

## Supplementary Material

### Natural Coumarins as Potential anti-SARS-CoV-2 Agents Supported by Docking Analysis

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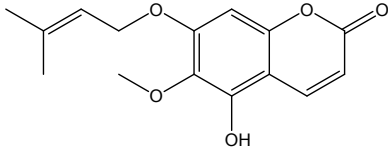
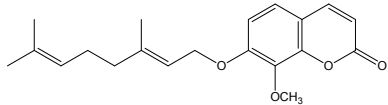
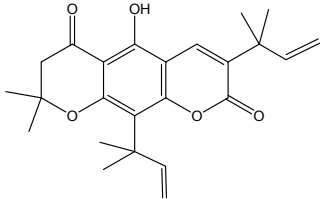
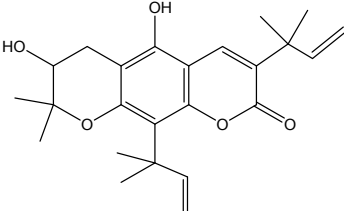
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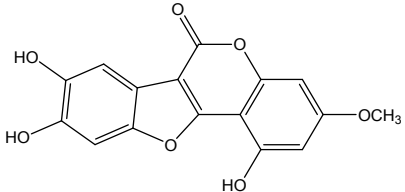
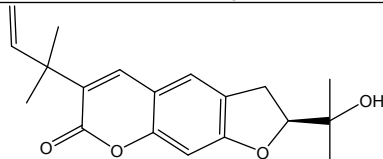
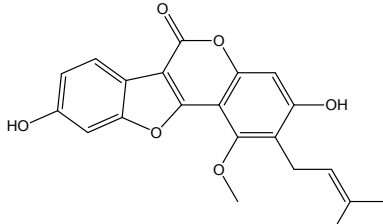
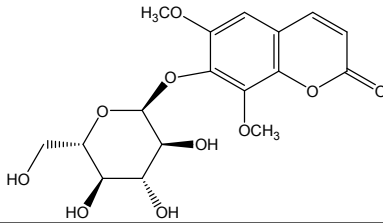
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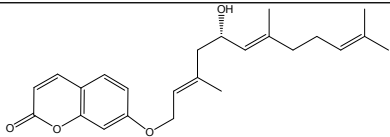
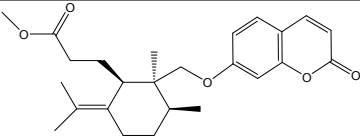
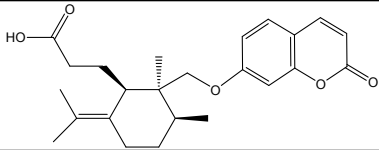
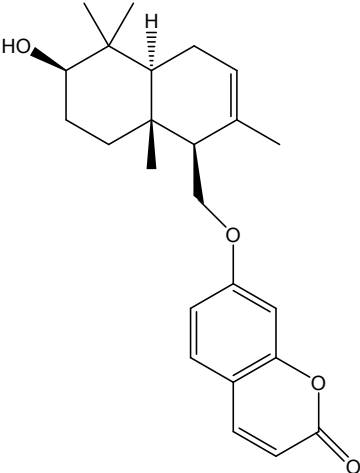
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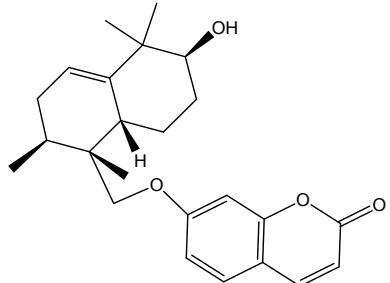
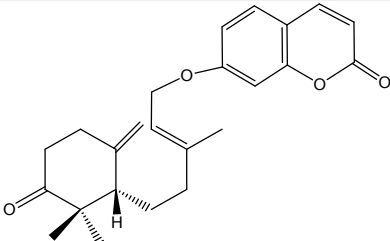
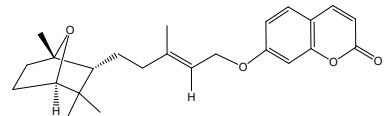
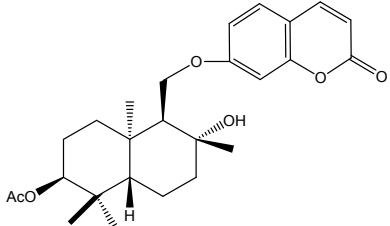
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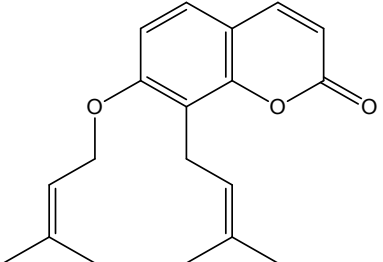
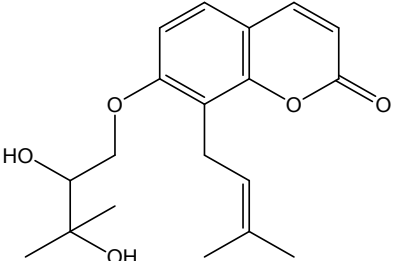
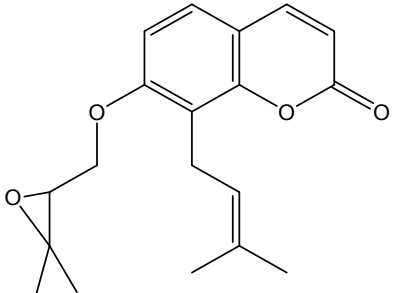
**Table S1.** A list of natural antiviral coumarins (**AV-1** - **AV-80**). The Table presents structures as shown in the primary literature, even if they may have been published without stereochemical details (like, e.g., for compound **AV-4** and others).

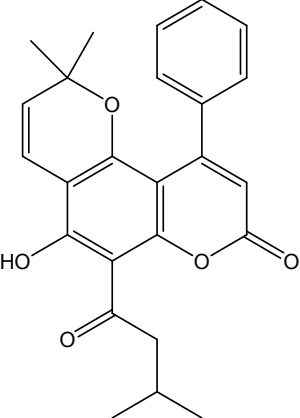
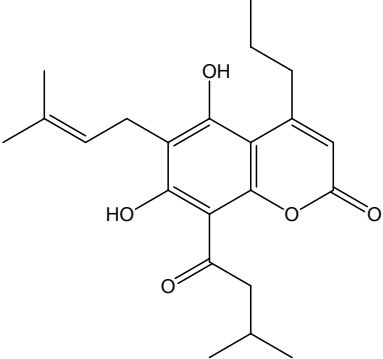
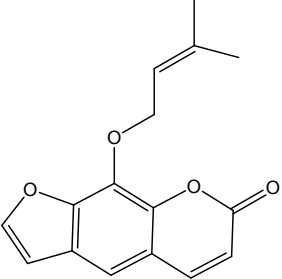
No.	Compound	Source	Structure	Antiviral Activity	Ref
1	Isoobtusitin	<i>Psiadia dentate</i> F. Asteraceae		Moderate inhibitory activity against poliovirus and a very weak activity against human immunodeficiency virus (HIV)	[1]
2	Collinin (Schinifolin)	<i>Zanthoxylum schinifolium</i> F. Rutaceae		Activity against hepatitis B virus (HBV) IC <sub>50</sub> = 17.1 μg/mL	[2]
3	Claucavatin-A	<i>Clausena excavata</i> F. Rutaceae		Activity against HBV	[3]
4	Claucavatin-B	<i>Clausena excavata</i> F. Rutaceae		Activity against HBV	[3]

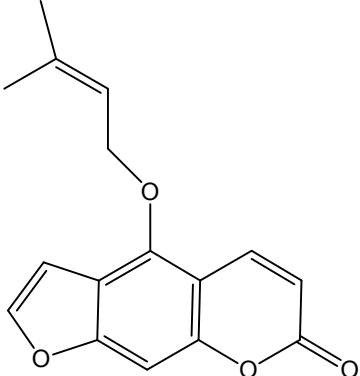
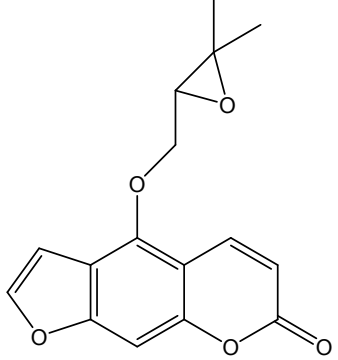
			"absolute configuration not given"		
5	Wedelolactone	<i>Wedelia calendulacea</i> F. Asteraceae		Activity against hepatitis C virus IC <sub>50</sub> = 36.1 μM	[2,4]
6	Chalepin	<i>Ruta angustifolia</i> F. Rutaceae		Activity against hepatitis C virus IC <sub>50</sub> = 1.7 ± 0.5 μg/mL	[2,4]
7	Glycyrol	<i>Glycyrrhiza uralensis</i> F. Fabaceae		Activity against hepatitis C virus IC <sub>50</sub> = 4.6 μg/mL	[4]
8	Eleutheroside B1	<i>Sarcandra glabra</i> F. Chloranthaceae		Activity against influenza virus IC <sub>50</sub> = 64–125 μg/mL	[5]
9	8'-Acetoxy-5'S-hydroxyumbelliprenin	Gum resin of <i>Ferula asfoetida</i> F. Apiaceae		Activity against influenza A (H1N1) virus IC <sub>50</sub> = 0.26-0.86 μg/mL	[6]

					
<b>10</b>	Methyl galbanate	Gum resin of <i>Ferula asfoetida</i> F. Apiaceae		Activity against H1N1 virus IC <sub>50</sub> = 0.26-0.86 µg/mL	[6]
<b>11</b>	Galbanic acid	Gum resin of <i>Ferula asfoetida</i> F. Apiaceae		Activity against H1N1 virus IC <sub>50</sub> = 0.26-0.86 µg/mL	[6]
<b>12</b>	Conferol	Gum resin of <i>Ferula asfoetida</i> F. Apiaceae		Activity against H1N1 virus IC <sub>50</sub> = 0.26-0.86 µg/mL	[6]

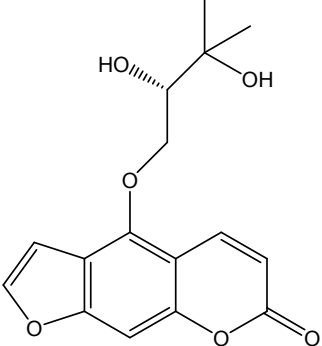
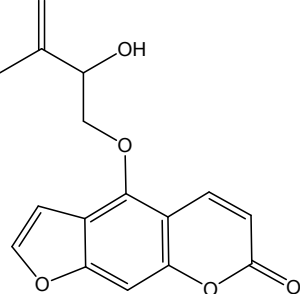
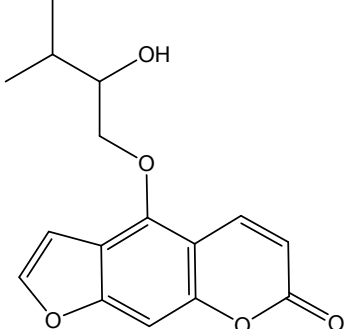
13	Microlobidene	Gum resin of <i>Ferula asfoetida</i> F. Apiaceae		Activity against <i>Herpes simplex</i> virus	[6]
14	Farnesiferol B	Gum resin of <i>Ferula asfoetida</i> F. Apiaceae		Activity against <i>Herpes simplex</i> virus	[6]
15	Farnesiferol C	Gum resin of <i>Ferula asfoetida</i> F. Apiaceae		Activity against <i>Herpes simplex</i> virus	[6]
16	Kellerine	Gum resin of <i>Ferula asfoetida</i> F. Apiaceae		Activity against <i>Herpes simplex</i> virus 1 (HSV-1) EC <sub>50</sub> = 38 µg/mL	[2]

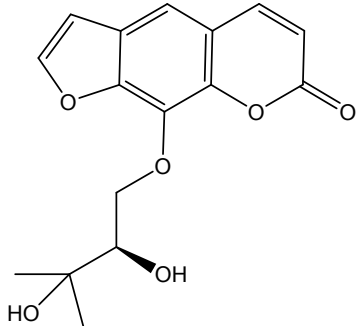
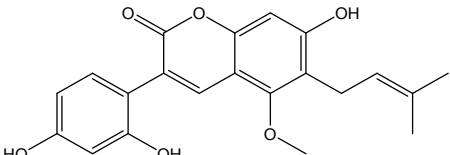
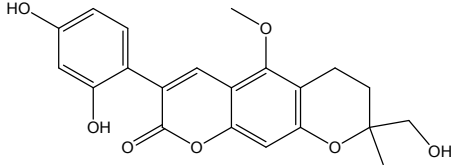
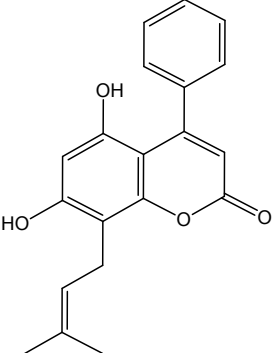
17	Ramosin	<i>Myrtopsis corymbosa</i> F. Rutaceae		Activity against dengue virus	[5]
18	Myrsellinol	<i>Myrtopsis corymbosa</i> F. Rutaceae		Activity against dengue virus	[5]
19	Myresellin	<i>Myrtopsis corymbosa</i> F. Rutaceae		Activity against dengue virus	[5]

