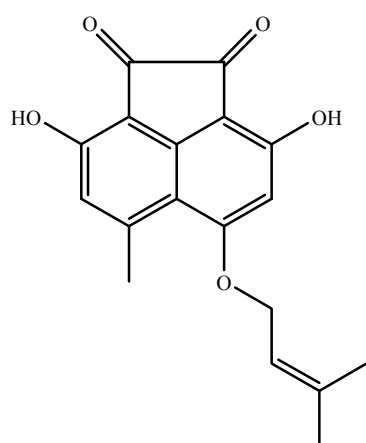
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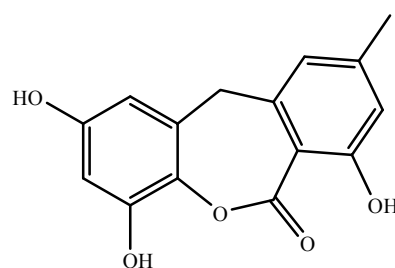
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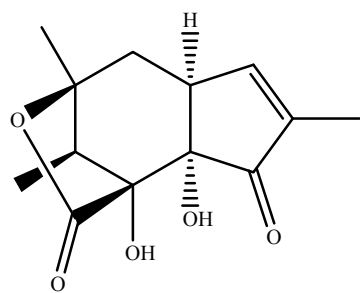


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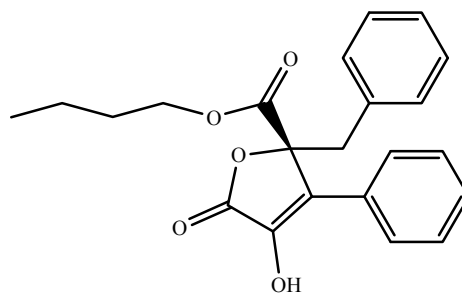


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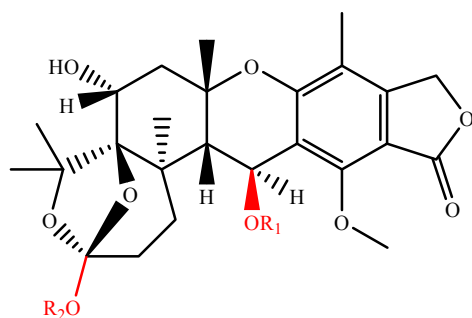
Figure S1. Cont.



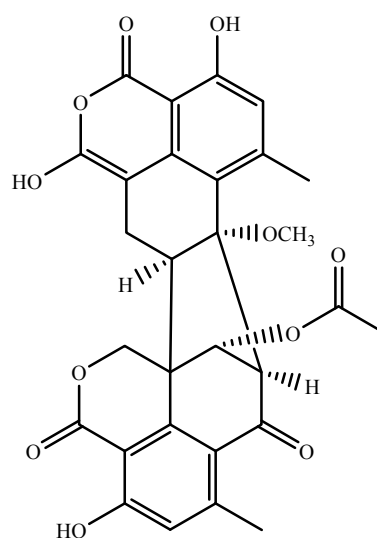
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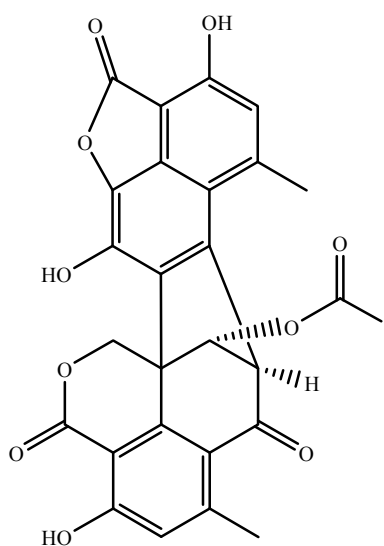
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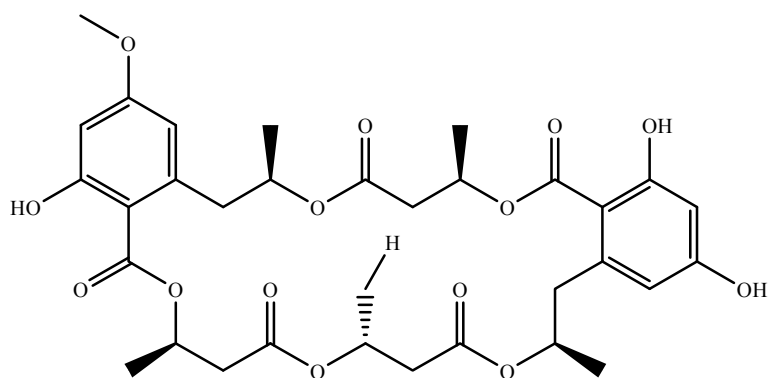
85: $R_1=H, R_2=H$
86: $R_1=R_2=Me$
87: $R_1=Ac, R_2=Me$



88

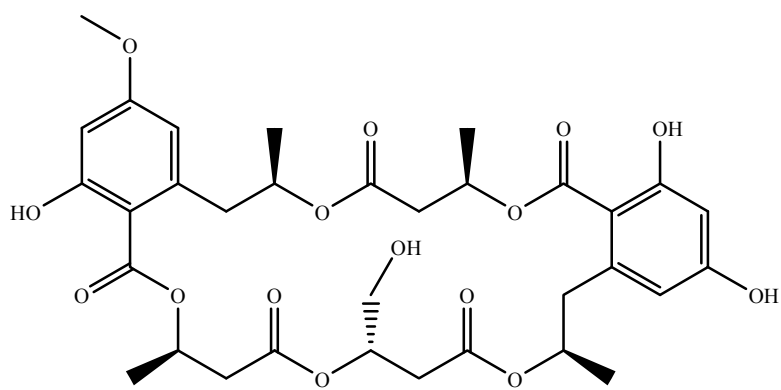


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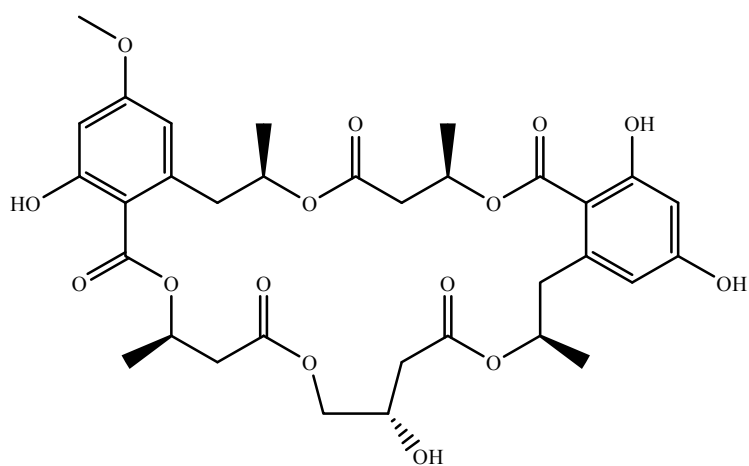


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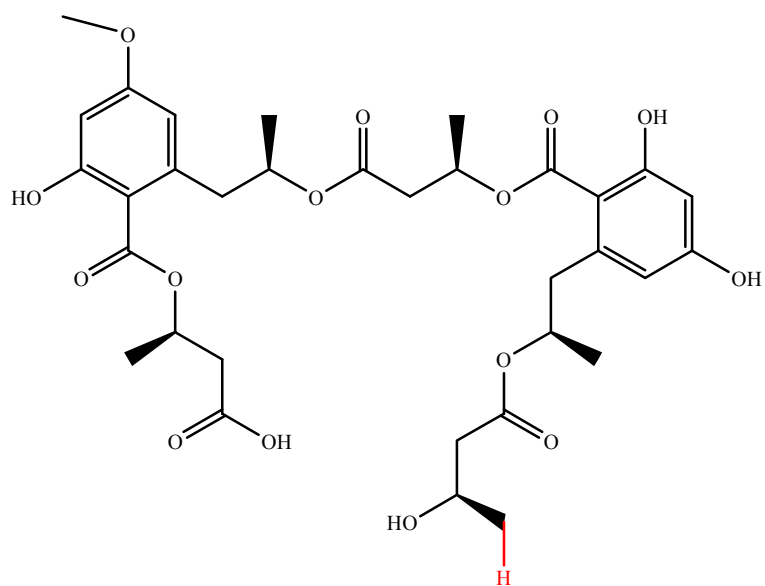
Figure S1. Cont.



91

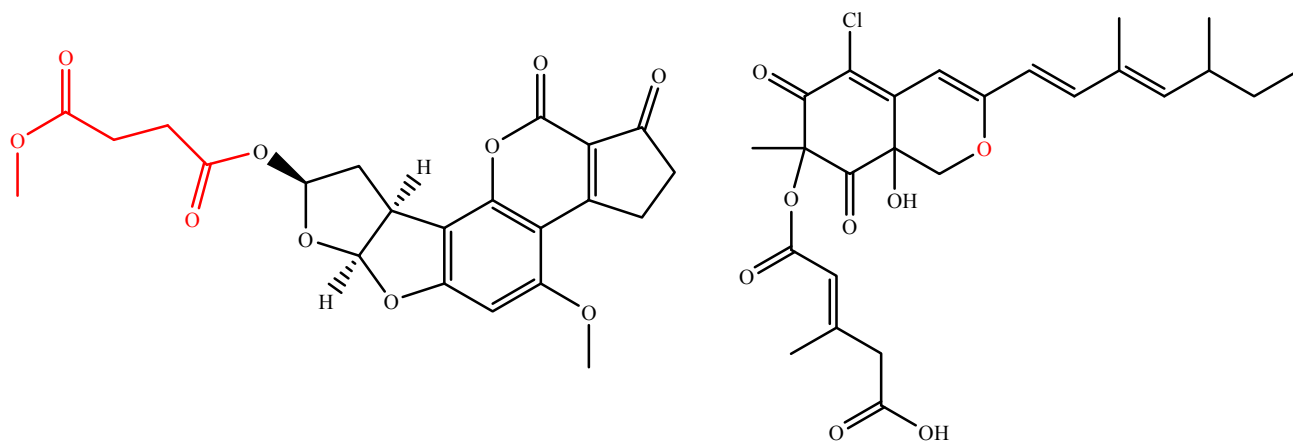


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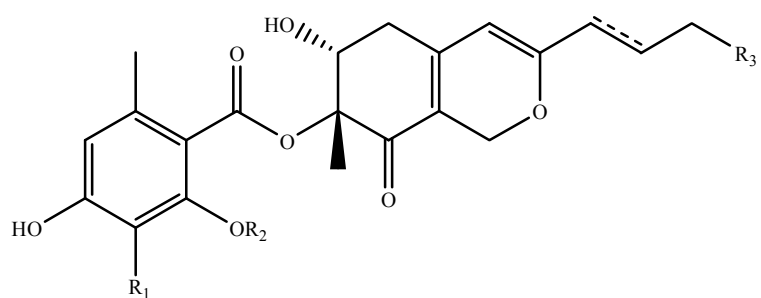
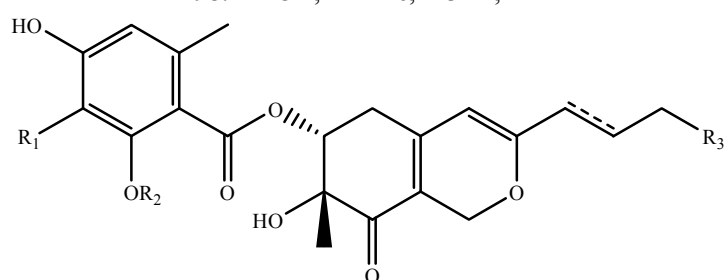
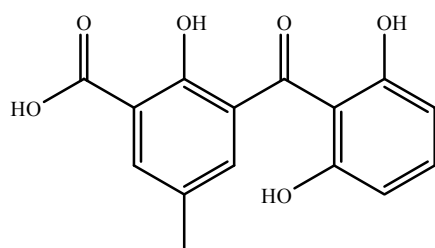
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Figure S1. Cont.

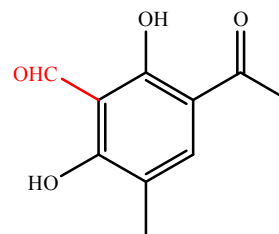


94

95

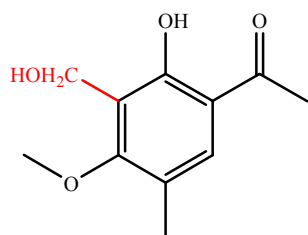
96: R₁=R₃=H, R₂=Me97: R₁=OH, R₂=Me, R₃=H98: R₁=OH, R₂=Me, R₃=H, Δ¹⁰99: R₁=R₂=R₃=H, Δ¹⁰100: R₁=OH, R₂=Me, R₃=H, Δ¹⁰101: R₁=OH, R₂=Me, R₃=H

102

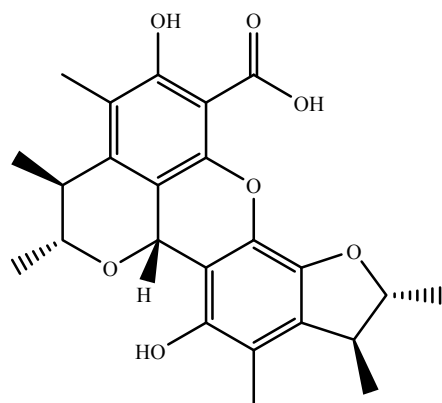


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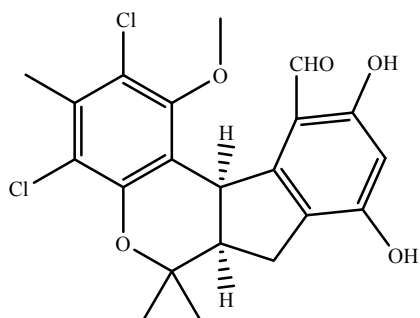
Figure S1. Cont.