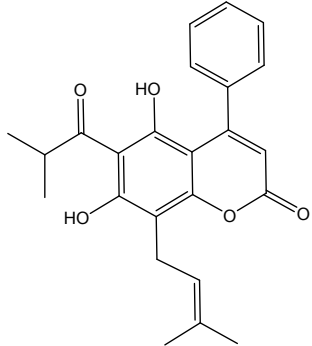
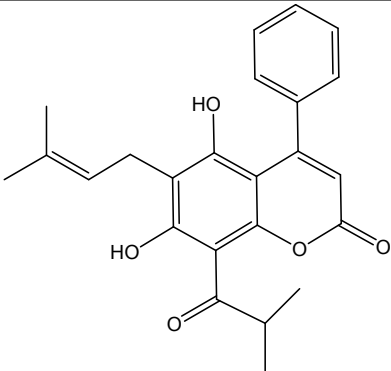
20	Coumarin A	<i>Mammea americana</i> F. Calophyllaceae		Activity against dengue and chikungunya virus	[4]
21	Coumarin B	<i>Mammea americana</i> F. Calophyllaceae		Activity against dengue and chikungunya virus	[4]
22	Imperatorin (Ammidin, Marmelosin)	<i>Ferula sumbul</i> , <i>Prangos tschimganica</i> F. Apiaceae		Activity against HIV EC <sub>50</sub> = < 0.10 µg/mL	[2,7]

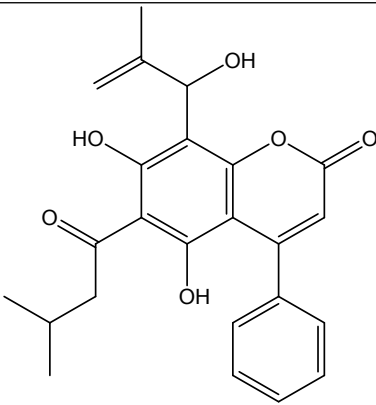
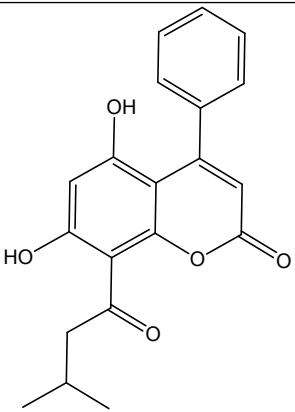
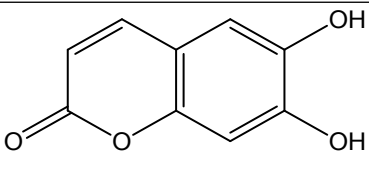
23	Isoimperatorin	<i>Ferula sumbul, Angelica apaensis</i> F. Apiaceae		Activity against HIV	[4]
24	Oxypeucedanin	<i>Ferula sumbul, Angelica apaensis</i> F. Apiaceae		Activity against HIV EC <sub>50</sub> = 1.0 µg/mL	[4]

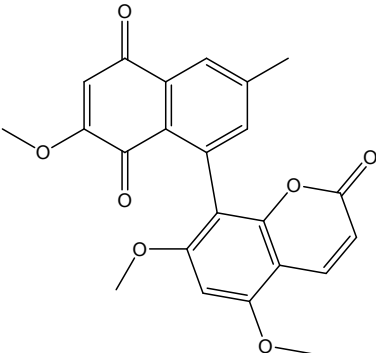
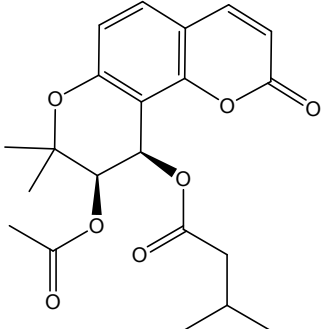
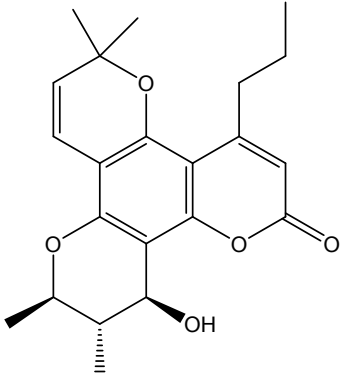


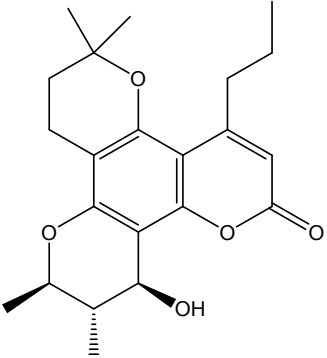
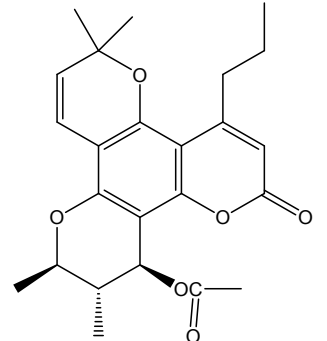
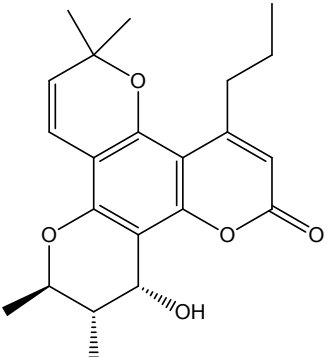
25	Oxypeucedanin hydrate	<i>Ferula sumbul</i> , <i>Angelica apaensis</i> F. Apiaceae		Activity against HIV EC <sub>50</sub> = 10 µg/mL	[4]
26	Gosferol (Pabulenol; Pangelin)	<i>Prangos ferulacea</i> F. Apiaceae		Activity against HIV	[8]
27	Pranpherol (Pranferol)	<i>Ferula sumbul</i> F. Apiaceae		Activity against HIV (TI) > 5	[4]

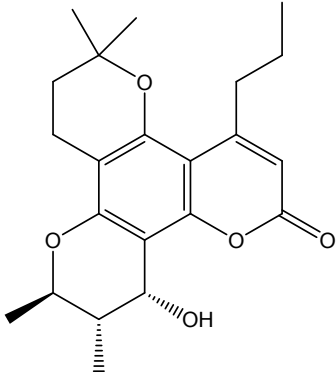
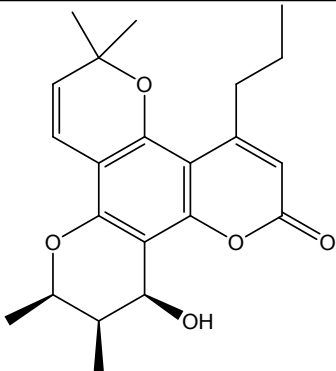
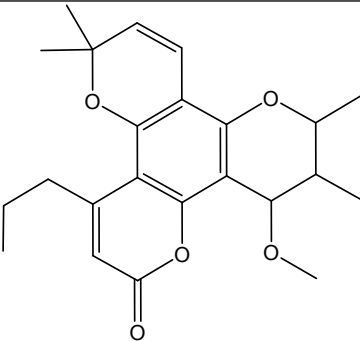
28	Heraclenol	<i>Ferula sumbul</i> F. Apiaceae		Activity against HIV EC <sub>50</sub> = 0.115 µg/mL	[2,4]
29	Glycycomarin	<i>Camellia sinensis</i> F. Theaceae, <i>Glycyrrhiza uralensis</i> , <i>Xibei licorice</i> F. Fabaceae		Activity against HIV	[2,4]
30	Licopyranocoumarin	<i>Camellia sinensis</i> F. Theaceae, <i>Glycyrrhiza uralensis</i> , <i>Xibei licorice</i> F. Fabaceae		Activity against HIV	[2,4]
31	5,7-Dihydroxy-4-phenyl-8-prenylcoumarin	<i>Marila pluricostata</i> F. Calophyllaceae		Activity against HIV at 50 µM	[5]

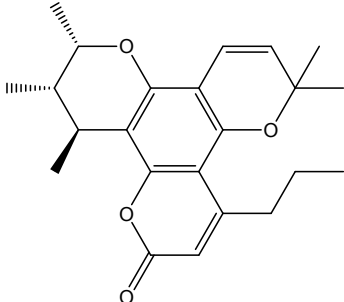
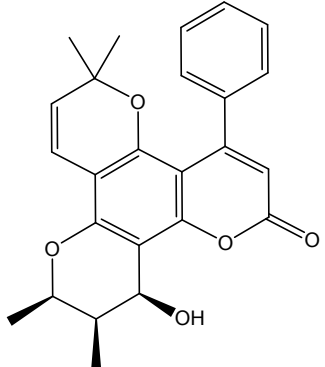
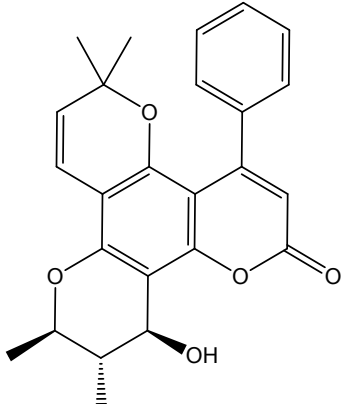
32	Mesuol	<i>Marila pluricostata</i> F. Calophyllaceae		Activity against HIV IC <sub>50</sub> = 2-2.5 μM	[5]
33	Isomesuol	<i>Marila pluricostata</i> F. Calophyllaceae		Activity against HIV IC <sub>50</sub> = 2-2.5 μM	[2]

34	Disparinol A	<i>Marila pluricostata</i> F. Calophyllaceae		Activity against HIV IC <sub>50</sub> = 0.5 μM	[9]
35	Isodispar B	<i>Marila pluricostata</i> F. Calophyllaceae		Activity against HIV IC <sub>50</sub> = 6.9 μM.	[9]
36	Esculetin (Sichorigenin)	<i>Artemisia capillaris</i> F. Asteraceae		Activity against HIV ED <sub>50</sub> = 2.51 μg/mL and therapeutic index (TI) = 11.2	[2]

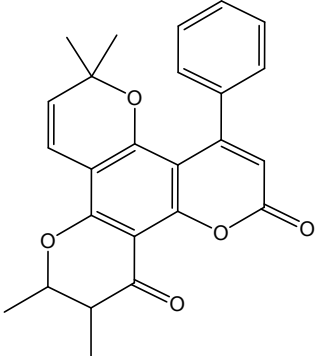
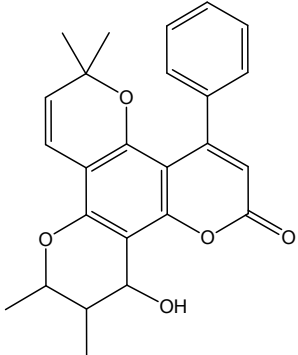
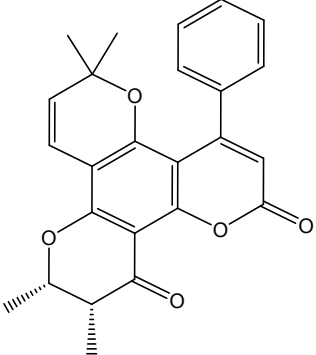
37	Toddacoumanone	<i>Toddalia asiatica</i> F. Rutaceae		Activity against <i>Herpes simplex</i> virus ED <sub>50</sub> = 10 µg/mL	[2]
38	Suksdorfin (Saxdorphin)	<i>Lomatium suksdorfii</i> F. Apiaceae		Activity against HIV EC <sub>50</sub> = 2.6 µM	[2,4]
39	(+)-Calanolide A	<i>Calophyllum lanigerum</i> F. Calophyllaceae		Activity against HIV EC <sub>50</sub> = 0.1 µM IC <sub>50</sub> = 20 µM	[2,4,7]

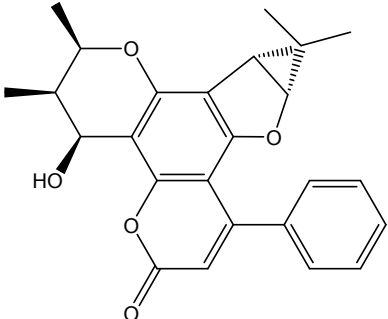
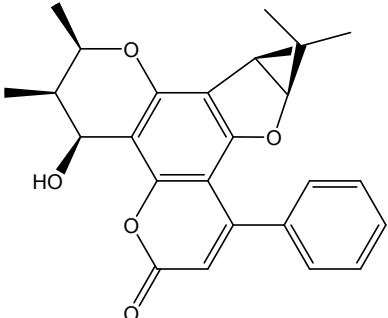
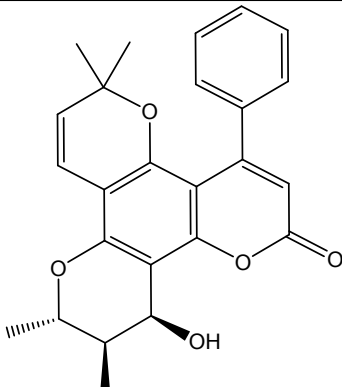
40	(+)-12-Oxocalanolide A	<i>Calophyllum lanigerum</i> F. Calophyllaceae	 <p>The structure shows a complex polycyclic molecule with a central benzene ring fused to a six-membered ring containing an oxygen atom. A side chain with a methyl group and a hydroxyl group is attached to the six-membered ring. Another side chain with a propyl group and a carbonyl group is attached to the benzene ring.</p>	Activity against HIV	[7]
41	12-O-Acetylcalanolide A	<i>Calophyllum lanigerum</i> F. Calophyllaceae	 <p>The structure is similar to (+)-12-Oxocalanolide A, but the hydroxyl group at the 12-position is replaced by an acetyl group (-COCH<sub>3</sub>).</p>	Activity against HIV	[10]
42	(+)-Calanolide B	<i>Calophyllum lanigerum</i> F. Calophyllaceae	 <p>The structure is similar to (+)-12-Oxocalanolide A, but the hydroxyl group at the 12-position is shown with a dashed bond, indicating it is on the opposite side of the ring.</p>	Activity against HIV EC <sub>50</sub> = 0.4 μM IC <sub>50</sub> = 15 μM	[2,4]

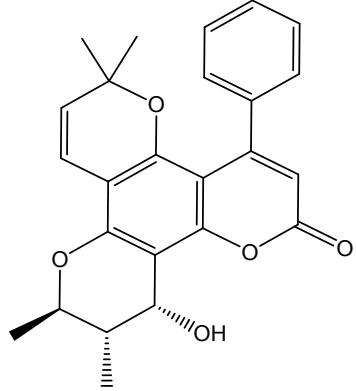
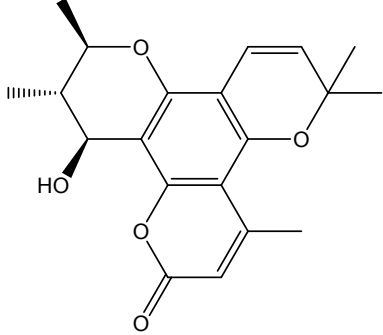
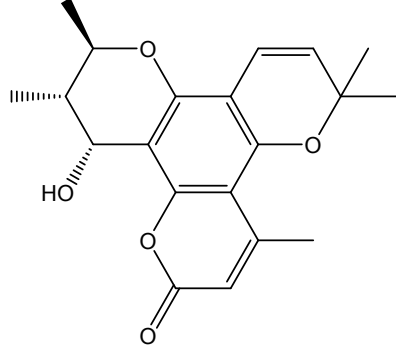
43	(-)- Dihydrocalanoli de B	<i>Calophyllum lanigerum</i> F. Calophyllaceae	 <p>The structure shows a central benzene ring with two furan rings fused at the 1 and 4 positions. A propyl group is attached to the 2-position of the furan ring at the 6-position of the benzene ring. A 2,2-dimethyl-1,3-dioxane ring is fused to the benzene ring at the 3 and 5 positions. The dioxane ring has a methyl group at the 2-position and a hydroxyl group at the 4-position, both shown with dashed bonds.</p>	Activity against HIV EC <sub>50</sub> = 0.1 μM	[7,11]
44	Calanolide C	<i>Calophyllum lanigerum</i> F. Calophyllaceae	 <p>The structure is similar to (-)-Dihydrocalanolid B, but the dioxane ring is fused to the benzene ring at the 2 and 5 positions. The dioxane ring has a methyl group at the 2-position and a hydroxyl group at the 4-position, both shown with solid wedges.</p>	Activity against HIV IC <sub>50</sub> = 30 μM	[2]
45	12- <i>O</i> - Methylcalanolid e B	<i>Calophyllum lanigerum</i> F. Calophyllaceae	 <p>The structure features a central benzene ring with two furan rings fused at the 1 and 4 positions. A propyl group is attached to the 2-position of the furan ring at the 6-position of the benzene ring. A 2,2-dimethyl-1,3-dioxane ring is fused to the benzene ring at the 3 and 5 positions. The dioxane ring has a methyl group at the 2-position and a methoxy group at the 4-position.</p>	Activity against HIV	[10]

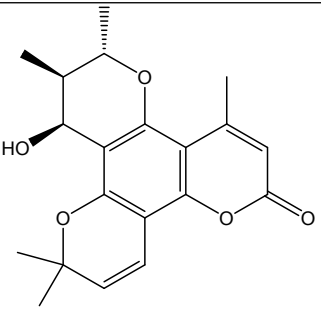
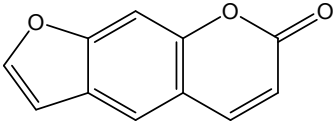
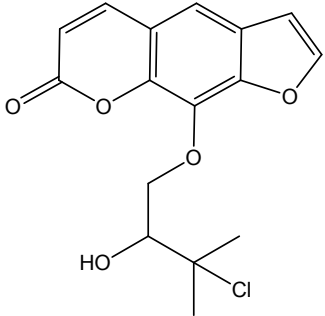
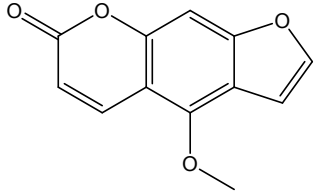
46	Calanolide F	<i>Calophyllum lanigerum</i> , <i>C. teysmannii</i> F. Calophyllaceae		Activity against HIV	[7]
47	Inophyllum A	<i>Calophyllum inophyllum</i> F. Calophyllaceae		Activity against HIV IC <sub>50</sub> = 30 μM	[7,12]
48	Inophyllum B	<i>Calophyllum inophyllum</i> F. Calophyllaceae		Activity against HIV IC <sub>50</sub> = 38 μM	[4,12]

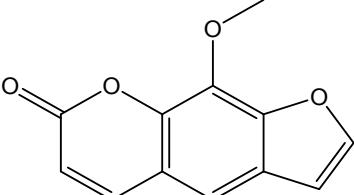
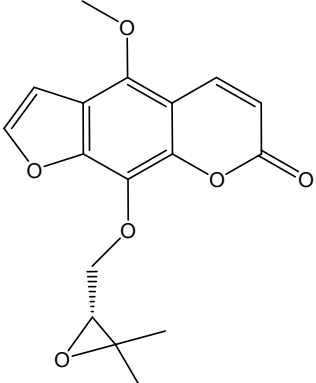
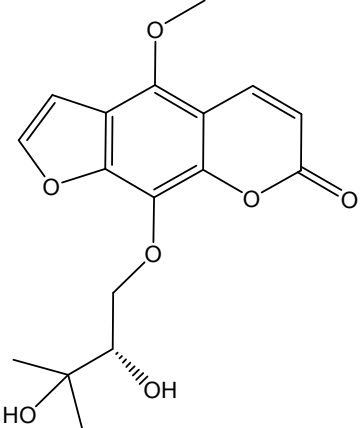


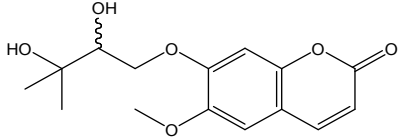
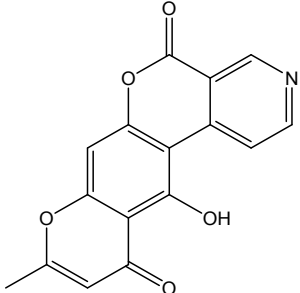
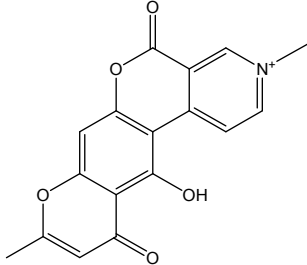
49	Inophyllum C	<i>Calophyllum inophyllum</i> F. Calophyllaceae		Activity against HIV	[7]
50	Inophyllum D	<i>Calophyllum inophyllum</i> F. Calophyllaceae		Activity against HIV	[7,12]
51	Inophyllum E	<i>Calophyllum inophyllum</i> F. Calophyllaceae		Activity against HIV	[7,12]

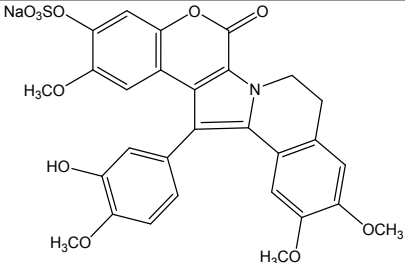
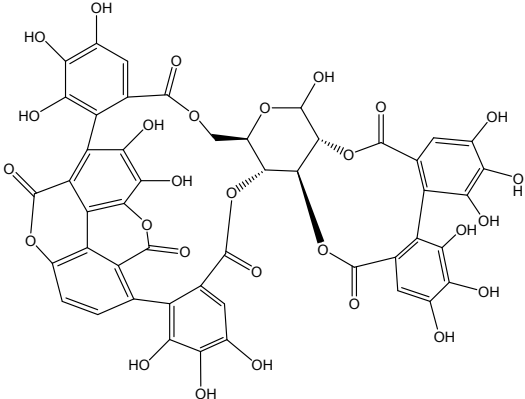
<p><b>52</b></p>	<p>Inophyllum G1</p>	<p><i>Calophyllum inophyllum</i> F. Calophyllaceae</p>		<p>Activity against HIV</p>	<p>[7,12]</p>
<p><b>53</b></p>	<p>Inophyllum G2</p>	<p><i>Calophyllum inophyllum</i> F. Calophyllaceae</p>		<p>Activity against HIV</p>	<p>[7,12]</p>
<p><b>54</b></p>	<p>Soulatrolide</p>	<p><i>Calophyllum inophyllum</i> F. Calophyllaceae</p>		<p>Activity against HIV IC<sub>50</sub> = 0.34 μM</p>	<p>[4,11]</p>

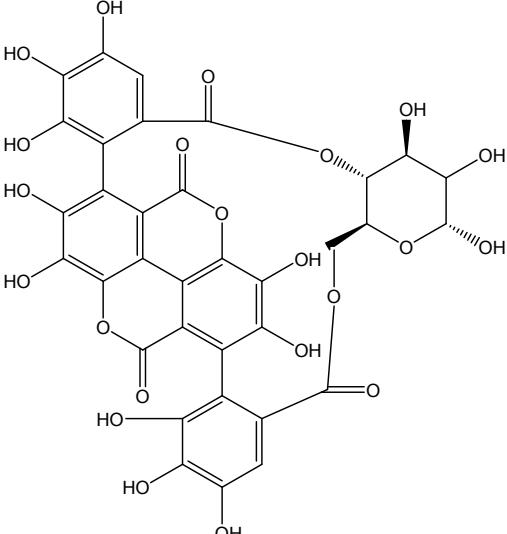
55	Inophyllum P	<i>Calophyllum inophyllum</i> F. Calophyllaceae	 <p>The structure of Inophyllum P is a complex polycyclic molecule. It features a central benzene ring substituted with a piperidine ring (with a methyl group and a methylidene group), a coumarin ring (with a phenyl group and a carbonyl group), and a piperazine ring (with a methyl group and a methylidene group). A hydroxyl group is attached to the piperazine ring.</p>	Activity against HIV $IC_{50} = 130 \mu\text{M}$	[4,12]
56	Cordatolide A	<i>Calophyllum cordato-oblongum</i> F. Calophyllaceae	 <p>The structure of Cordatolide A is a complex polycyclic molecule. It features a central benzene ring substituted with a piperidine ring (with a methyl group and a methylidene group), a coumarin ring (with a methyl group and a carbonyl group), and a piperazine ring (with a methyl group and a methylidene group). A hydroxyl group is attached to the piperazine ring.</p>	Activity against HIV $IC_{50} = 12.3 \mu\text{M}$	[2]
57	Cordatolide B	<i>Calophyllum cordato-oblongum</i> F. Calophyllaceae	 <p>The structure of Cordatolide B is a complex polycyclic molecule. It features a central benzene ring substituted with a piperidine ring (with a methyl group and a methylidene group), a coumarin ring (with a methyl group and a carbonyl group), and a piperazine ring (with a methyl group and a methylidene group). A hydroxyl group is attached to the piperazine ring.</p>	Activity against HIV $IC_{50} = 19 \mu\text{M}$	[2]

58	Pseudocordatoli de C	<i>Calophyllum lanigerum</i> , <i>C. teysmannii</i> F. Calophyllaceae		Activity against HIV	[7]
59	Psoralen	<i>Prangos tschimganica</i> F. Apiaceae		Activity against HIV EC <sub>50</sub> = 0.1 µg/mL	[2,4]
60	Saxalin	<i>Prangos tschimganica</i> F. Apiaceae		Activity against HIV	[4]
61	Bergapten	<i>Prangos tschimganica</i> F. Apiaceae		Activity against HIV EC <sub>50</sub> = 0.354 µg/mL	[2,4]

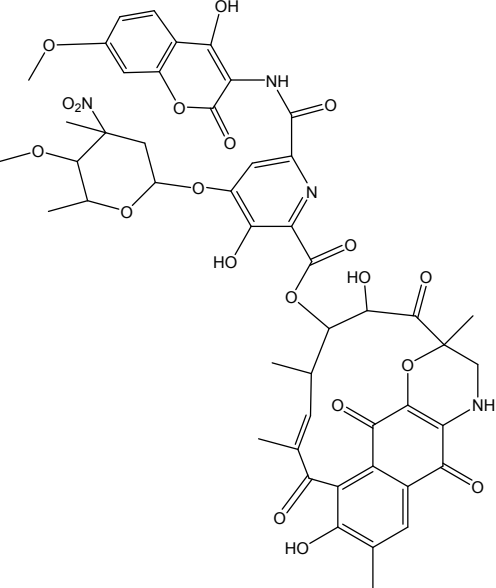
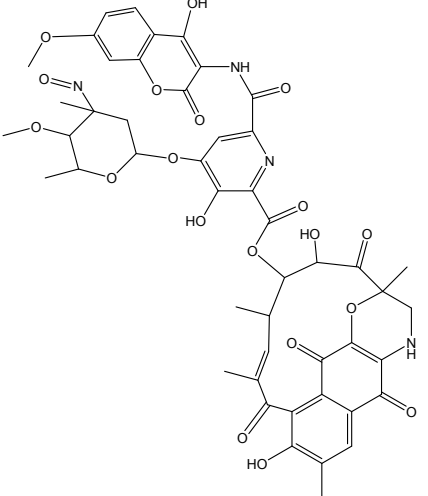
62	Xanthotoxin	<i>Ferula sumbul</i> F. Apiaceae		Activity against HIV therapeutic index (TI) > 5	[4]
63	Byakangelicol	<i>Angelica apaensis</i> F. Apiaceae		Activity against HIV	[4]
64	Byakangelicin	<i>Angelica apaensis</i> F. Apiaceae		Activity against HIV	[4]