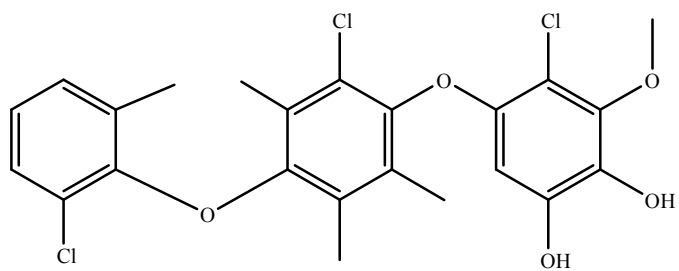
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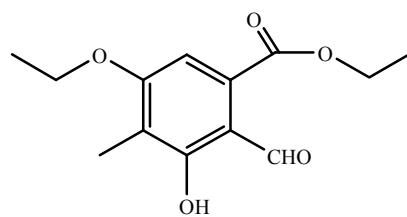
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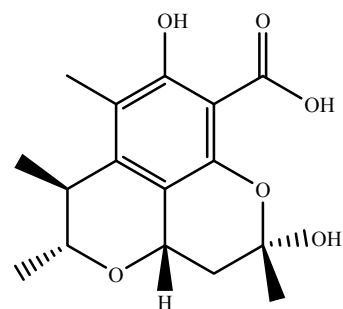
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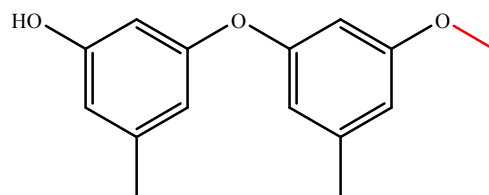
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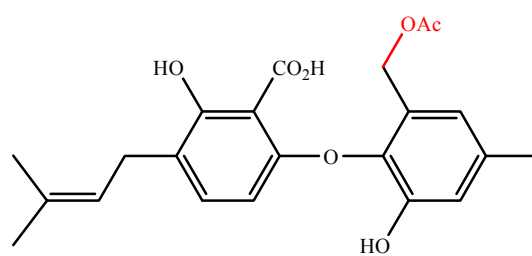
105



107



109



111

Figure S1. Cont.

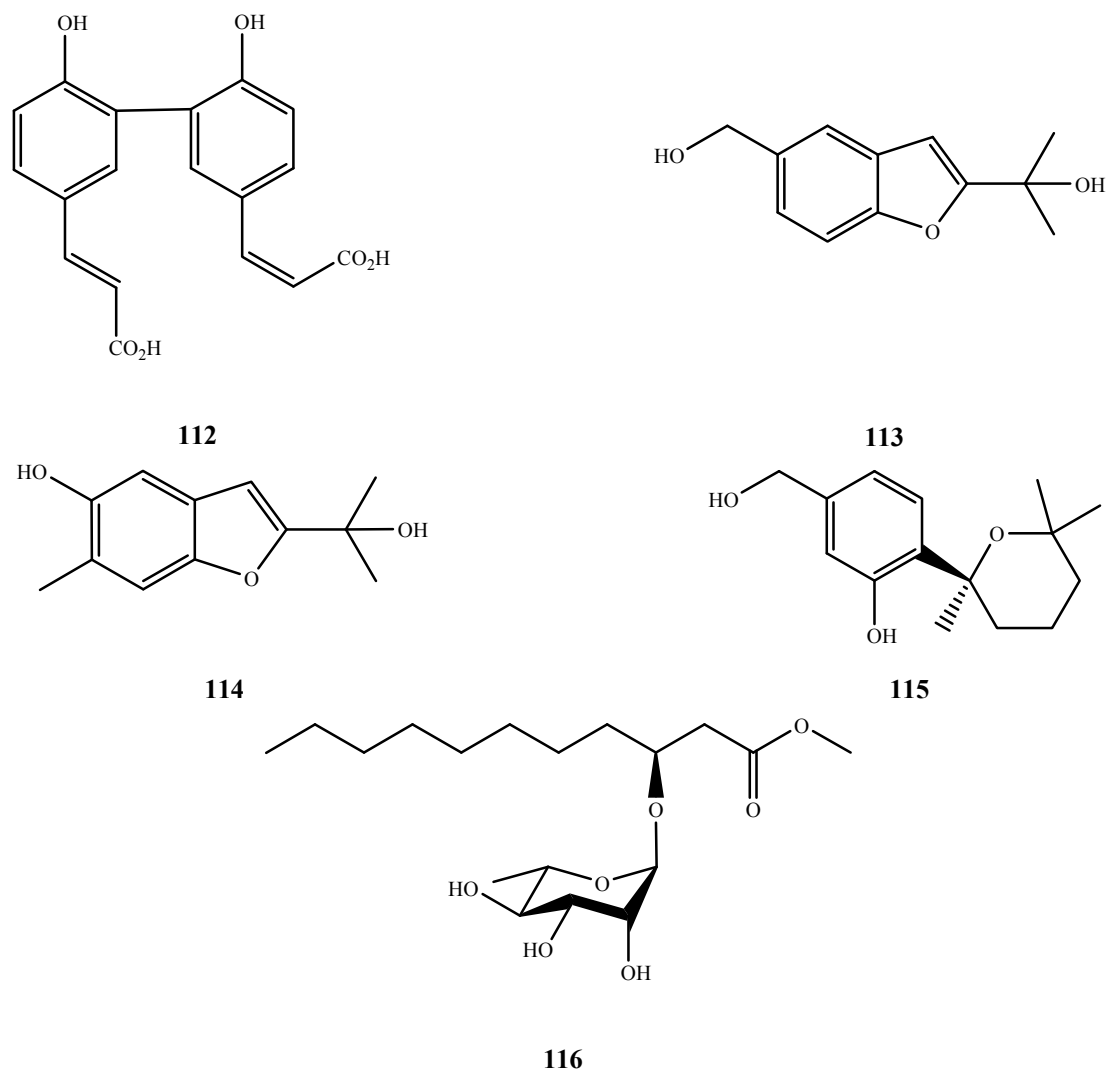
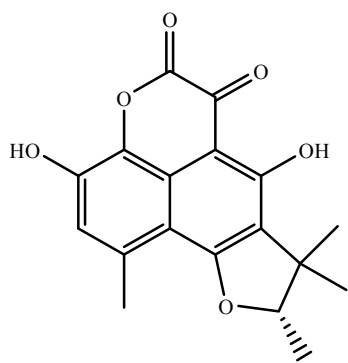
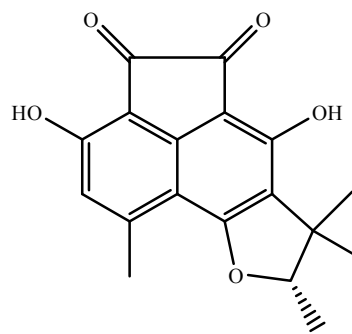


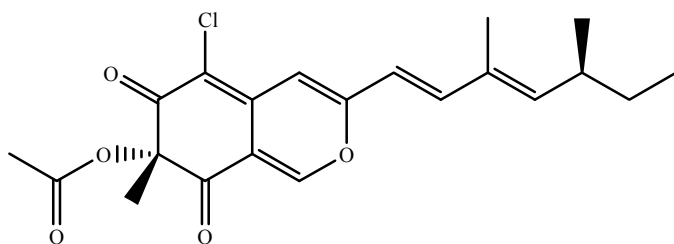
Figure S1. Structures of compound 1–116 (the red moiety of compound enhances the antimicrobial activity of the compound).



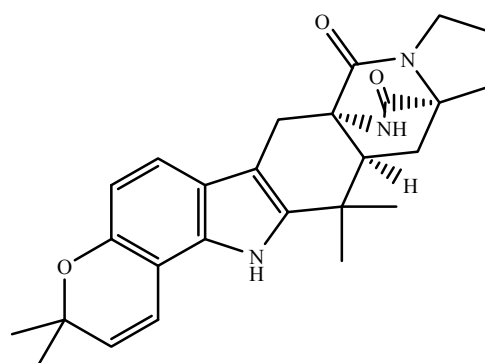
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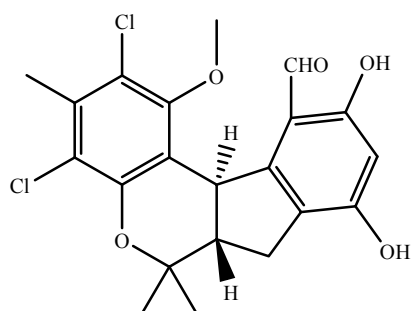
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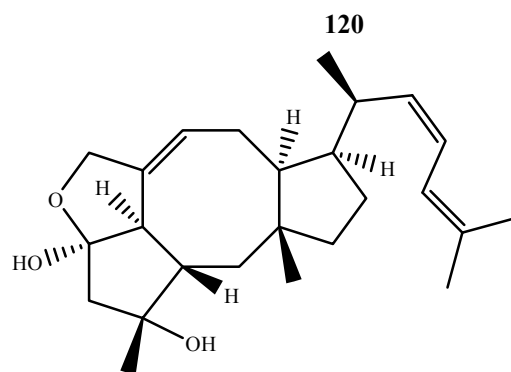
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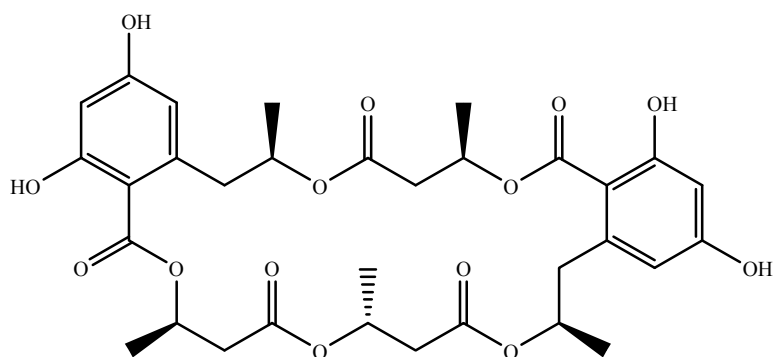
120



121

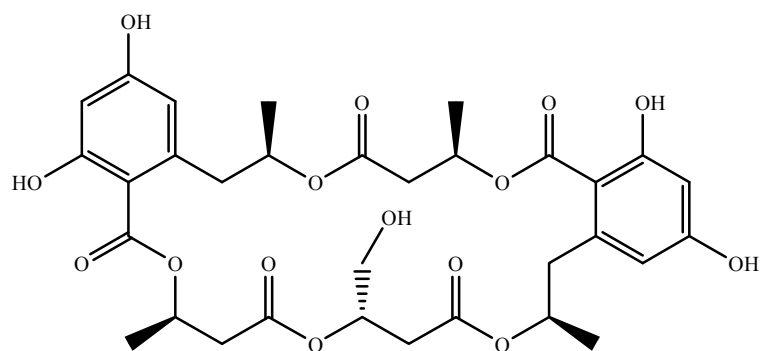


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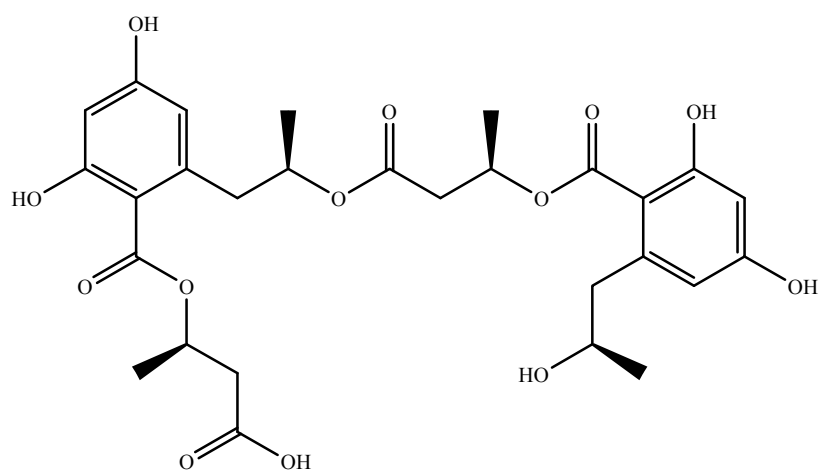


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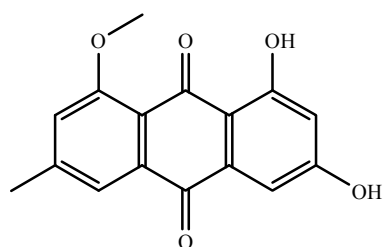
Figure S2. Cont.