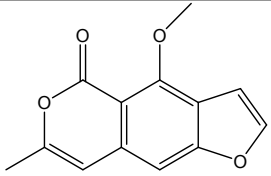
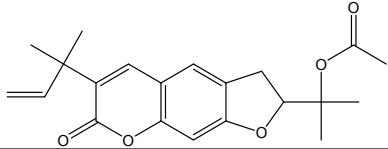
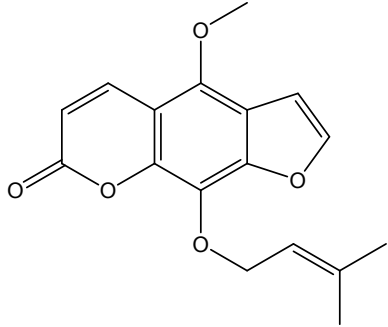
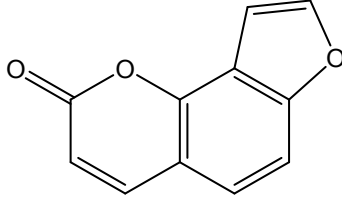
65	7-(2',3'-Dihydroxy-3'-methylbutoxy)-6-methoxycoumarin	<i>Pterocaulon alopecuroides</i> F. Asteraceae		Activity against <i>Herpes simplex</i> virus	[13]
66	Isoschumanniphytine	<i>Schumanniphyton magnificum</i> F. Rubiaceae		Activity against <i>Herpes simplex</i> virus	[14]
67	<i>N</i> -Methylisoschumanniphytine	<i>Schumanniphyton magnificum</i> F. Rubiaceae	 <p>Natural counteranion not known</p>	Activity against HIV	[14]
68	Lamellarin-alpha-20-sulfate	Marine invertebrates (mainly ascidians and sponges)		Activity against HIV IC <sub>50</sub> = 16 μM	[2]

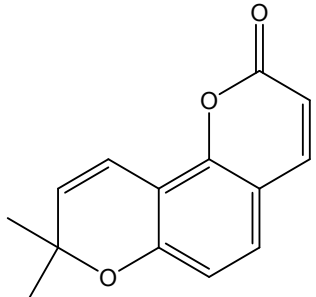
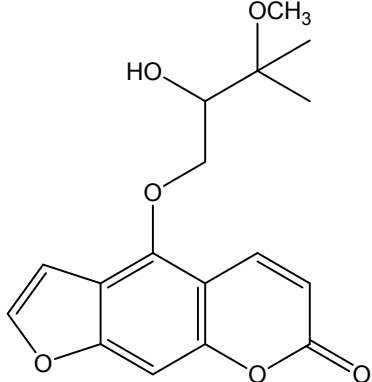
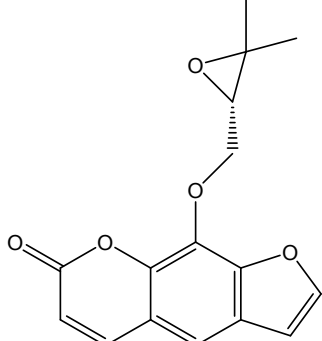
					
69	Punicalagin	<i>Terminalia</i> spp., <i>Combretum molle</i> F. Combretaceae, <i>Punica granatum</i> F. Punicaceae		Activity against HIV	[15]

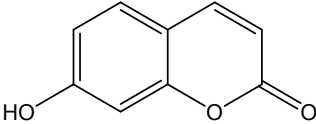
70	Punicalin	<i>Punica granatum</i> F. Punicaceae	 <p>The image shows the chemical structure of Punicalin, a polyphenolic compound. It consists of a central gallic acid unit (3,4,5-trihydroxybenzoic acid) that is esterified to three other gallic acid units. One of these units is further esterified to a glucose molecule. The glucose is in its cyclic pyranose form, with hydroxyl groups at the 2, 3, and 6 positions. The gallic acid units are linked via ester bonds, and the overall structure is highly branched and complex.</p>	Activity against HIV	[15]
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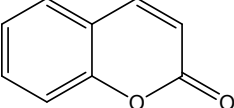
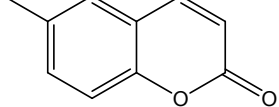
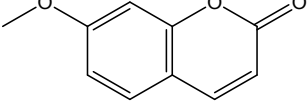
71	Rubradirin	<p><i>Streptomyces achromogenes</i>,  <i>Micromonospora saitamica</i>  F. Streptomycetaceae</p>	 <p>The chemical structure of Rubradirin is a complex polyketide. It features a central naphthalene ring system with multiple hydroxyl groups and a methyl group. Attached to this core is a long, branched side chain containing a decalin-like bicyclic system, a lactone ring, and a nitrogen-containing ring. The side chain is further substituted with a 2-hydroxy-5-methoxyphenyl group, a 2-nitro-5-methoxyphenyl group, and a 2-hydroxy-5-methoxyphenyl group.</p>	Activity against HIV	[16]
72	Protorubradirin	<p><i>Streptomyces achromogenes</i>  F. Streptomycetaceae</p>	 <p>The chemical structure of Protorubradirin is very similar to Rubradirin, but it lacks the nitro group on the phenyl ring of the side chain. It features a central naphthalene ring system with multiple hydroxyl groups and a methyl group. Attached to this core is a long, branched side chain containing a decalin-like bicyclic system, a lactone ring, and a nitrogen-containing ring. The side chain is further substituted with a 2-hydroxy-5-methoxyphenyl group, a 2-hydroxy-5-methoxyphenyl group, and a 2-hydroxy-5-methoxyphenyl group.</p>	Activity against HIV	[16]

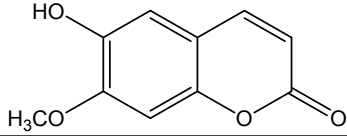
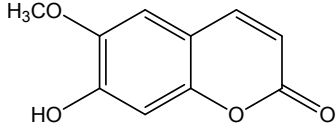
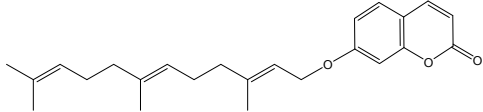
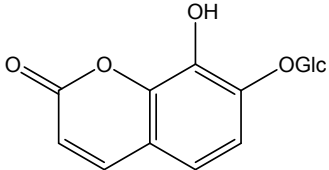
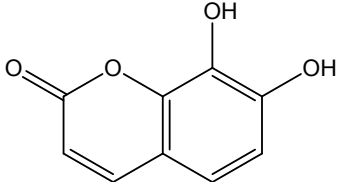
73	Coriandrin	<i>Coriandrum sativum</i> F. Apiaceae		Activity against HIV	[17]
74	(+)-Rutamarin	<i>Ruta graveolens</i> F. Apiaceae		Activity against <i>Herpes simplex</i> virus EC <sub>50</sub> = 1.62 μM	[2]
75	Phellopterin	<i>Angelica archangelica</i> F. Apiaceae		Activity against <i>Herpes simplex</i> virus	[18]
76	Angelicin	<i>Angelica archangelica</i> , <i>Apium graveolens</i> F. Apiaceae		Anti-influenza virus activity	[2]

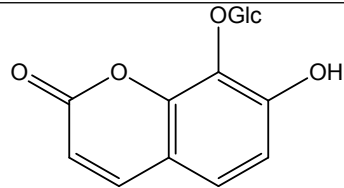
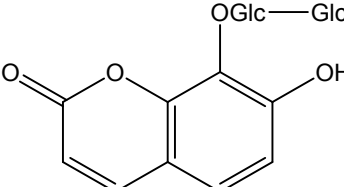
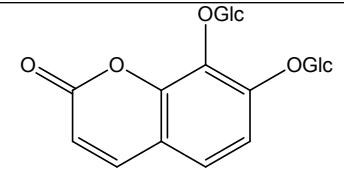
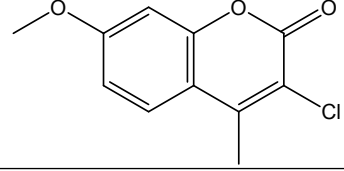
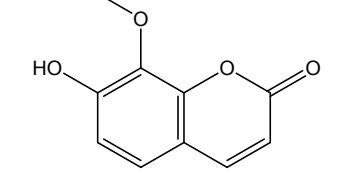
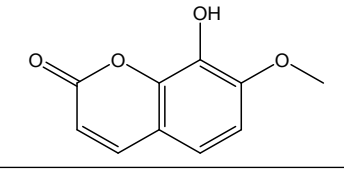
77	Seselin	<i>Apium graveolens</i> , <i>Foeniculum vulgare</i> F. Apiaceae		Activity against HIV EC <sub>50</sub> = 3.5 μM	[11]
78	Oxypeucedanin methanolate	<i>Ferula sumbul</i> , <i>Angelica apaensis</i> F. Apiaceae		Activity against HIV EC <sub>50</sub> = 33 μg/mL	[2]
79	Heraclenin	<i>Ferula sumbul</i> , <i>Prangos tschimganica</i> F. Apiaceae		Activity against HIV EC <sub>50</sub> = 2.37 μg/mL	[2]

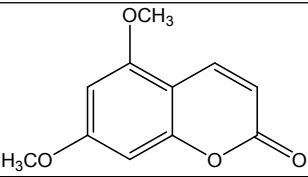
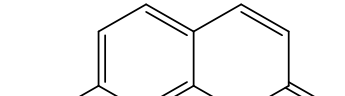
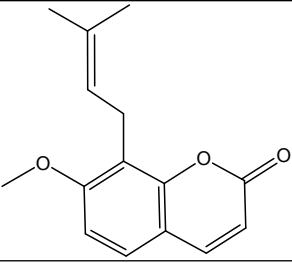
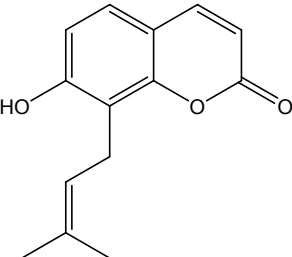
80	Umbelliferone	<i>Lantana camara</i> F. Verbenaceae; <i>Ficus nervosa</i> F. Moraceae; <i>Cyperus incompletus</i> F. Cyperaceae <i>Angelica archangelica</i> , <i>Coriandrum sativum</i> , <i>Apium graveolens</i> , <i>Foeniculum vulgare</i> , <i>Pimpinella anisum</i> F. Apiaceae		Activity against HIV	[11]
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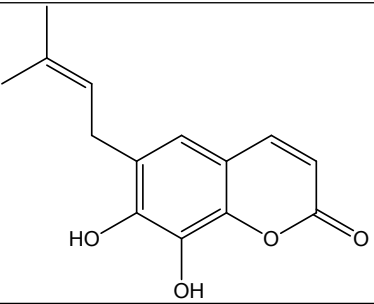
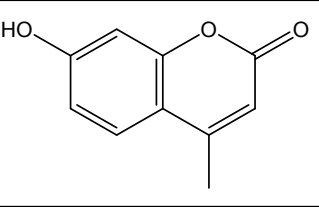
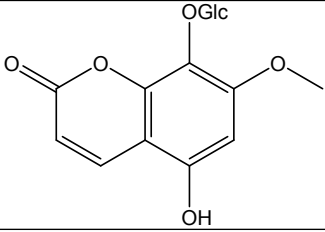
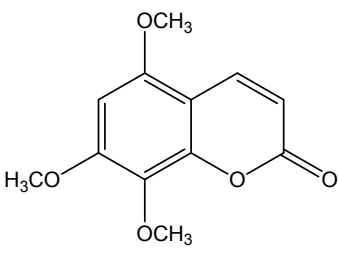
**Table S2.** A list of natural C-coumarins (**C-1** - **C-138**) isolated from different medicinal plants. The Table presents structures as shown in the primary literature, even if they may have been published without stereochemical details (like, e.g., for compounds **C-66** - **69** and others).

No.	Compound Name	Plant Source	Structure	Ref.
1	Coumarin	<i>Lantana camara</i> F. Verbenaceae		[19]
2	6-Methylcoumarin	<i>Lantana camara</i> F. Verbenaceae		[19]
3	Herniarin	<i>Ficus platyphylla</i> F. Moraceae		[20]

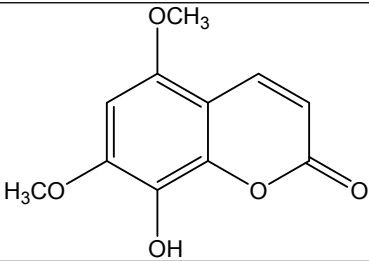
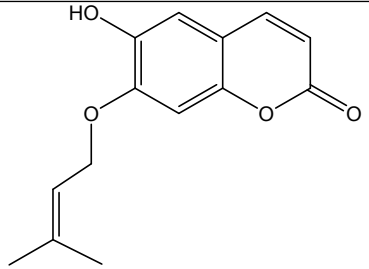
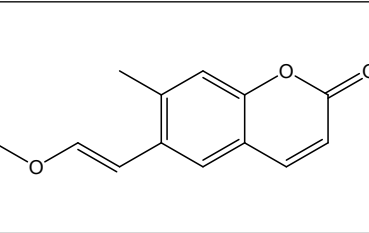
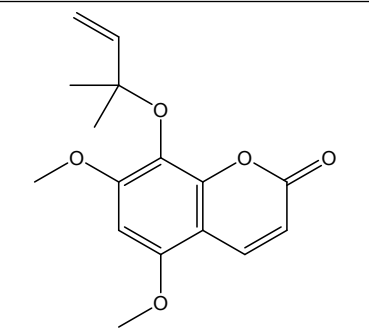
4	Isoscopoletin	<i>Cyperus alopecuroides</i> F. Cyperaceae		[21]
5	Scopoletin	<i>Cyperus incompletus</i> F. Cyperaceae		[21]
		<i>Ficus nervosa</i> F. Moraceae		[22]
		<i>Anethum graveolens, Pimpinella anisum</i> F. Apiaceae		[23]
6	Umbelliprenine	<i>Pimpinella anisum</i> Gum resin of <i>Ferula assafoetida</i> F. Apiaceae		[23,24]
7	Daphnin	<i>Daphne giraldii</i> F. Thymelaeaceae		[25]
8	Daphnetin	<i>Daphne giraldii</i> F. Thymelaeaceae		[25]

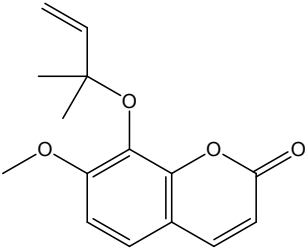
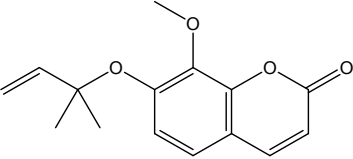
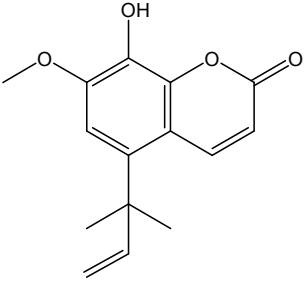
9	Daphnetin-8- <i>O</i> - $\beta$ -D-glucoside	<i>Daphne giraldii</i> F. Thymelaeaceae		[25]
10	Daphnetin-8- <i>O</i> - $\beta$ -D-glucopyranosyl(1 $\rightarrow$ 6) $\beta$ -D-glucopyranoside	<i>Daphne giraldii</i> F. Thymelaeaceae		[25]
11	Daphneside	<i>Daphne giraldii</i> F. Thymelaeaceae		[25]
12	3-Chloro-7-methoxy-4-methylchromen-2-one	<i>Ficus krishnae</i> F. Moraceae		[26]
13	7-Hydroxy-8-methoxycoumarin	<i>Daphne giraldii</i> F. Thymelaeaceae		[25]
14	8-Hydroxy-7-methoxycoumarin	<i>Daphne giraldii</i> F. Thymelaeaceae		[25]

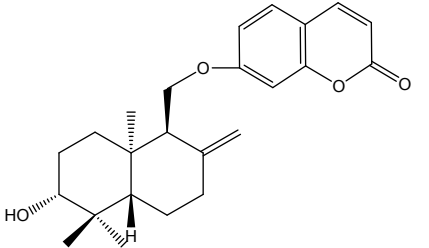
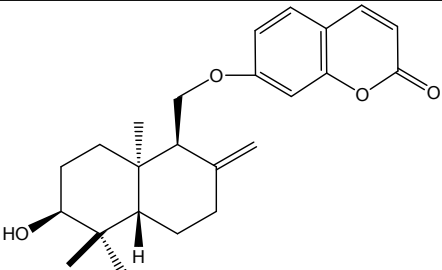
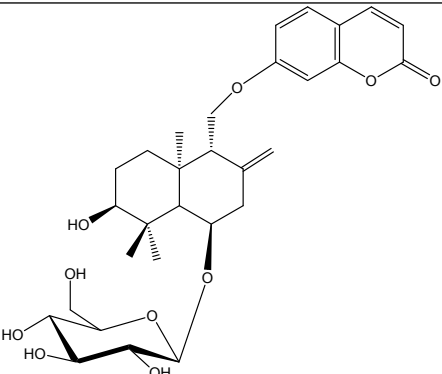
15	5,7-Dimethoxycoumarin	<i>Cyperus incompletus</i> F. Cyperaceae		[21]
16	7,8-Dimethoxycoumarin	<i>Cyperus incompletus</i> F. Cyperaceae		[21]
		<i>Daphne giraldii</i> F. Thymelaeceae		[25]
17	Osthol	<i>Angelica archangelica</i> F. Apiaceae		[23]
18	Osthenol	<i>Apium graveolens</i> F. Apiaceae		[23]

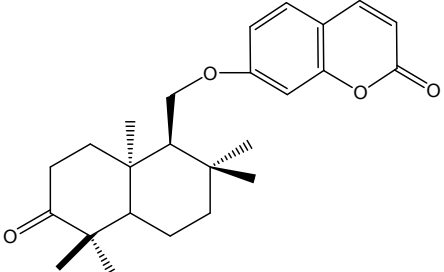
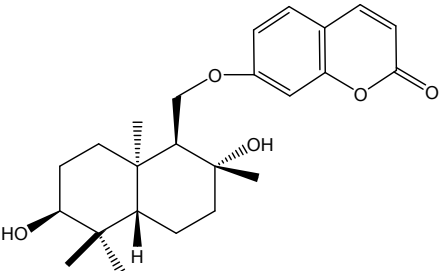
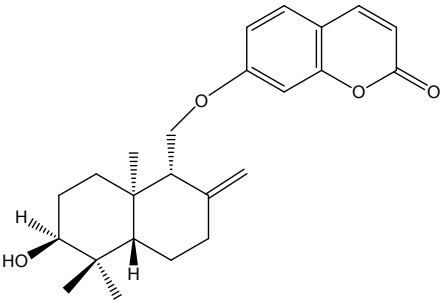
19	Apigravin	<i>Apium graveolens</i> F. Apiaceae		[23]
20	4-Methyl-7-hydroxycoumarin	<i>Daphne giraldii</i> F. Thymelaeaceae		[25]
21	5-Hydroxy-7-methoxycoumarin-8-O-β-D-glucoside	<i>Daphne giraldii</i> F. Thymelaeaceae		[25]
22	5,7,8-Trimethoxycoumarin	<i>Cyperus incompletus</i> F. Cyperaceae		[21]

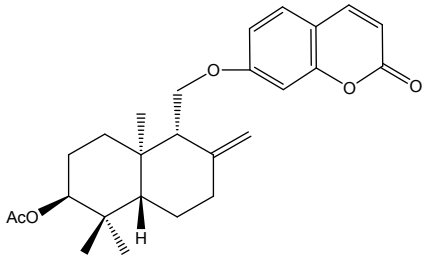
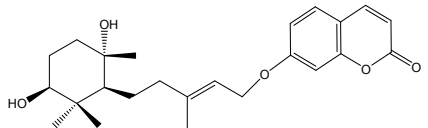
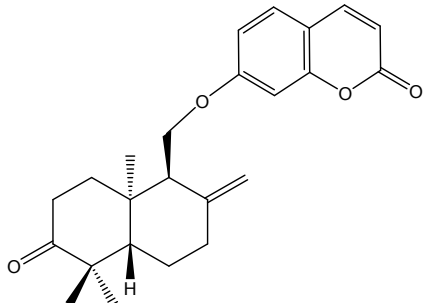


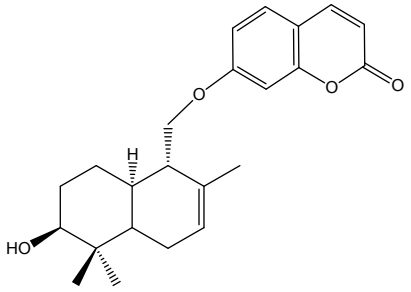
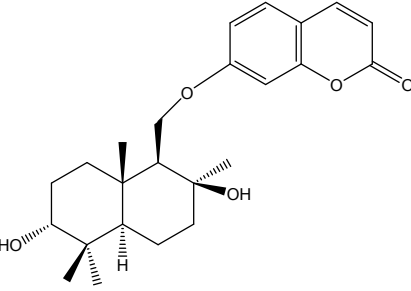
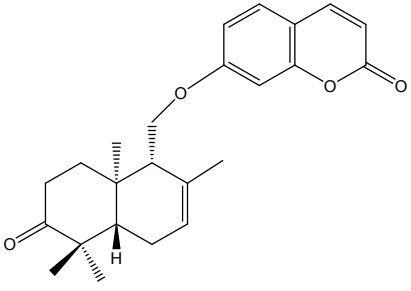
23	Leptodactylone	<i>Cyperus incompletus</i> F. Cyperaceae		[21]
24	Prenyletin	<i>Cyperus incompletus</i> F. Cyperaceae		[21]
25	6-(2-Methoxyvinyl)-7-methyl-2H-1-benzopyran-2-one	<i>Ficus carica</i> F. Moraceae		[27]
26	5,7-Dimethoxy-8-( $\gamma,\gamma$ -dimethylallyloxy) coumarin	<i>Cyperus incompletus</i> F. Cyperaceae		[21]

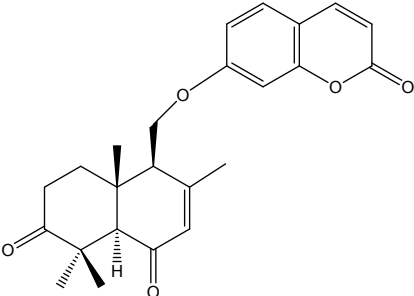
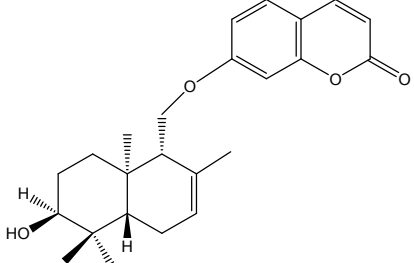
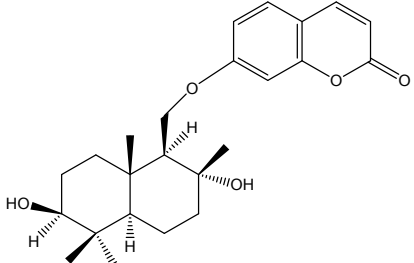
27	7-Methoxy-8-( $\gamma,\gamma$ -dimethylallyloxy)coumarin	<i>Cyperus incompletus</i> F. Cyperaceae		[21]
28	7-( $\gamma,\gamma$ -Dimethylallyloxy)-8-methoxycoumarin	<i>Cyperus incompletus</i> F. Cyperaceae		[21]
29	Celerin	<i>Apium graveolens</i> F. Apiaceae		[23]

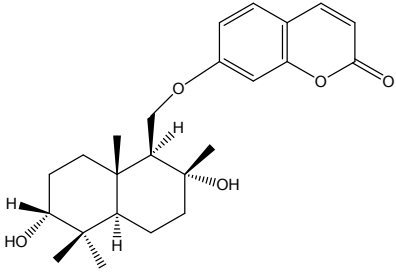
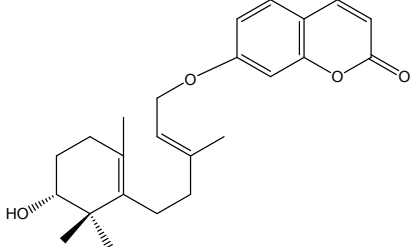
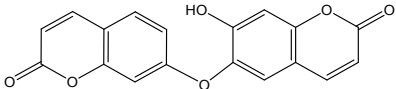
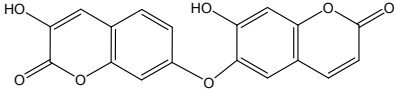
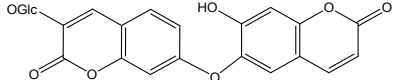
30	Farnesiferol A	Gum resin of <i>Ferula assafoetida</i> F. Apiaceae		[24]
31	Gummosin	Gum resin of <i>Ferula assafoetida</i> F. Apiaceae		[24]
32	Gumoside B	<i>Ferula gummosa</i> F. Apiaceae		[28]

33	Ferukrinone	Gum resin of <i>Ferula assafoetida</i> F. Apiaceae		[24]
34	Deacetylkellerin	Gum resin of <i>Ferula assafoetida</i> F. Apiaceae		[24]
35	Badrakemin	Oleo-gum resin of <i>Ferula assafoetida</i> F. Apiaceae		[29]