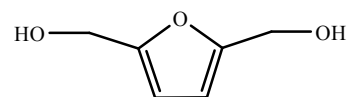
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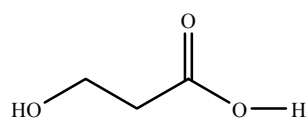
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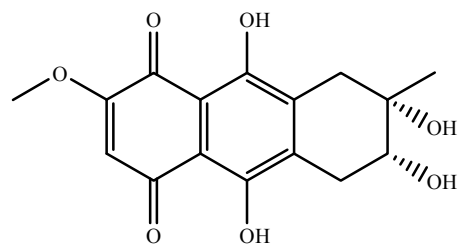
126



127



128



129

Figure S2. Cont.

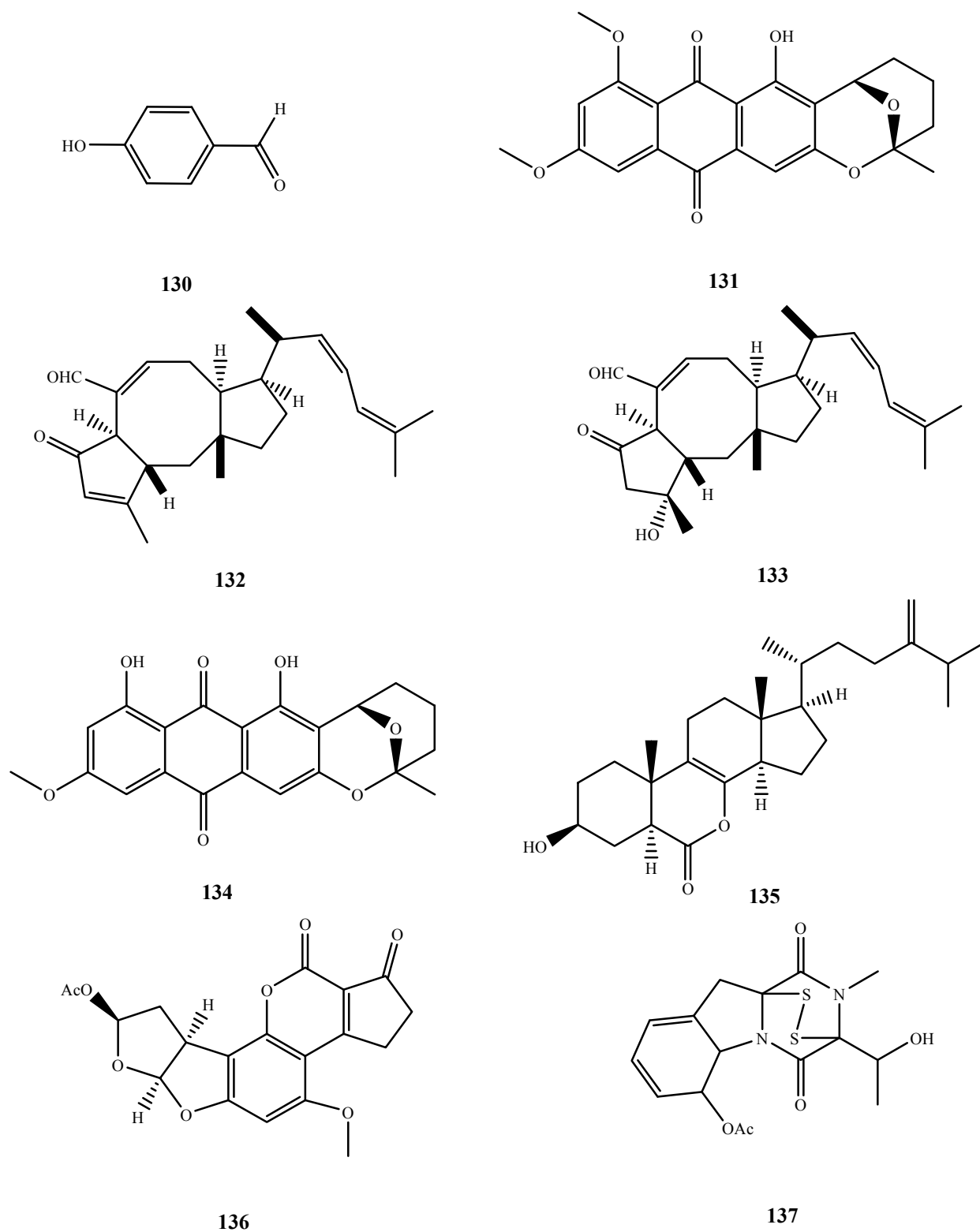
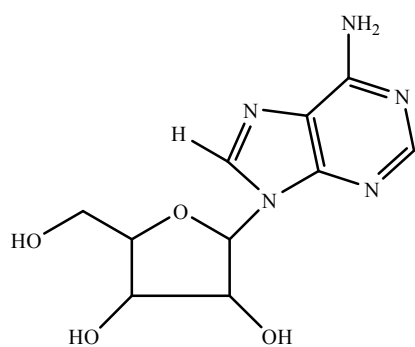
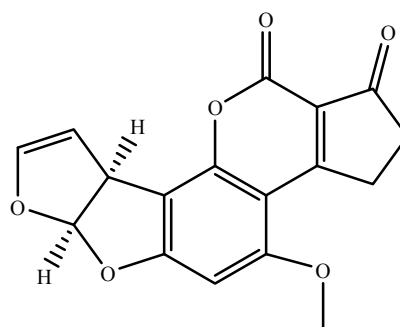


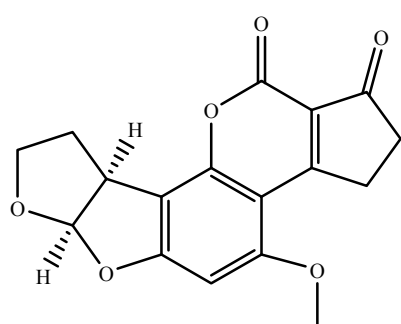
Figure S2. Cont.



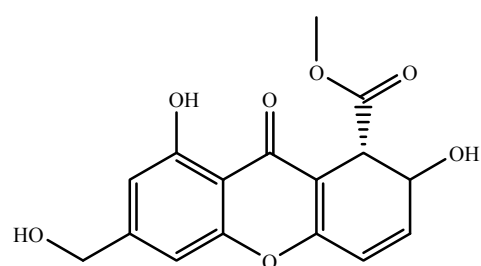
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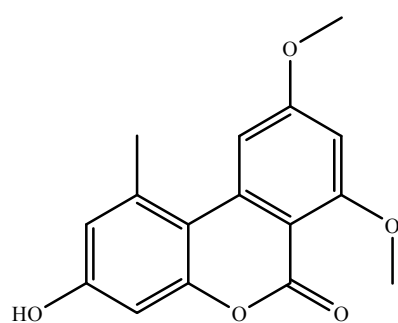
139



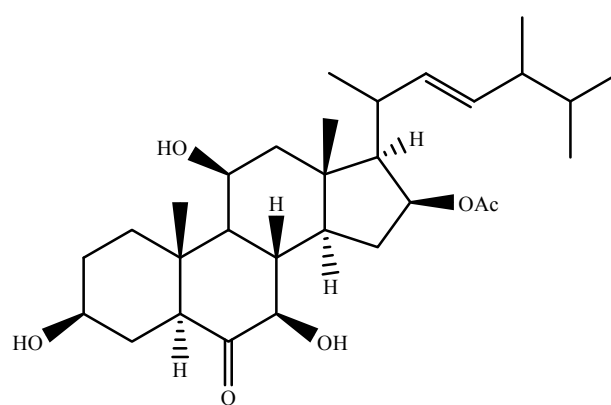
140



141

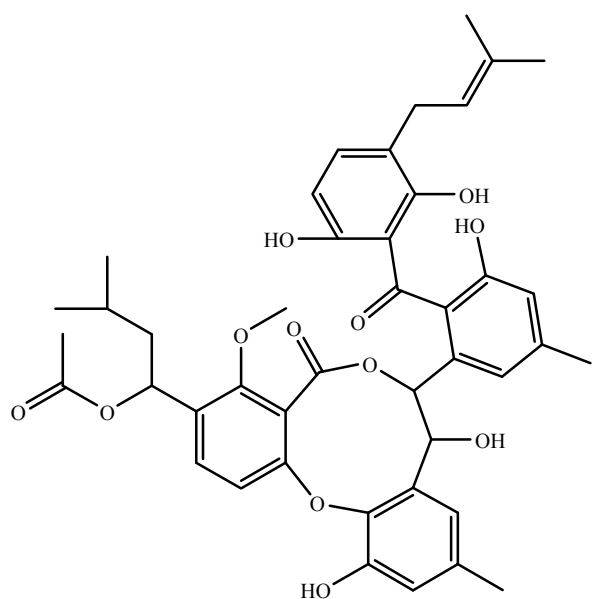


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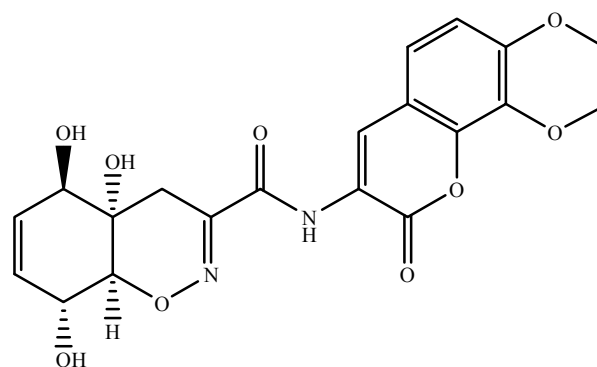


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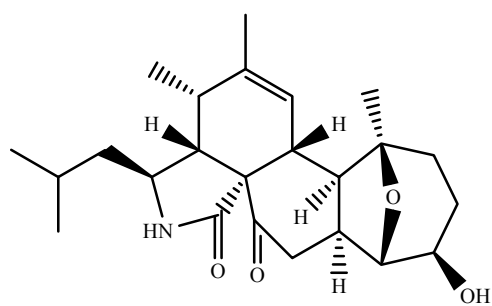
Figure S2. Cont.



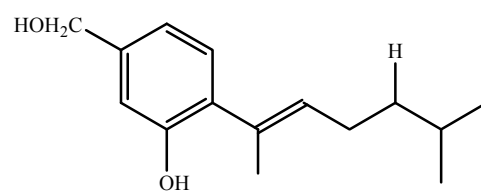
144



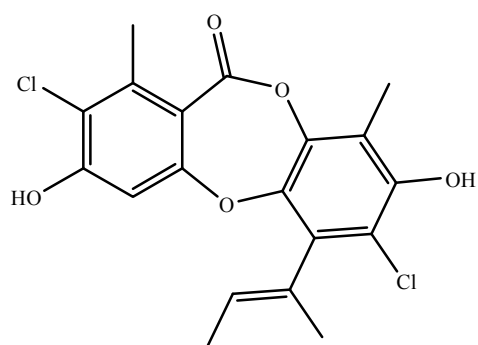
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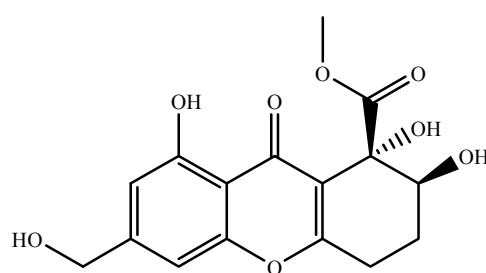
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147

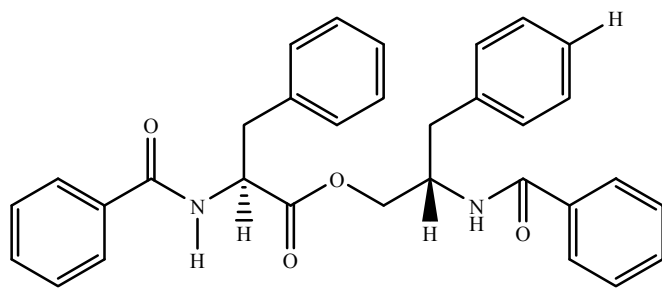


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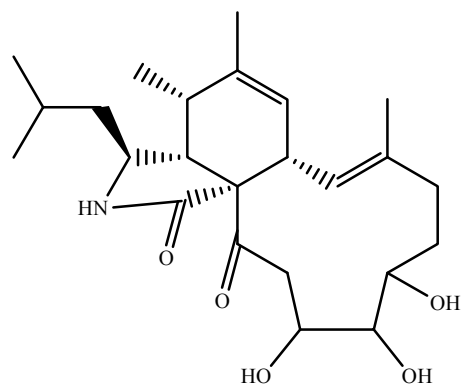