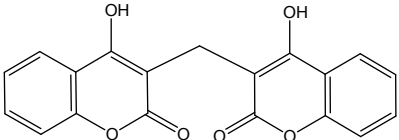
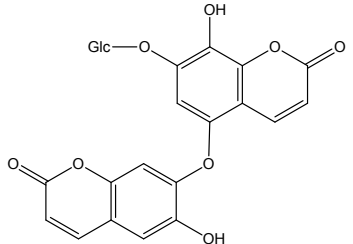
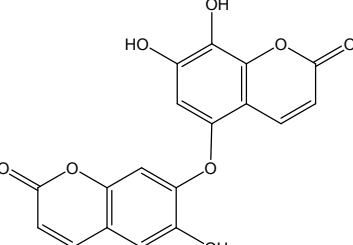
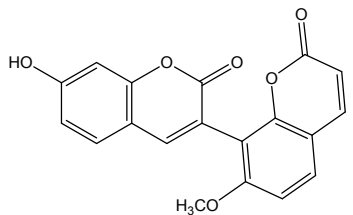
36	Badrakemin acetate	Gum resin of <i>Ferula assafoetida</i> F. Apiaceae		[30]
37	Asimafoetidnol	Gum resin of <i>Ferula assafoetida</i> F. Apiaceae		[31]
38	Mogoltadone	<i>Ferula flabelliloba</i> F. Apiaceae		[28]

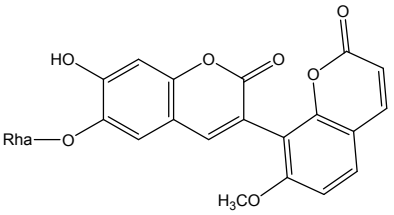
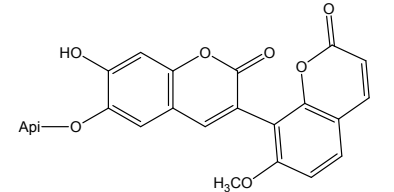
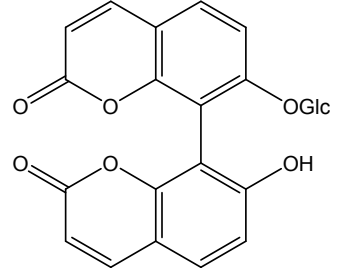
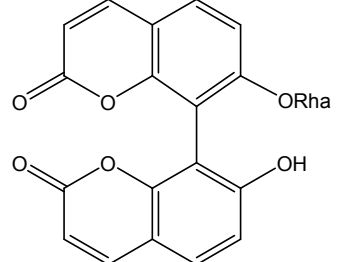
39	Mogoltacin	<i>Ferula flabelliloba</i> F. Apiaceae		[28]
40	Mogoltavidin	<i>Ferula galbaniflua</i> F. Apiaceae		[29]
41	Conferone	Oleo-gum resin of <i>Ferula assafoetida</i> F. Apiaceae		[29]

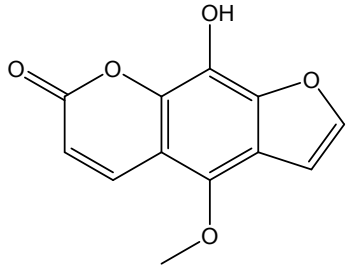
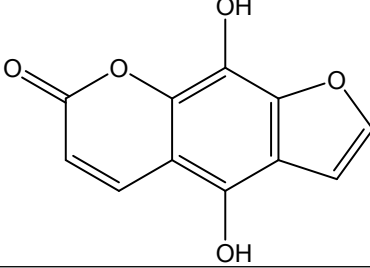
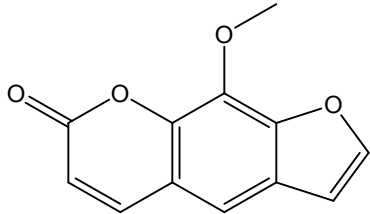
42	Conferdione	<i>Ferula gummosa</i> F. Apiaceae		[28]
43	Feslol	Oleo-gum resin of <i>Ferula assafoetida</i> F. Apiaceae		[29]
44	Isosamarandin	Oleo-gum resin of <i>Ferula assafoetida</i> F. Apiaceae		[29]

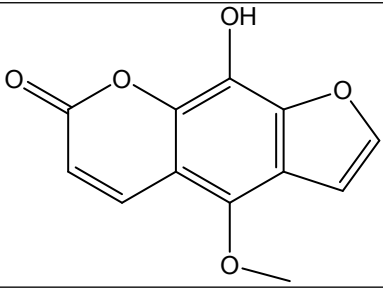
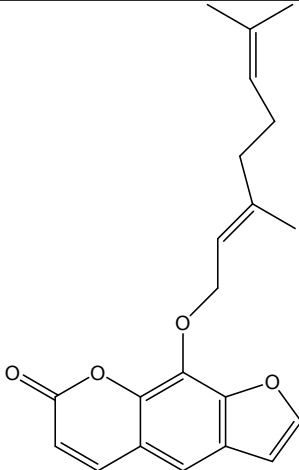
45	Samarcandin	Oleo-gum resin of <i>Ferula assafoetida</i> F. Apiaceae		[24,29]
46	Lehmferin	<i>Ferula szowitsiana</i> F. Apiaceae		[28]
47	Daphnogitin	<i>Daphne giraldii</i> F. Thymelaeaceae		[25]
48	Daphnoretin	<i>Daphne giraldii</i> F. Thymelaeaceae		[25]
49	Daphnorin	<i>Daphne giraldii</i> F. Thymelaeaceae		[25]

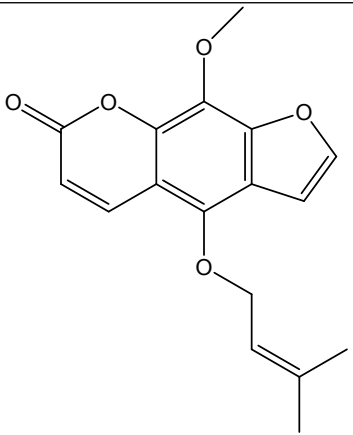
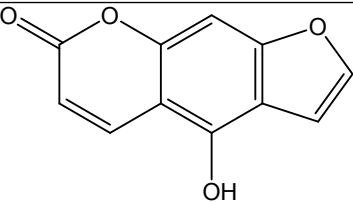
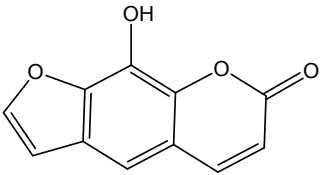


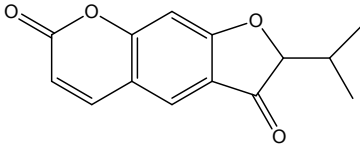
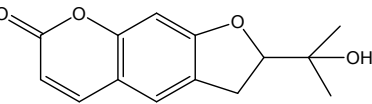
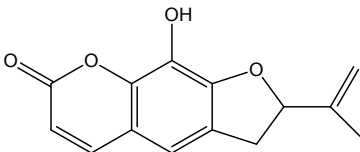
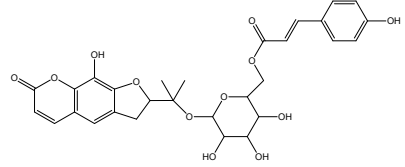
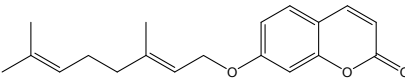
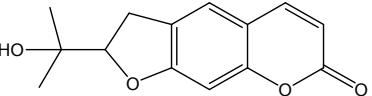
50	Dicoumarol	<i>Melilotus officinalis</i> F. Fabaceae		[23]
51	Daphnolin	<i>Daphne giraldii</i> F. Thymelaeaceae		[25]
52	Daphgilin	<i>Daphne giraldii</i> F. Thymelaeaceae		[25]
53	Daphnogirin	<i>Daphne giraldii</i> F. Thymelaeaceae		[25]

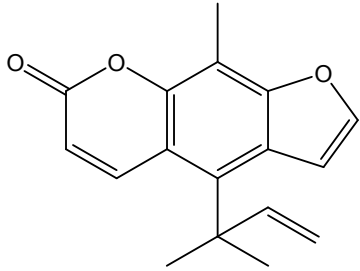
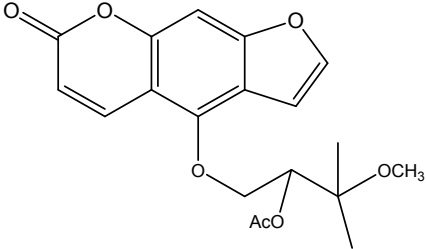
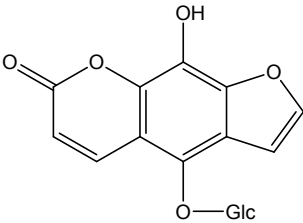
54	6- <i>O</i> - $\alpha$ -L-Rhamnopyranosyl daphnogirin	<i>Daphne giraldii</i> F. Thymelaeaceae		[25]
55	6- <i>O</i> - $\beta$ -D-Apiofuranosyl daphnogirin	<i>Daphne giraldii</i> F. Thymelaeaceae		[25]
56	Giraldoid A	<i>Daphne giraldii</i> F. Thymelaeaceae		[25]
57	Edgeworoside C	<i>Daphne giraldii</i> F. Thymelaeaceae		[25]

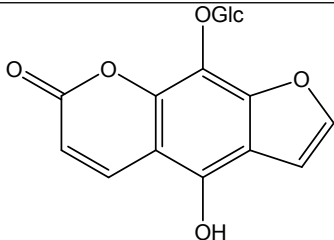
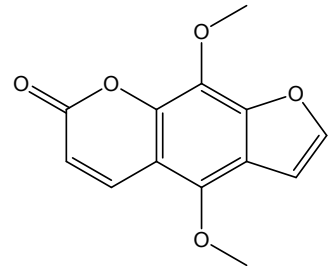
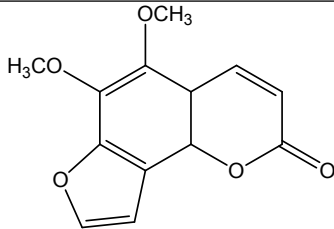
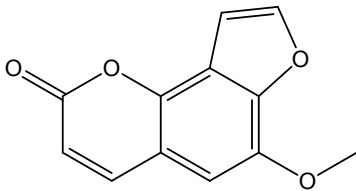
58	8-Hydroxy-5-methoxypsoralen	<i>Daucus carota</i> subsp. <i>carota</i> F. Apiaceae	 <p>The structure shows a psoralen core with a hydroxyl group at position 8 and a methoxy group at position 5.</p>	[23]
59	5,8-Dihydroxypsoralen	<i>Apium graveolens</i> F. Apiaceae	 <p>The structure shows a psoralen core with hydroxyl groups at positions 5 and 8.</p>	[32]
60	8-Methoxypsoralen	<i>Petroselinum crispum</i> , <i>Apium graveolens</i> F. Apiaceae	 <p>The structure shows a psoralen core with a methoxy group at position 8.</p>	[23,32]

61	8-Hydroxybergapten	<i>Apium graveolens</i> F. Apiaceae		[32]
62	8-Geranoxy-psoralen	<i>Apium graveolens</i> F. Apiaceae		[32]

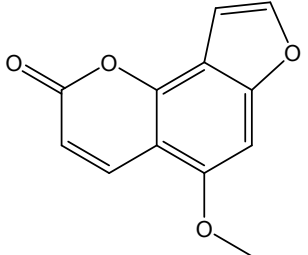
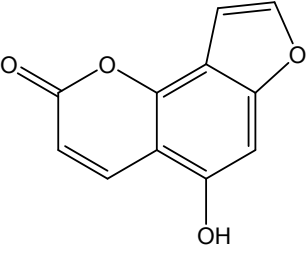
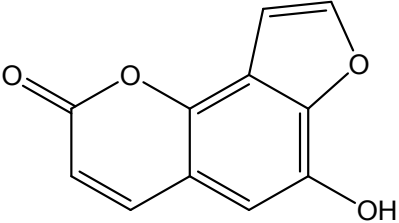
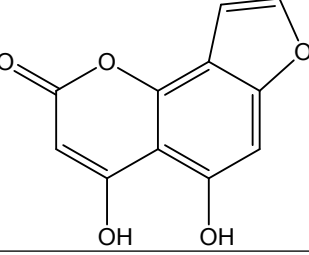
63	Cnidilin	<i>Apium graveolens</i> F. Apiaceae		[32]
64	Bergaptol	<i>Apium graveolens</i> F. Apiaceae		[32]
65	Xanthotoxol	<i>Cyperus alopecuroides</i> F. Cyperaceae		[21]
		<i>Ficus carica</i> F. Moraceae		[33]
		<i>Apium graveolens</i> F. Apiaceae		[32]
		<i>Angelica archangelica</i> F. Apiaceae		[23]

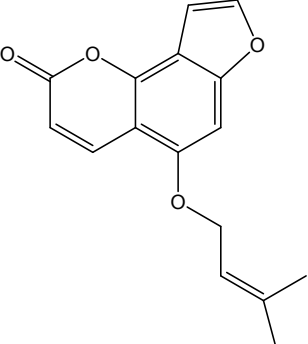
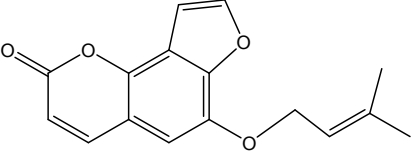
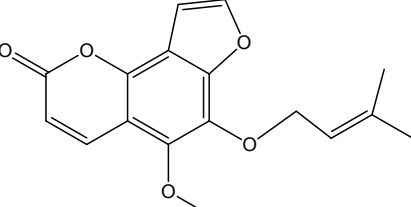
66	Oreoselone	<i>Angelica archangelica</i> F. Apiaceae		[23]
67	Rutaretin	<i>Apium graveolens</i> F. Apiaceae		[23]
68	Apiumetin	<i>Apium graveolens</i> F. Apiaceae		[23]
69	Apiumoside	<i>Apium graveolens</i> F. Apiaceae		[23]
70	Auraptene	<i>Aegle marmelos</i> F. Rutaceae		[23]
71	Marmesin	<i>Ficus nervosa</i> F. Moraceae		[22]
		<i>Ammi majus</i> F. Apiaceae		[23]