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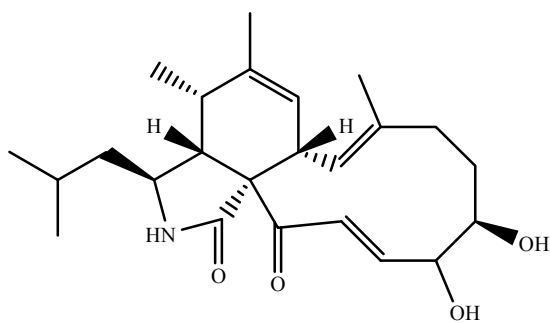
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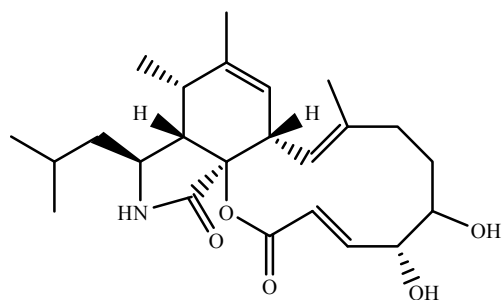
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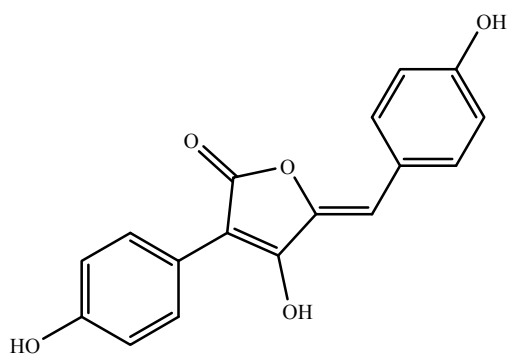
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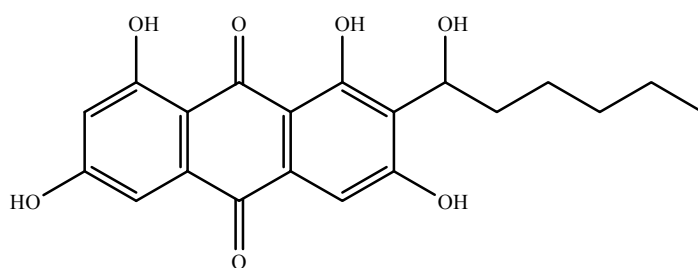
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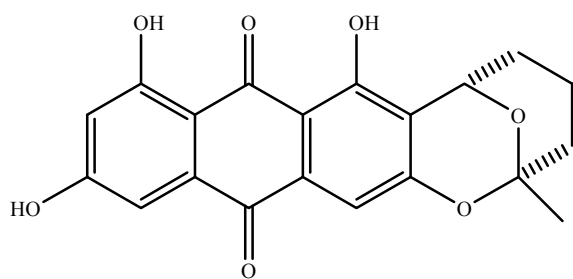
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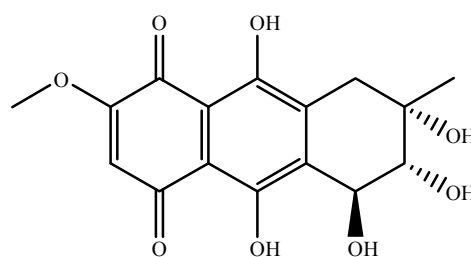
154



155

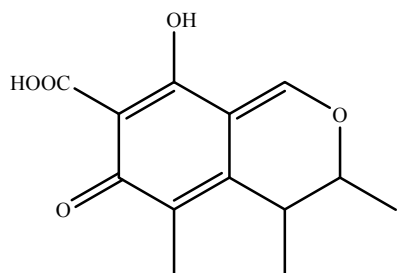


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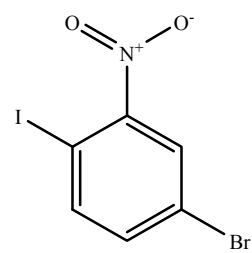


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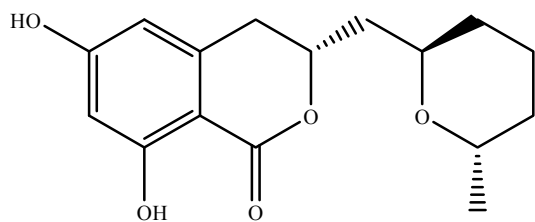
Figure S2. Cont.



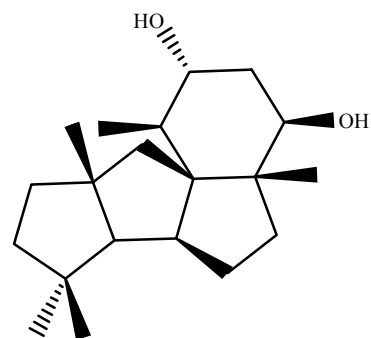
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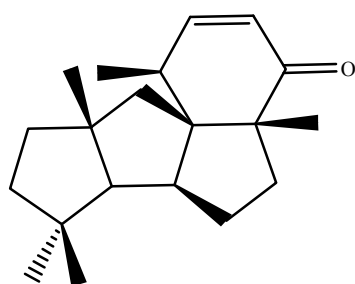
166



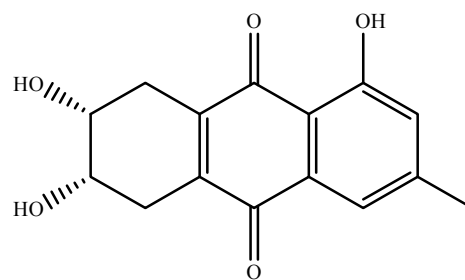
167



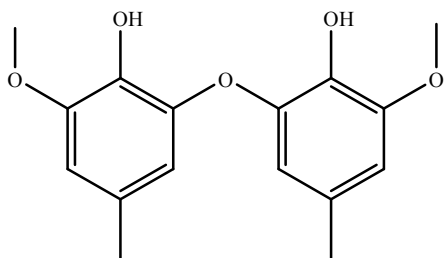
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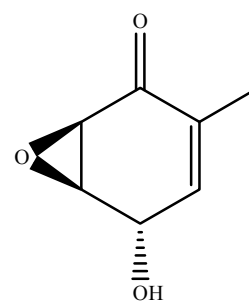
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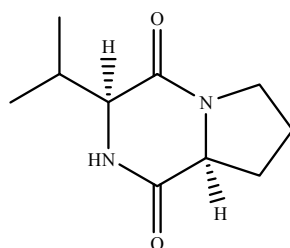
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171

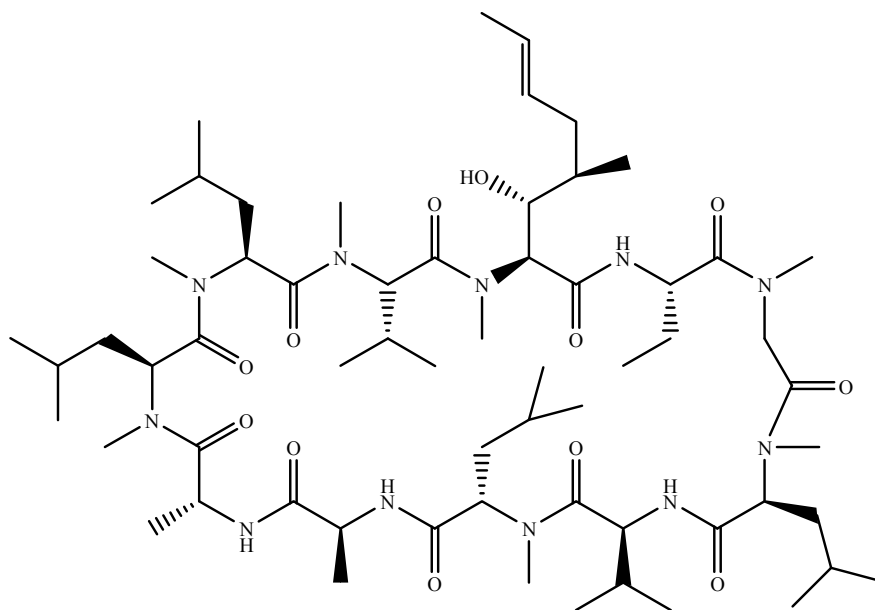


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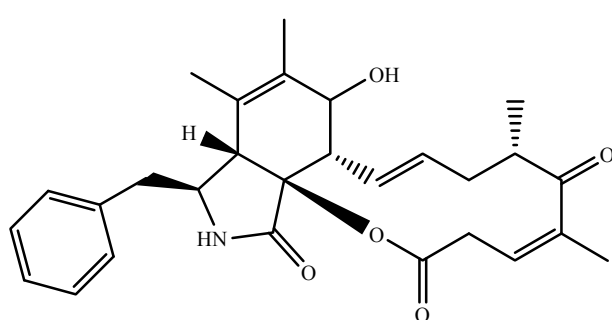


173

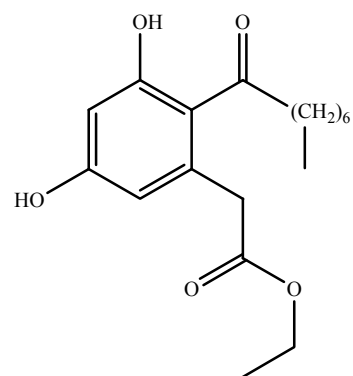
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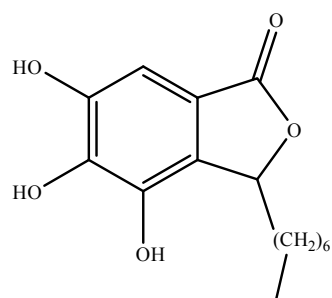
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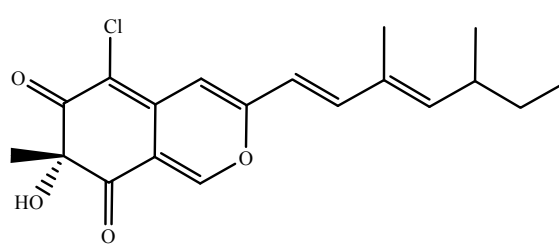
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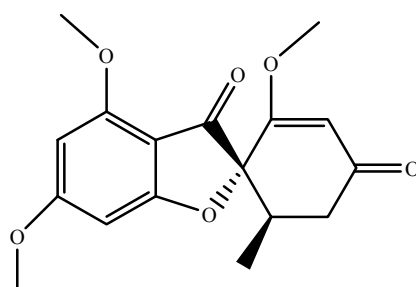
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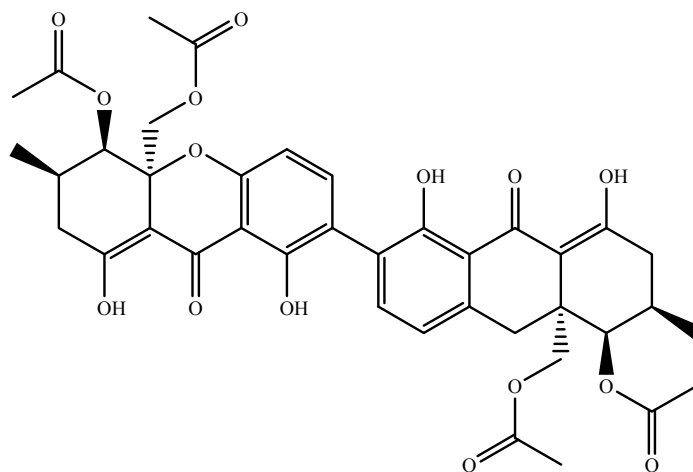


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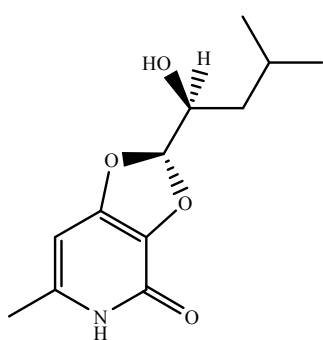


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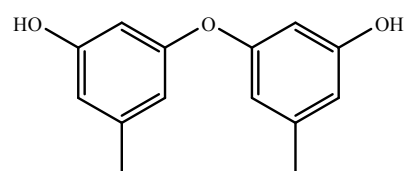
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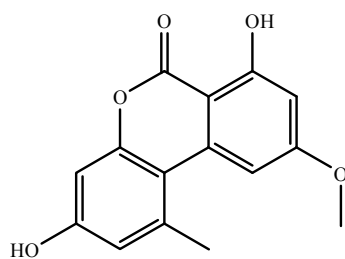
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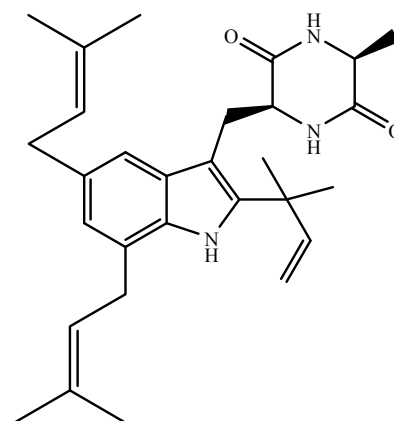
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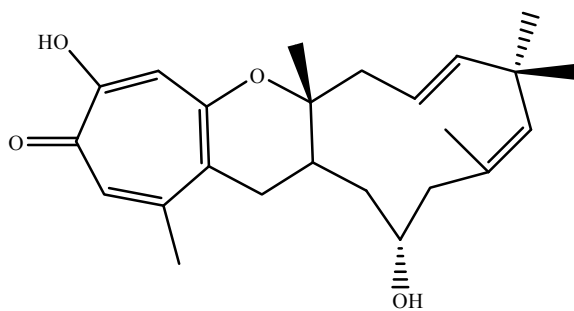
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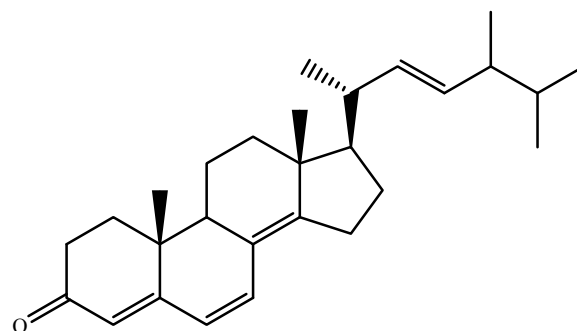
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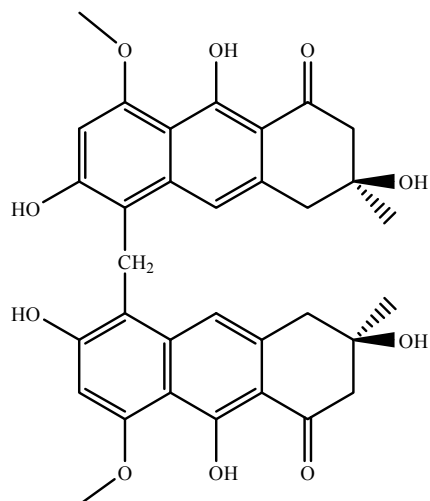


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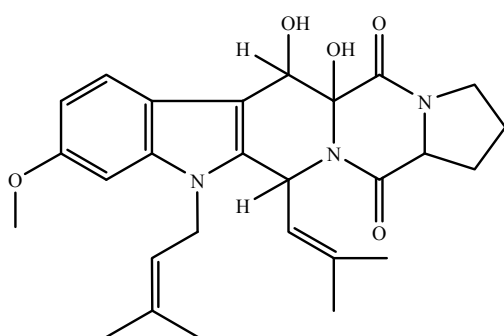


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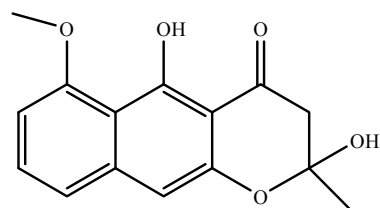
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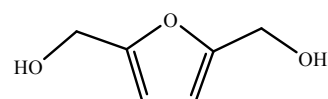
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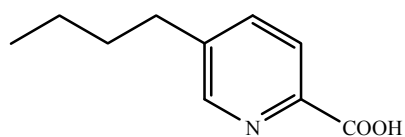
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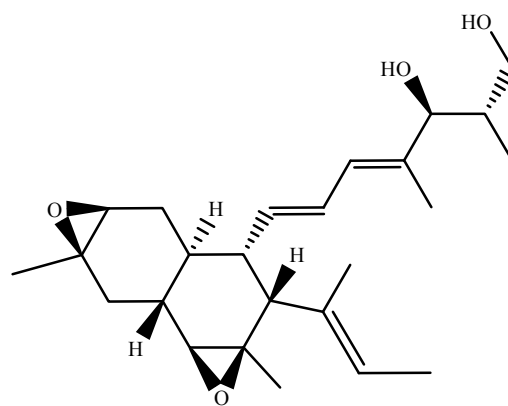
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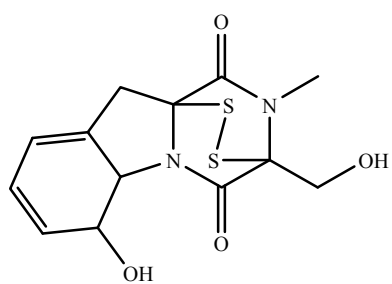
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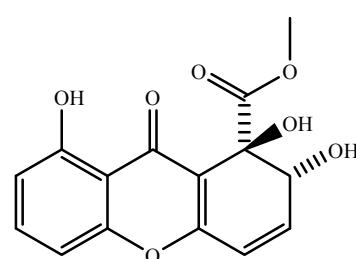
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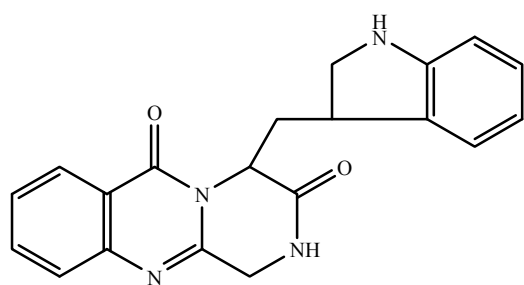


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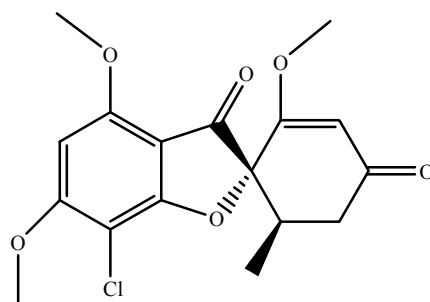


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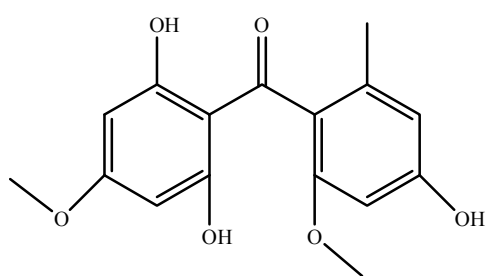
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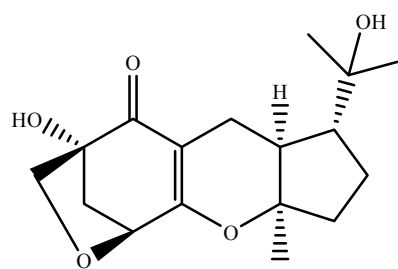
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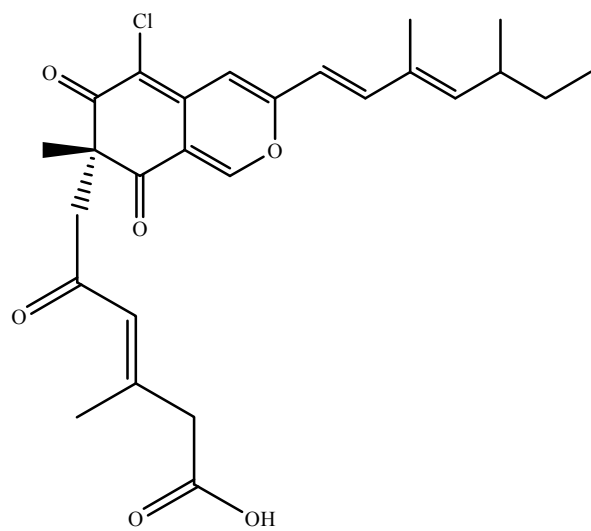
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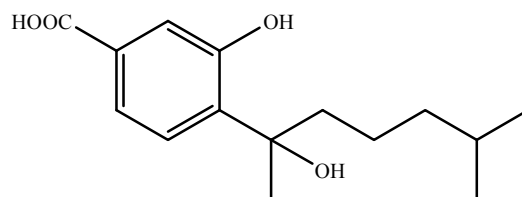
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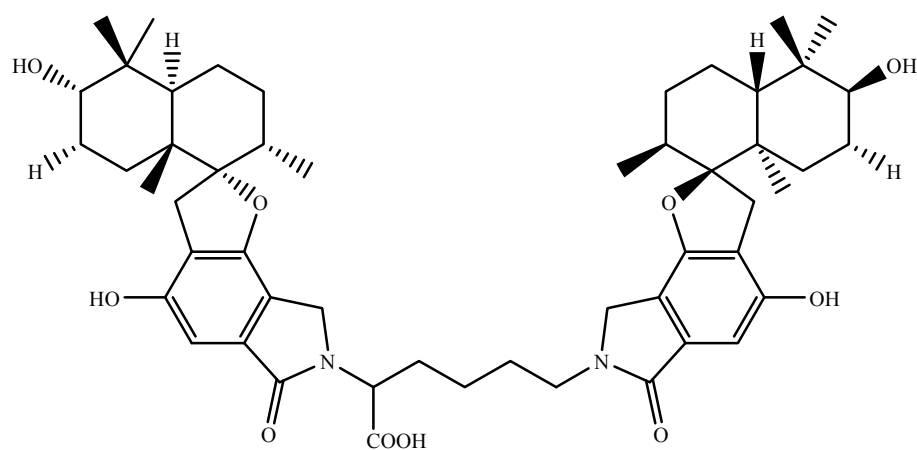


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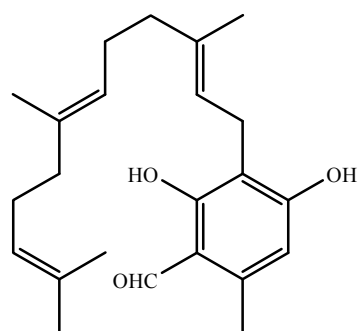


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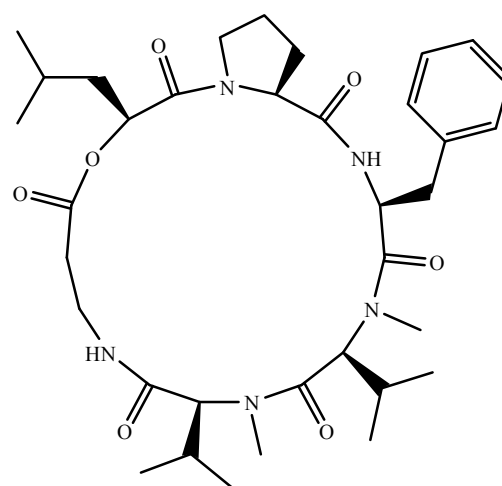
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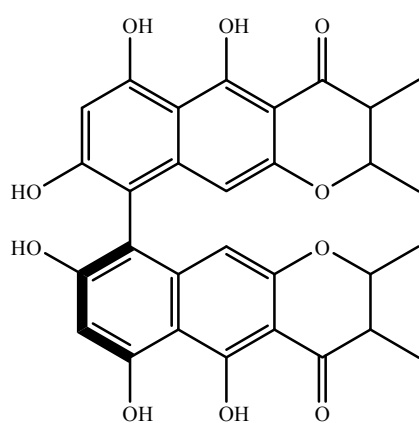
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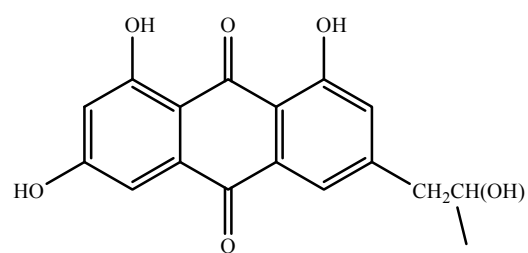
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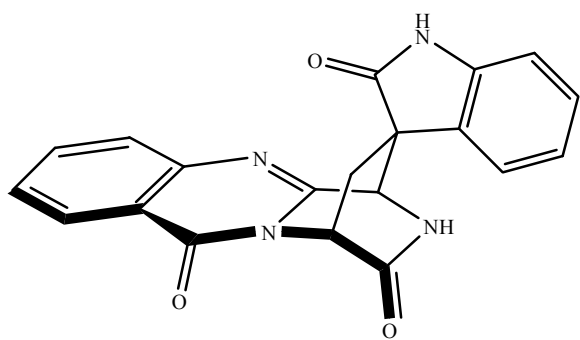


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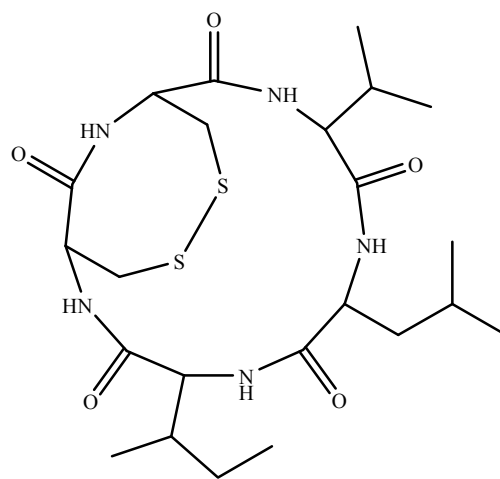


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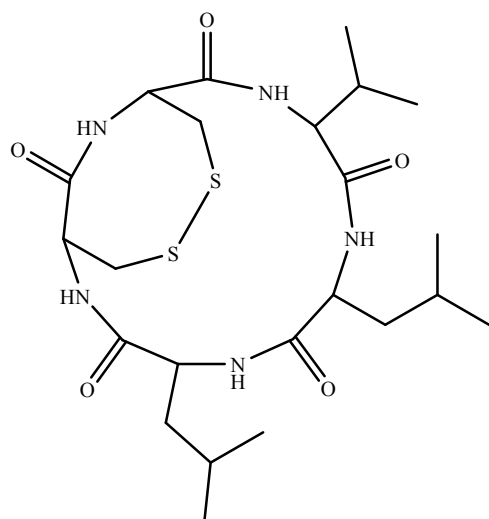
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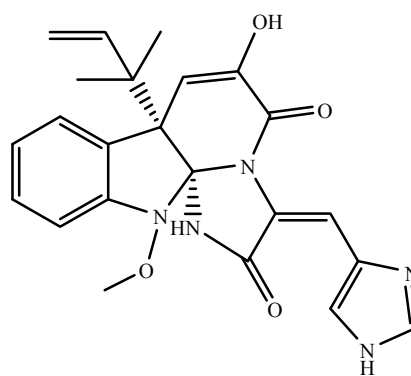
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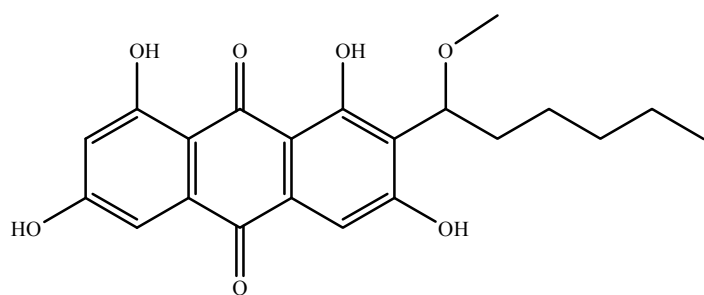
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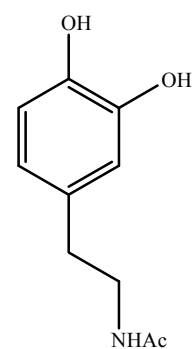
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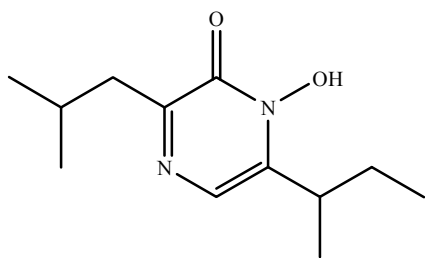