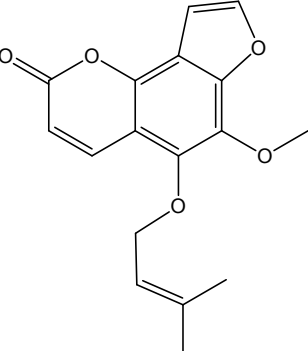
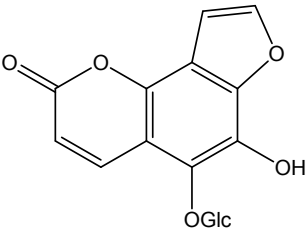
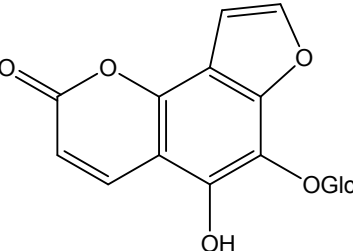
72	5-(1'',1''-Dimethylallyl)-8-methylpsoralen	<i>Ficus carica</i> F. Moraceae	 <p>The structure shows a psoralen core consisting of a coumarin ring fused to a furan ring. At the 5-position of the coumarin ring, there is a 1,1-dimethylallyl group. At the 8-position, there is a methyl group.</p>	[34]
73	2''-O-Acetyloxypeucedanin hydrate-3''-methyl ether	<i>Ficus carica</i> F. Moraceae	 <p>The structure shows a psoralen core with a furan ring. At the 2'' position of the furan ring, there is an acetoxy group (AcO). At the 3'' position, there is a methyl ether group (OCH<sub>3</sub>).</p>	[34]
74	5-O-β-D-Glucopyranosyl-8-hydroxypsoralen	<i>Ficus species</i> F. Moraceae	 <p>The structure shows a psoralen core with a furan ring. At the 5-position of the coumarin ring, there is a hydroxyl group (OH). At the 8-position, there is a β-D-glucopyranosyl group (O-Glc).</p>	[35,36]

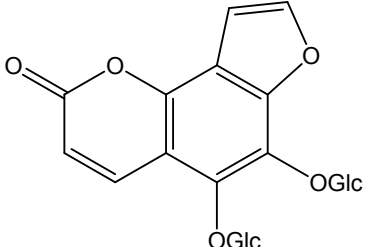
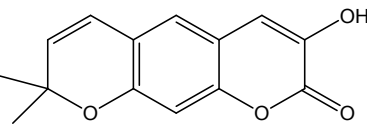
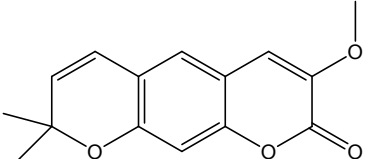
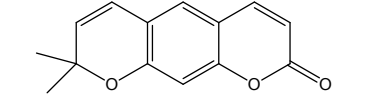
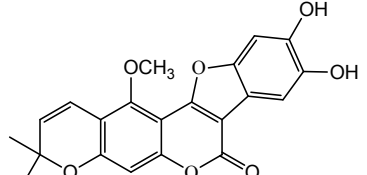
75	8- <i>O</i> - $\beta$ -D-Glucopyranosyl-5-hydroxypsoralen	<i>Ficus</i> species F. Moraceae		[35,36]
76	Isopimpinellin	<i>Ammi majus</i> , <i>Apium graveolens</i> , <i>Petroselinum crispum</i> F. Apiaceae		[23]
77	Pimpinellin	<i>Cyperus papyrus</i> F. Moraceae		[21]
		<i>Apium graveolens</i> F. Apiaceae		[32]
78	Sphondin	<i>Apium graveolens</i> F. Apiaceae		[32]

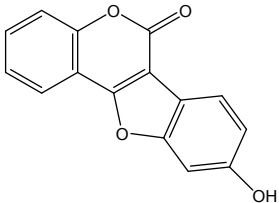
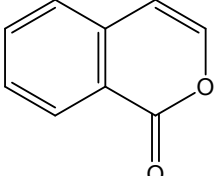
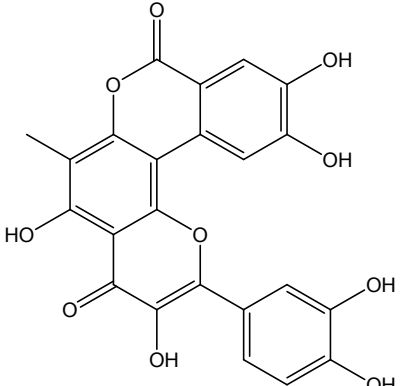
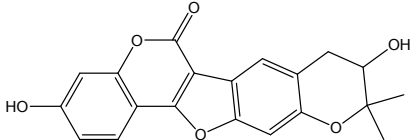


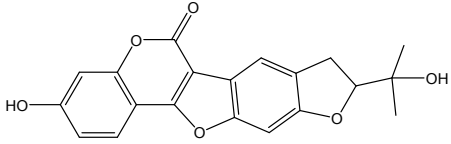
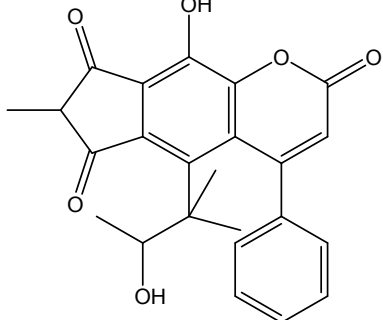
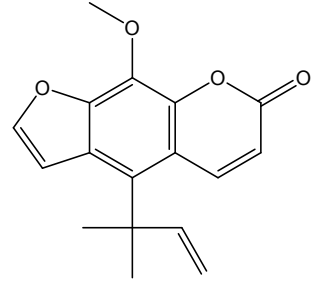
79	Isobergapten	<i>Apium graveolens</i> F. Apiaceae		[32]
80	Isobergaptol	<i>Apium graveolens</i> F. Apiaceae		[32]
81	Sphondinol	<i>Apium graveolens</i> F. Apiaceae		[32]
82	5,6-Dihydroxyangelicin	<i>Apium graveolens</i> F. Apiaceae		[32]

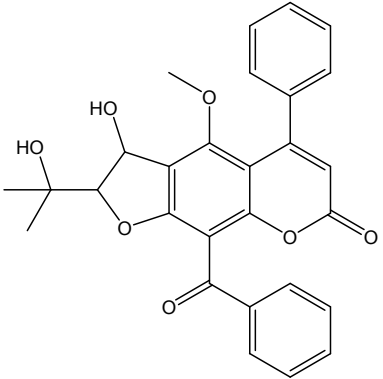
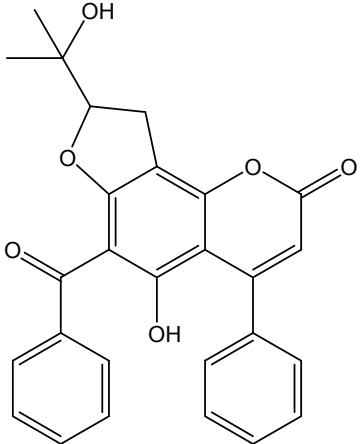
83	Lanatin	<i>Apium graveolens</i> F. Apiaceae		[32]
84	Heratomin	<i>Apium graveolens</i> F. Apiaceae		[32]
85	6-Isopentenylxyisobergapten	<i>Apium graveolens</i> F. Apiaceae		[32]

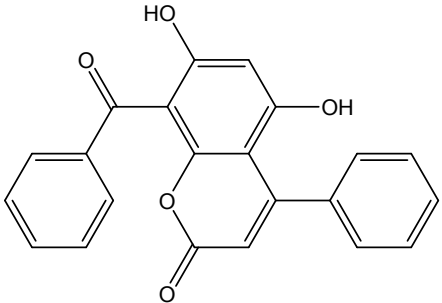
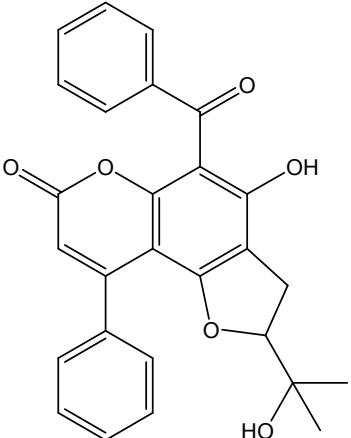
86	5-Isopentenylloxysphondin	<i>Apium graveolens</i> F. Apiaceae	 <p>The structure shows a central benzene ring substituted with a coumarin ring at the 2-position, a furfuryl ring at the 3-position, a methoxy group at the 4-position, and an isopentenyl ether chain at the 5-position.</p>	[32]
87	5- <i>O</i> -β-D-Glucopyranosyl-6-hydroxyangelicin	<i>Ficus species</i> F. Moraceae	 <p>The structure shows a central benzene ring substituted with a coumarin ring at the 2-position, a furfuryl ring at the 3-position, a hydroxyl group at the 4-position, and a β-D-glucopyranosyl group (OGlc) at the 5-position.</p>	[35,36]
88	6- <i>O</i> -β-D-Glucopyranosyl-5-hydroxyangelicin	<i>Ficus species</i> F. Moraceae	 <p>The structure shows a central benzene ring substituted with a coumarin ring at the 2-position, a furfuryl ring at the 3-position, a hydroxyl group at the 5-position, and a β-D-glucopyranosyl group (OGlc) at the 6-position.</p>	[35,36]

89	5,6- <i>O</i> - $\beta$ -D-Diglucopyranosylangelicin	<i>Ficus</i> species F. Moraceae		[35,36]
90	3-Hydroxyxanthyletin	<i>Ficus nervosa</i> F. Moraceae		[22]
91	3-Methoxyxanthyletin	<i>Ficus nervosa</i> F. Moraceae		[22]
92	Xanthyletin	<i>Ficus nervosa</i> F. Moraceae		[22]
93	5-Methoxy-4,2'-epoxy-3-(4',5'-dihydroxyphenyl)-linear pyranocoumarin	<i>Ficus hirta</i> F. Moraceae		[37]

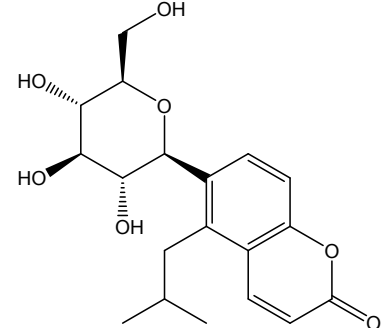
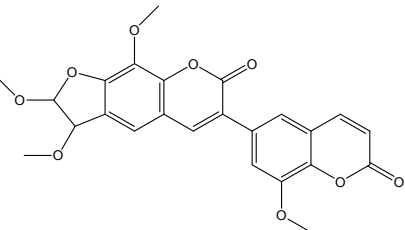
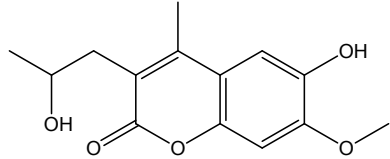
94	Coumestrol	<i>Punica granatum</i> F. Punicaceae		[38]
95	Isocoumarin	<i>Ficus racemosa</i> F. Moraceae		[39,40]
96	Baeckein A	<i>Baeckea frutescens</i> F. Myrtaceae		[41]
97	Bavacoumestan A	<i>Psoralea corylifoli</i> F. Fabaceae		[42]

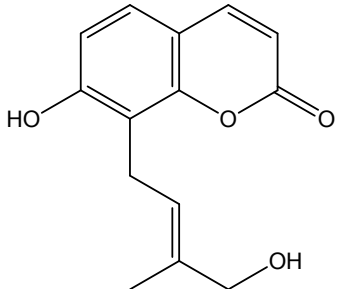
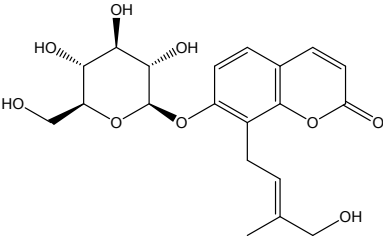
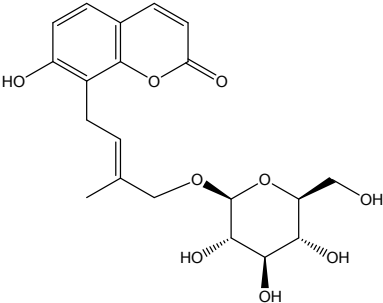
98	Bavacoumestan B	<i>Psoralea corylifoli</i> F. Fabaceae	 <p>The structure of Bavacoumestan B is a complex polycyclic molecule. It features a central benzene ring fused to a five-membered furan ring and a six-membered pyridone ring. A hydroxyl group (-OH) is attached to the benzene ring. The pyridone ring is further fused to another five-membered furan ring, which is substituted with a tert-butyl group and a hydroxyl group (-OH).</p>	[42]
99	Beccamarin	<i>Mesua beccariana</i> F. Calophyllaceae	 <p>The structure of Beccamarin is a complex polycyclic molecule. It features a central benzene ring fused to a five-membered furan ring and a six-membered pyridone ring. The pyridone ring is further fused to another five-membered furan ring, which is substituted with a methyl group and a hydroxyl group (-OH). A phenyl ring is attached to the central benzene ring.</p>	[43]
100	Benahorin	<i>Ruta pinnata</i> F. Rutaceae	 <p>The structure of Benahorin is a complex polycyclic molecule. It features a central benzene ring fused to a five-membered furan ring and a six-membered pyridone ring. A methoxy group (-OCH<sub>3</sub>) is attached to the benzene ring. The pyridone ring is further fused to another five-membered furan ring, which is substituted with a methyl group and a hydroxyl group (-OH).</p>	[44]