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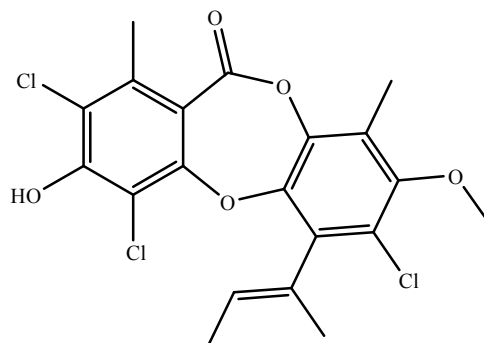


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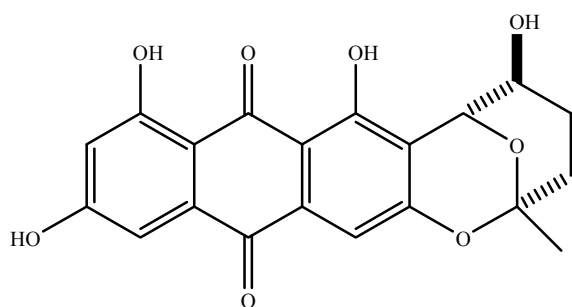
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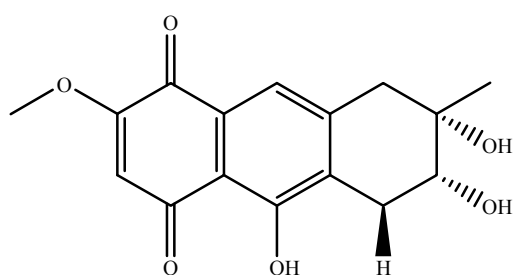
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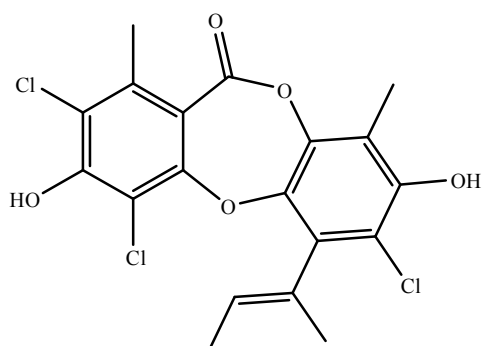
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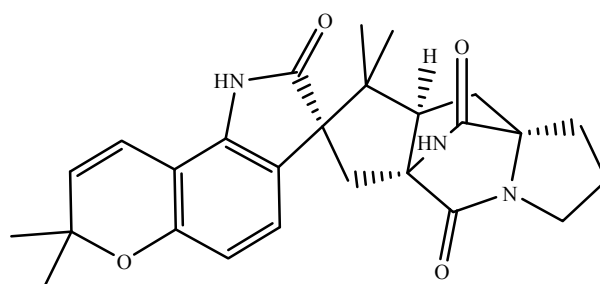
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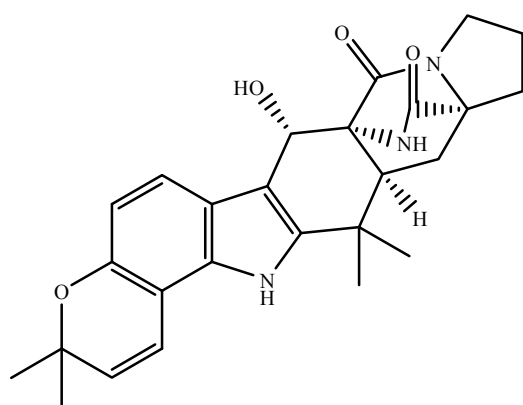
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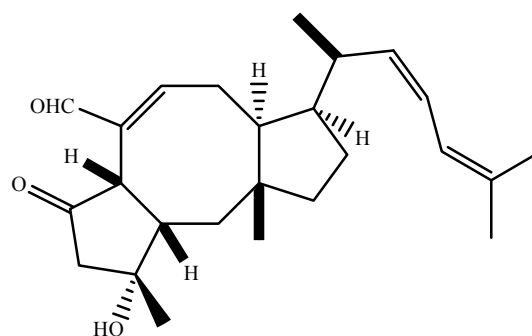
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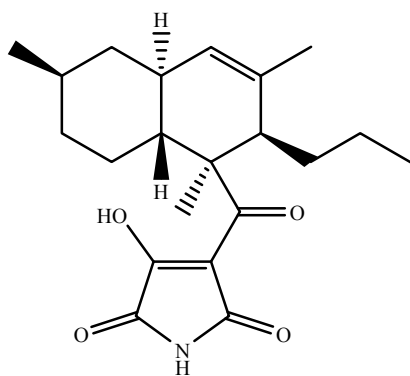


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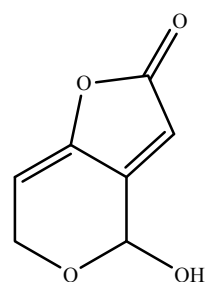


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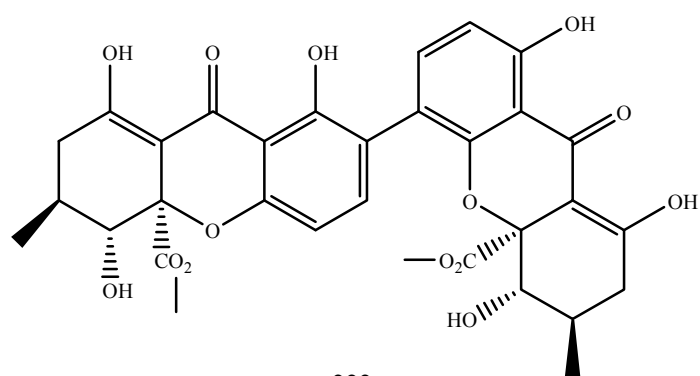
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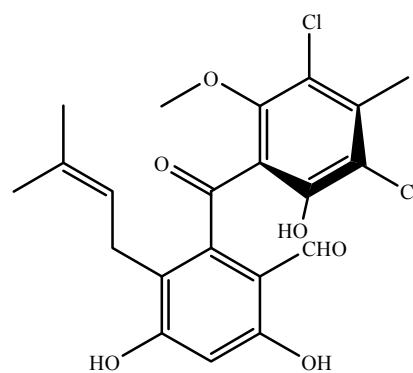
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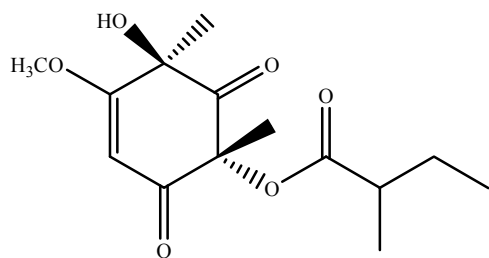
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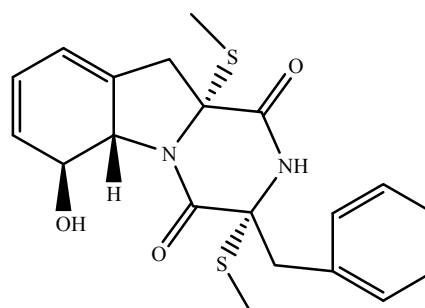
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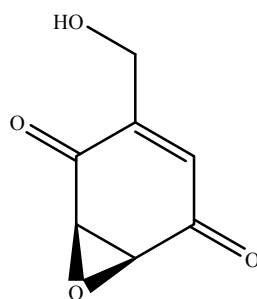
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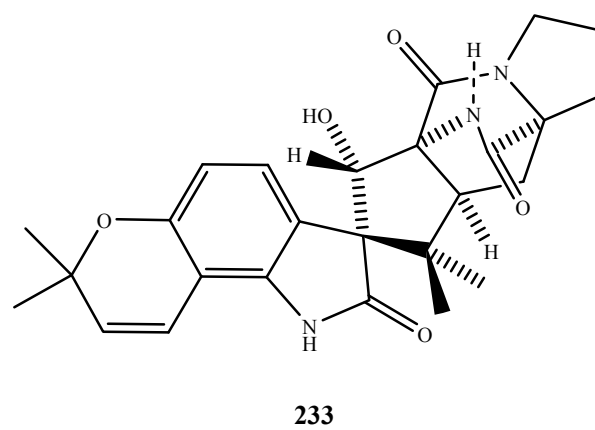
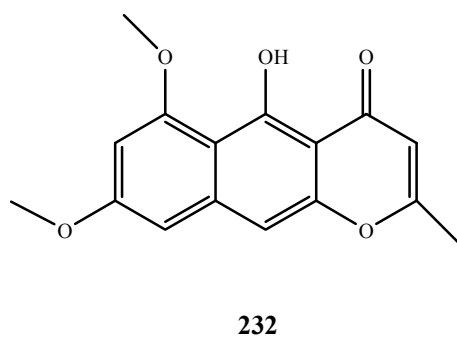
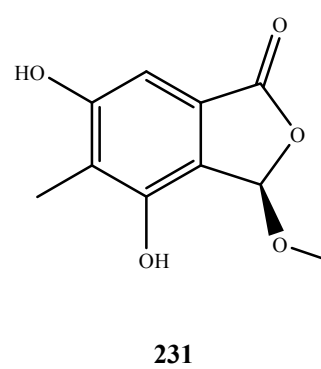
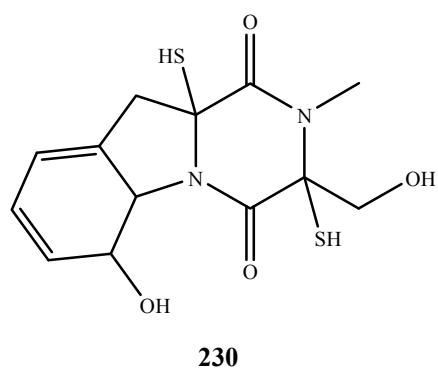
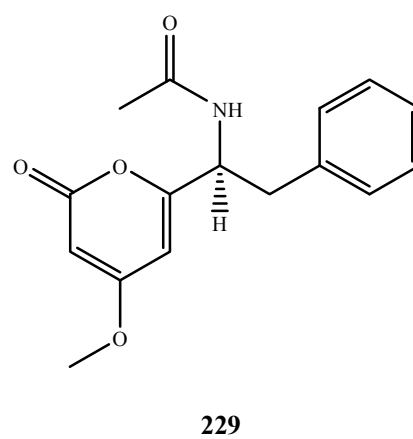
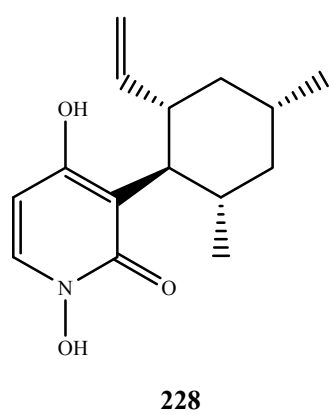
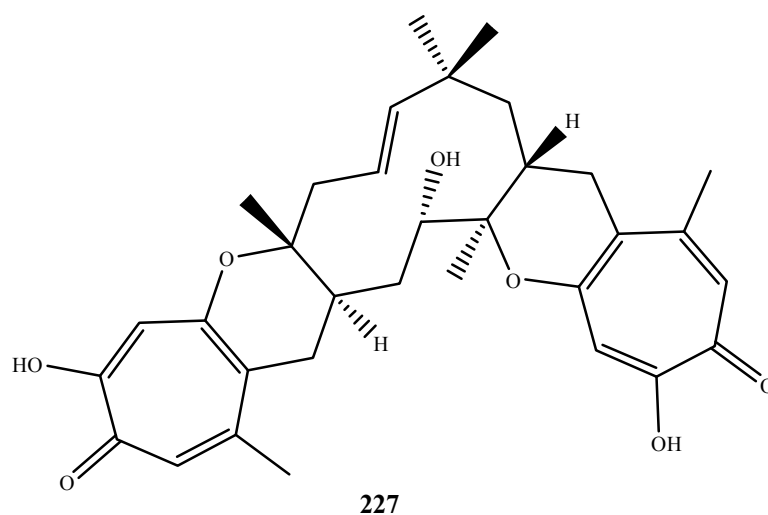


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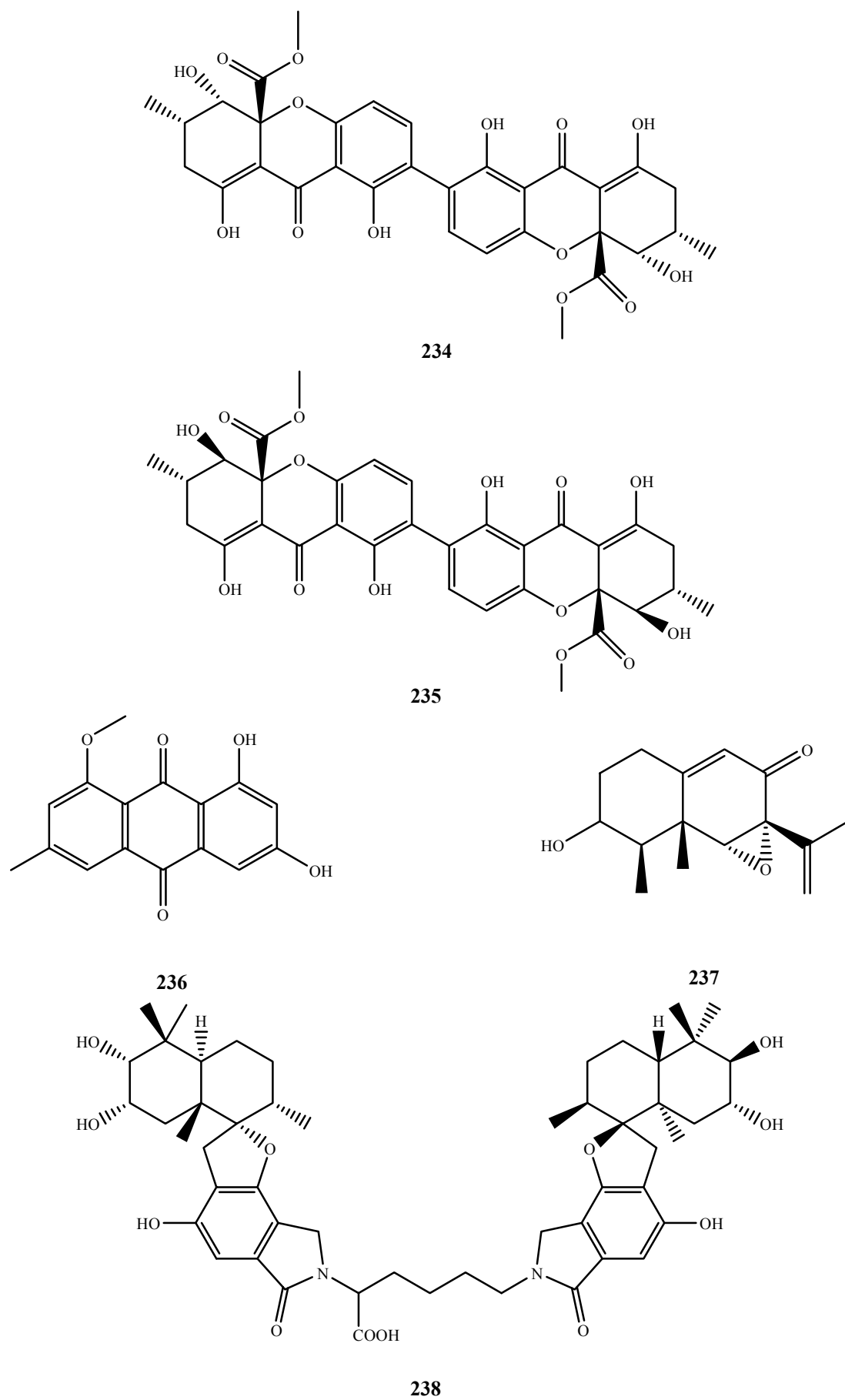
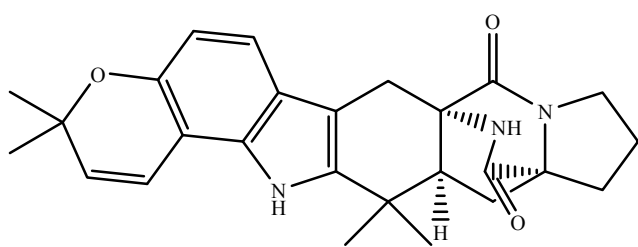
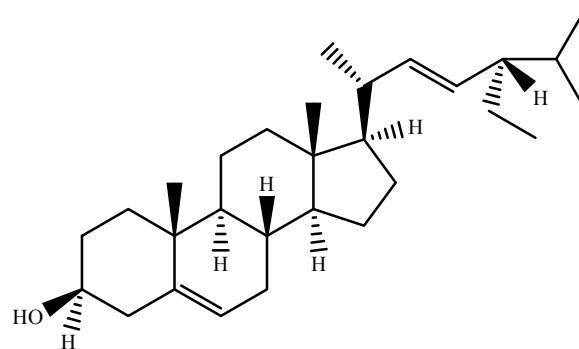


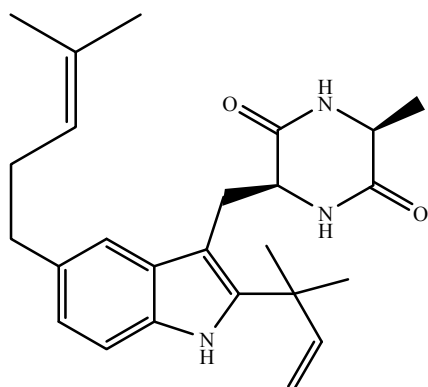
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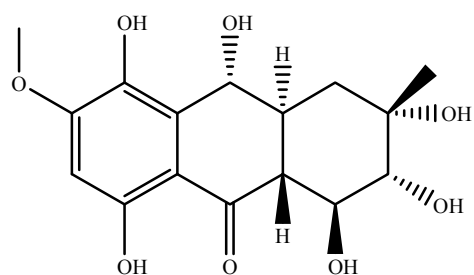
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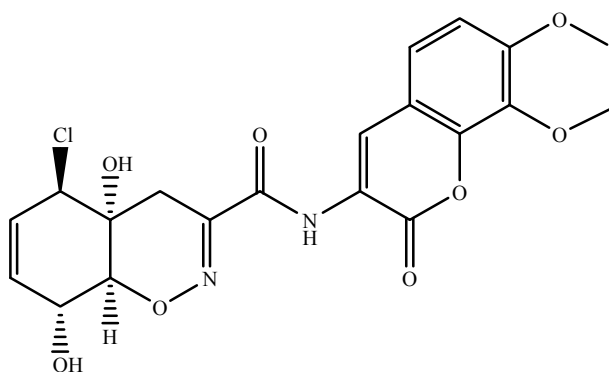
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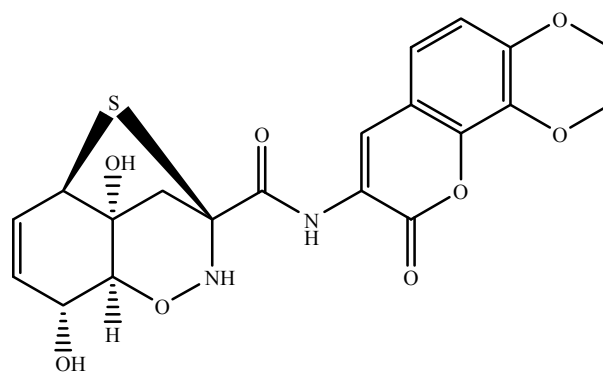
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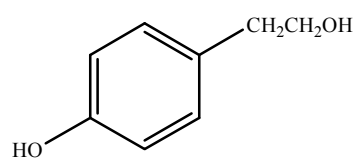
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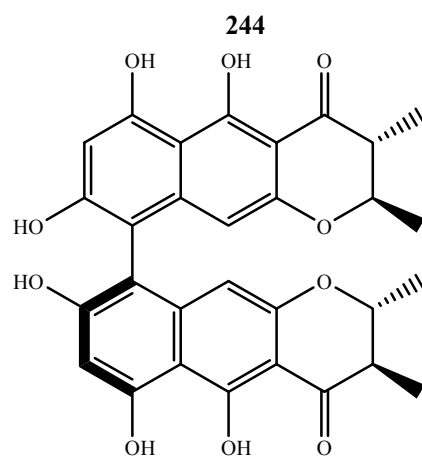
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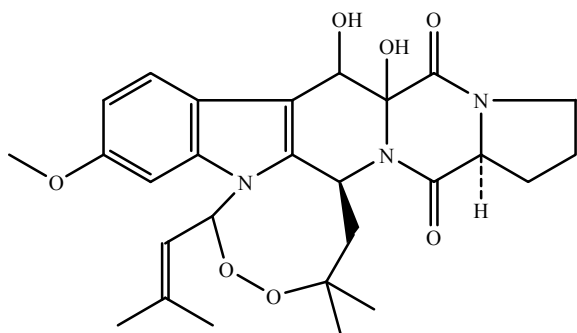


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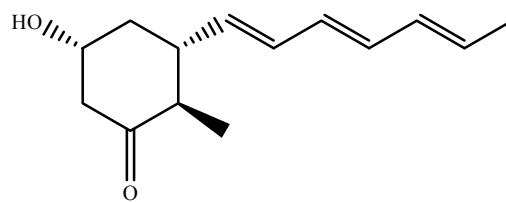


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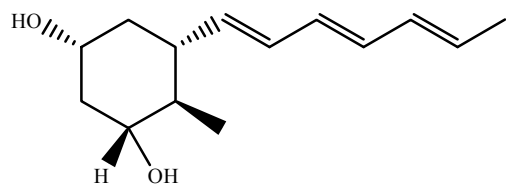
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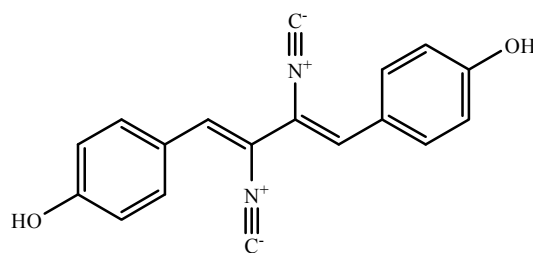
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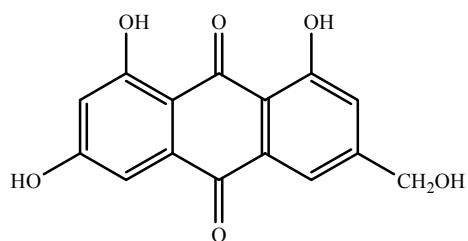
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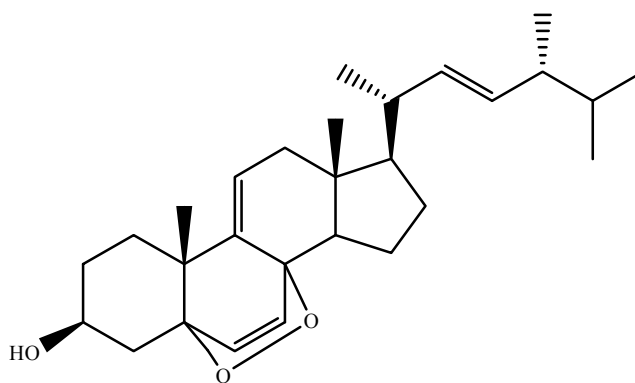
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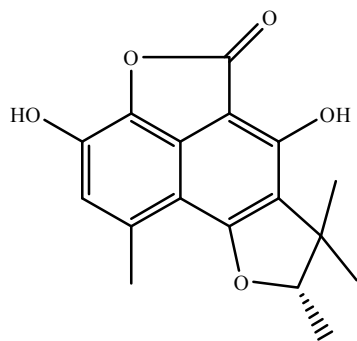
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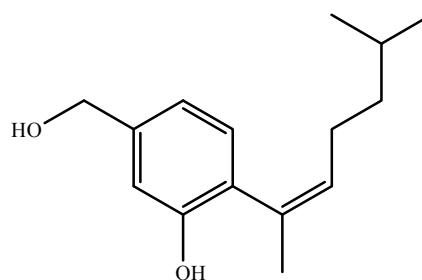
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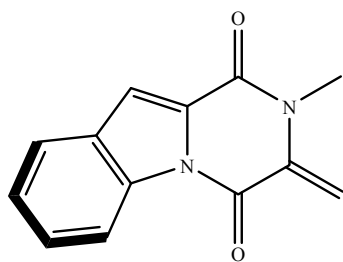


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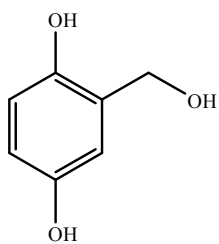


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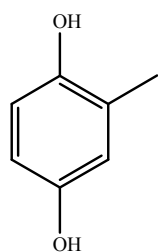
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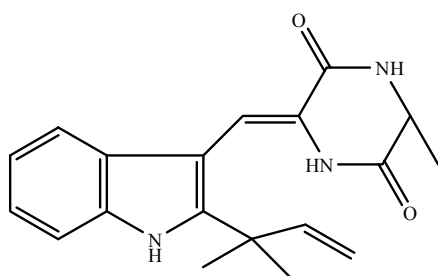
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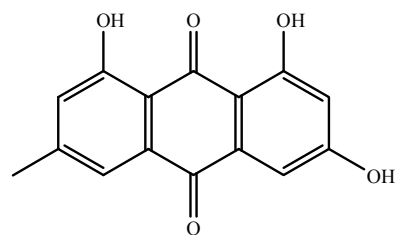
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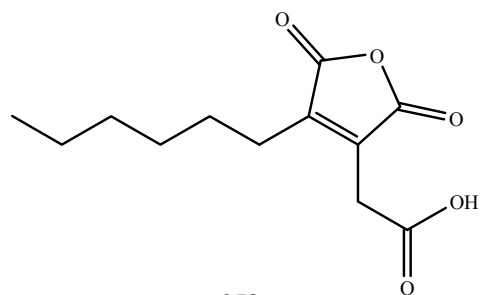
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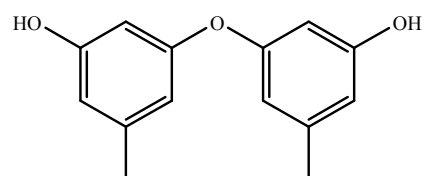
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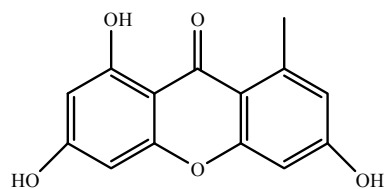
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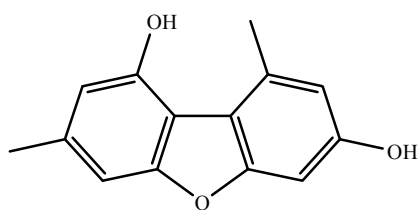
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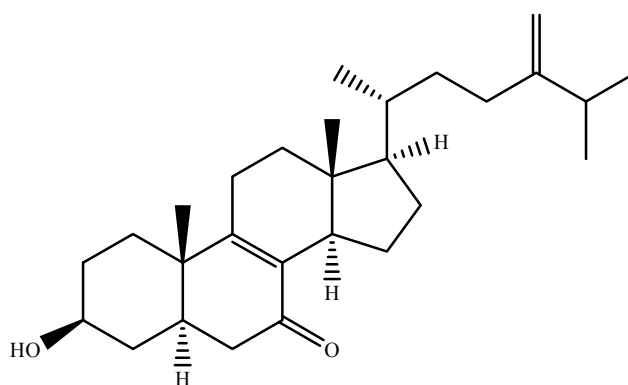
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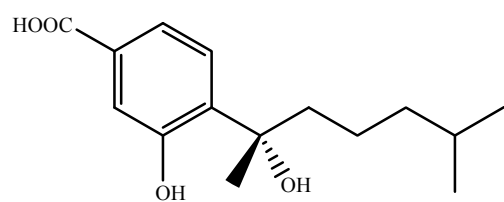


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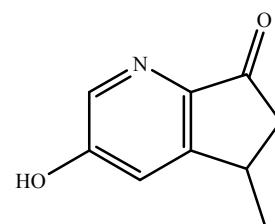


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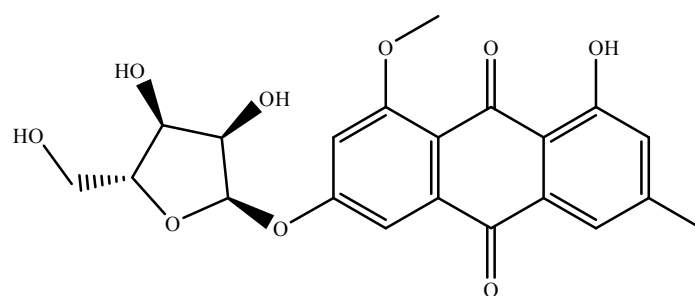
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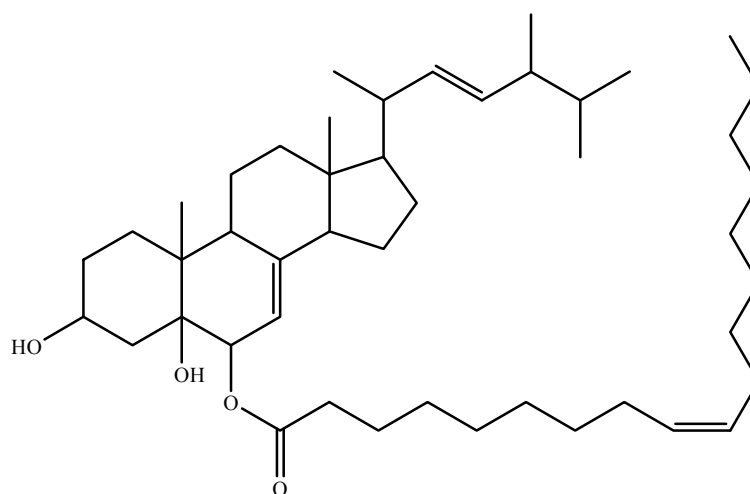
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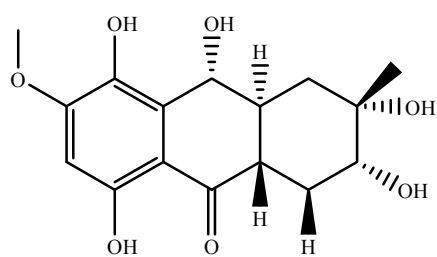
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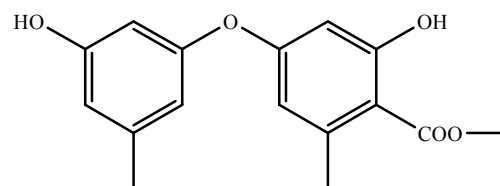
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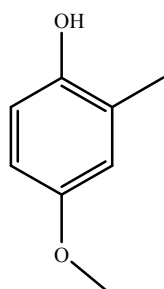


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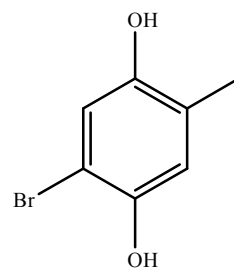


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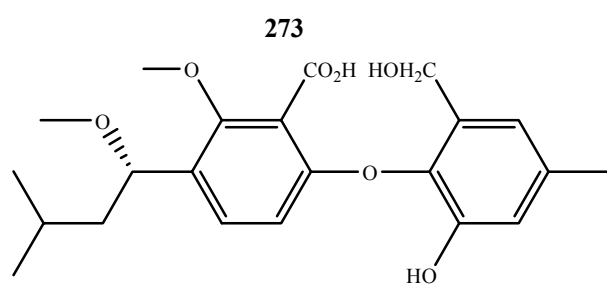
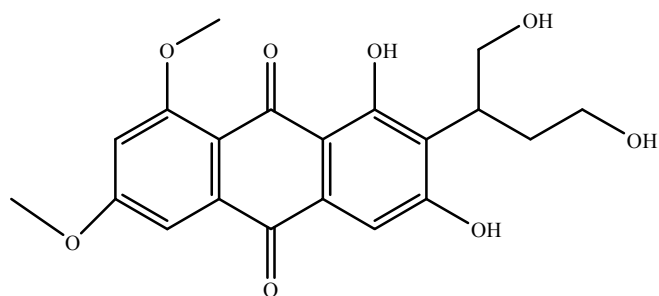
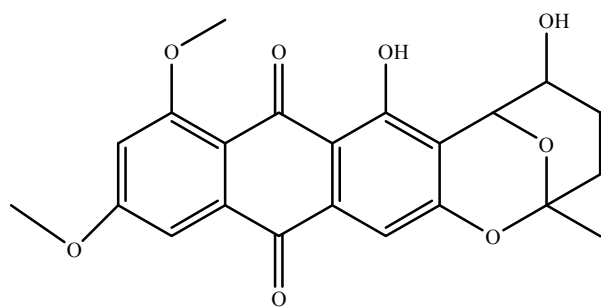
Figure S2. Cont.



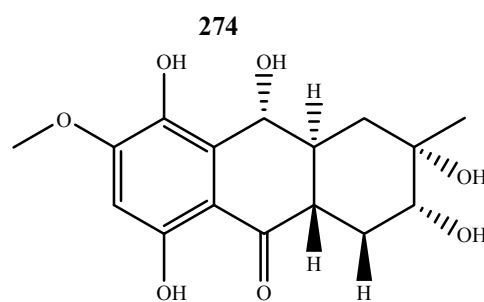
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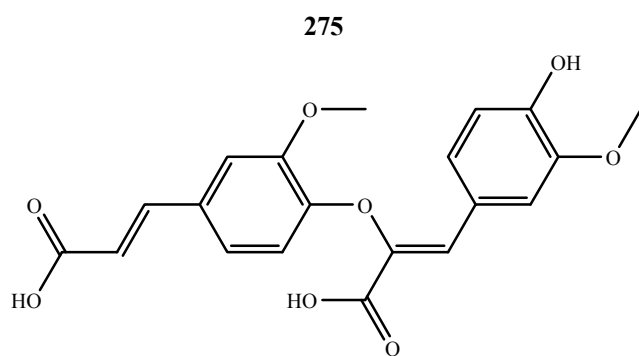
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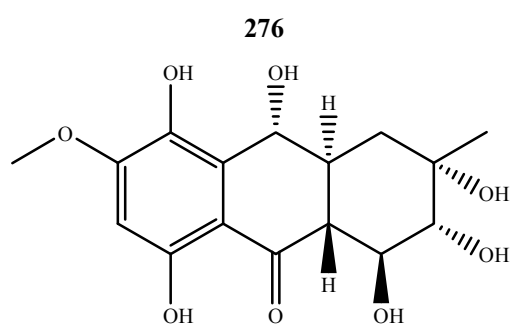
273



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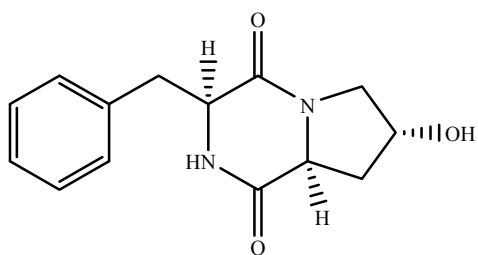


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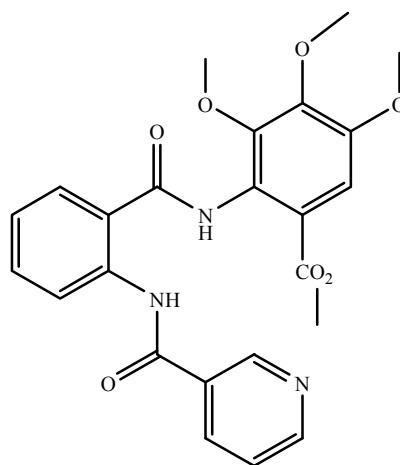
277

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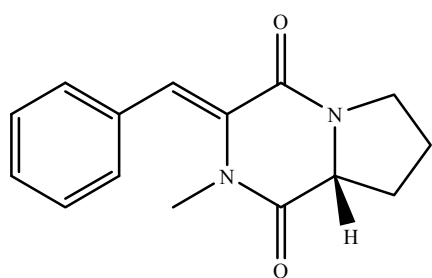
Figure S2. Cont.



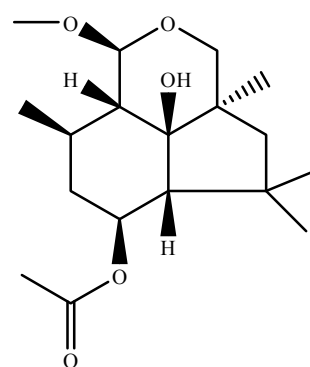
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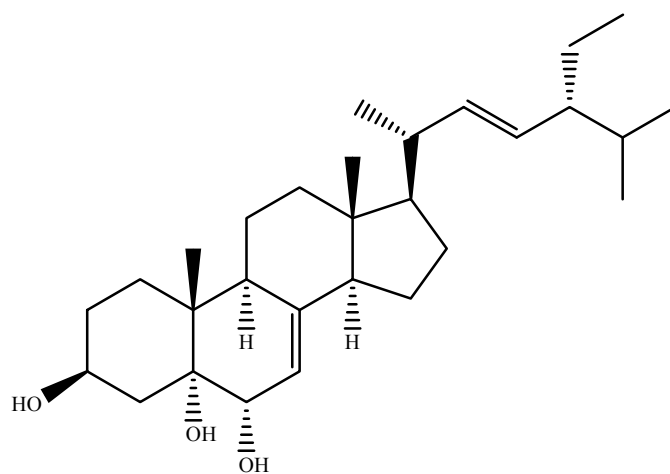
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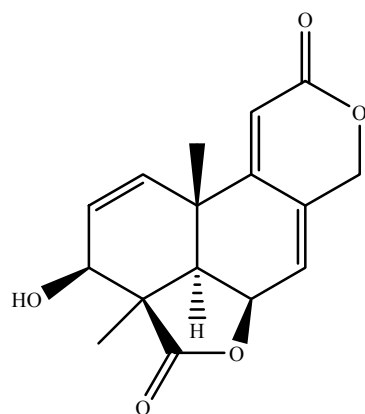


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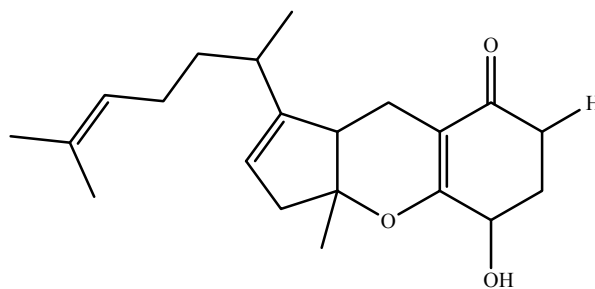


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Figure S2. Cont.



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Figure S2. Structures of compound 117–285.

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