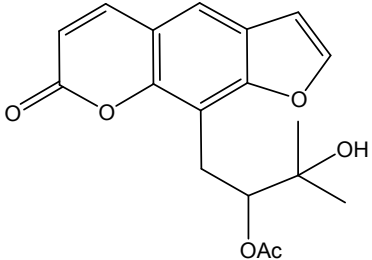
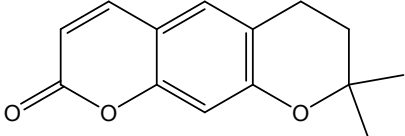
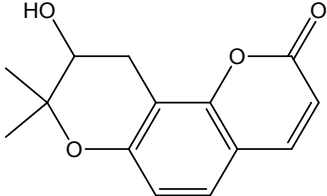
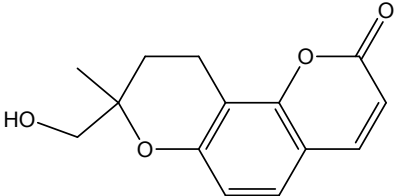
101	9-Benzoyl-2,3-dihydro-3-hydroxy-2-(1-hydroxy-1-methylethyl)-4-methoxy-5-phenyl-7H-furo[3,2-g]-1-benzopyran-7-one	<i>Calophyllum teysmannii</i> F. Calophyllaceae		[45]
102	6-Benzoyl-8,9-dihydro-5-hydroxy-8-(1-hydroxy-1-methylethyl)-4-phenyl-2H-furo[2,3-h]-1-benzopyran-2-one	<i>Calophyllum teysmannii</i> F. Calophyllaceae		[45]

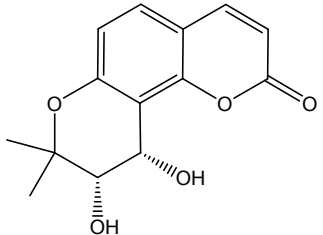
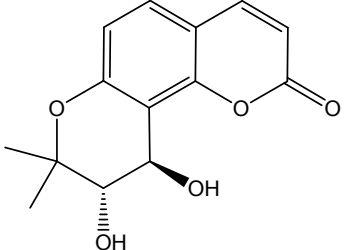
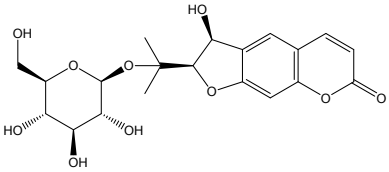
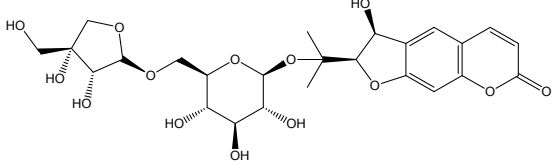
103	8-Benzoyl-5,7-dihydroxy-4-phenyl-2H-1-benzopyran-2-one	<i>Calophyllum teysmannii</i> F. Calophyllaceae	 <p>The structure shows a central benzopyran ring system. The pyran ring has a carbonyl group at position 2 and a phenyl group at position 4. The benzene ring has hydroxyl groups at positions 5 and 7, and a benzoyl group at position 8.</p>	[45]
104	Hydrohydroxyisocalanone	<i>Calophyllum teysmannii</i> F. Calophyllaceae	 <p>The structure is a complex polycyclic molecule. It features a central benzopyran core. Attached to this core are a benzoyl group, a hydroxyl group, and a side chain containing a five-membered furan ring and a quaternary carbon atom with two methyl groups and a hydroxyl group.</p>	[45]

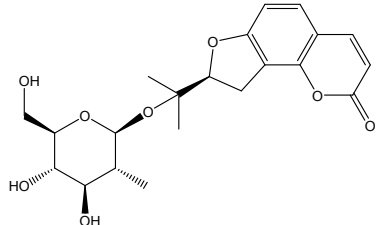
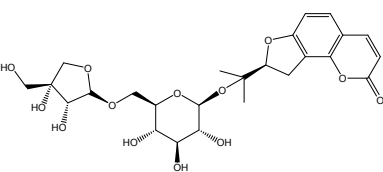
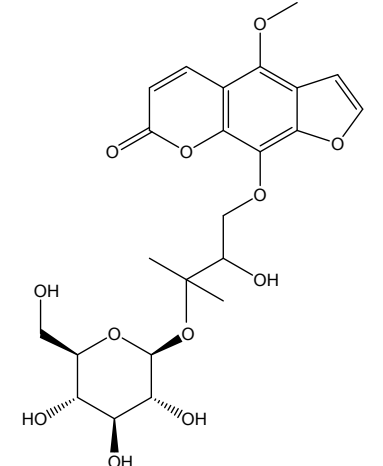


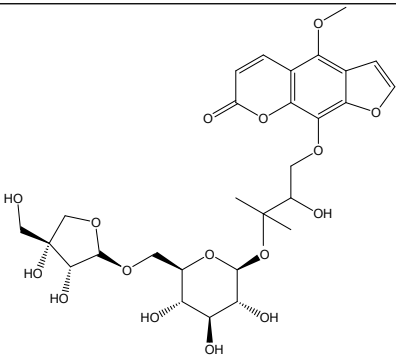
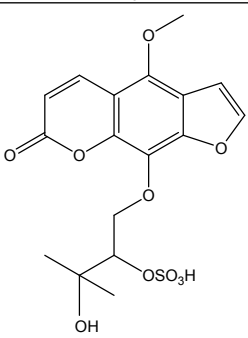
105	5-Isobutylcoumarin-6-C-glucoside	<i>Ammi majus</i> F. Apiaceae		[28]
106	6,7,9-Trimethoxy-3-(8'-methoxy-2'-oxo-2H-chromen-3-yl)-2H-furo[3,2-g]chromen-2(3H)-one	<i>Ammi majus</i> F. Apiaceae		[46]
107	6-Hydroxy-3-(2-hydroxypropyl)-7-methoxy-4 methylcoumarin	<i>Ammi majus</i> F. Apiaceae		[46]

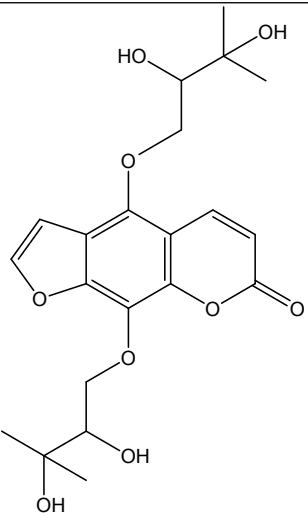
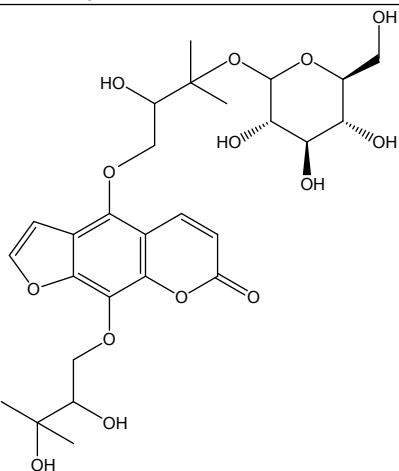
108	Isoarnottinin	<i>Ammi majus</i> F. Apiaceae		[47]
109	Isoarnottinin-7-O-β-D-glucoside	<i>Ammi majus</i> F. Apiaceae		[47]
110	Isoarnottinin-4'-O-β-D-glucoside	<i>Ammi majus</i> F. Apiaceae		[47]

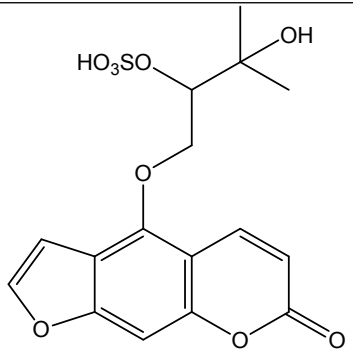
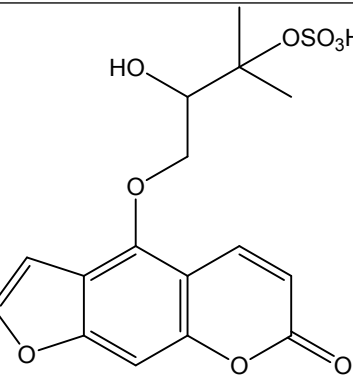
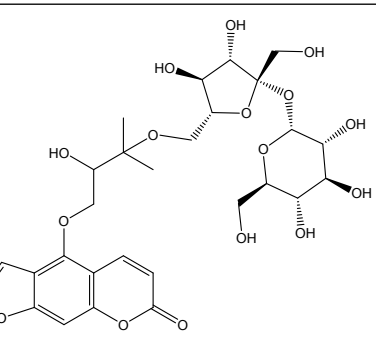
111	8-(2''-Acetoxy-3''-hydroxy-3''-methylbutoxy)psoralen	<i>Ammi majus</i> F. Apiaceae	 <p>The structure shows a psoralen core (a benzopyrone fused to a furan ring). At the 8-position of the benzopyrone ring, there is a butoxy chain. The 2-position of this butoxy chain has an acetoxy group (OAc) and the 3-position has a hydroxyl group (OH) and a methyl group.</p>	[47]
112	Dihydroxanthyletin	<i>Ammi majus</i> F. Apiaceae	 <p>The structure shows a psoralen core. At the 8-position of the benzopyrone ring, there is a tetrahydrofuran ring. The 2-position of this tetrahydrofuran ring has a methyl group and a hydroxyl group (OH).</p>	[47]
113	Lomatin	<i>Ammi majus</i> F. Apiaceae	 <p>The structure shows a psoralen core. At the 8-position of the benzopyrone ring, there is a tetrahydrofuran ring. The 2-position of this tetrahydrofuran ring has a methyl group and a hydroxyl group (HO).</p>	[47]
114	Ammirol	<i>Ammi majus</i> F. Apiaceae	 <p>The structure shows a psoralen core. At the 8-position of the benzopyrone ring, there is a tetrahydrofuran ring. The 2-position of this tetrahydrofuran ring has a methyl group and a hydroxymethyl group (HO-CH<sub>2</sub>).</p>	[47]

115	(-)- <i>cis</i> -Khellactone	<i>Peucedanum japonicum</i> F. Apiaceae		[30]
116	(+) - <i>trans</i> -Khallactone	<i>Peucedanum japonicum</i> F. Apiaceae		[48]
117	1'- <i>O</i> -β-D-Glucopyranosyl-3'-hydroxynodakenetin	<i>Angelica dahurica</i> F. Apiaceae		[49]
118	(3' <i>S</i> )-Hydroxynodakenetin-4'- <i>O</i> -β-D-apiofuranosyl-(1 → 6)-β-D-glucopyranoside	<i>Angelica dahurica</i> F. Apiaceae		[49]

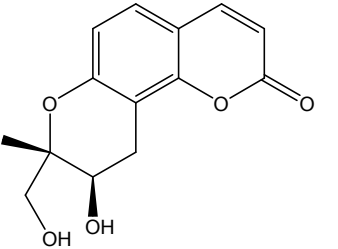
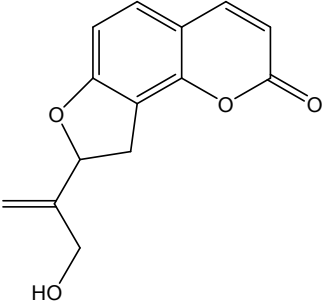
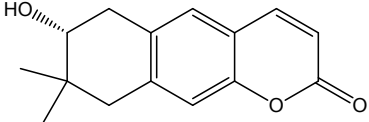
119	Columbianetin 2'-O-β-D-glucopyranoside	<i>Angelica dahurica</i> F. Apiaceae	 <p>The structure shows a glucose molecule in its pyranose form. At the 2' position, there is an ether linkage to a side chain. This side chain consists of a quaternary carbon atom bonded to a methyl group, a propyl group, and an oxygen atom. The oxygen atom is part of a five-membered furan ring, which is further substituted with a 6-methoxy-2-pyrone ring system.</p>	[49]
120	Columbianetin 2'-O-β-D-apiofuranosyl-(1 → 6)-β-D-glucopyranoside	<i>Angelica dahurica</i> F. Apiaceae	 <p>This structure is similar to the previous one, but the glucose molecule is linked to an apiofuranose molecule at the 6' position. The apiofuranose is a five-membered furanose ring with a hydroxymethyl group at the 2' position and a hydroxyl group at the 3' position. It is connected to the glucose molecule via an oxygen atom at the 1' position.</p>	[49]
121	Byakangelicin 3''-O-β-D-glucopyranoside	<i>Angelica dahurica</i> F. Apiaceae	 <p>The structure shows a glucose molecule in its pyranose form. At the 3'' position, there is an ether linkage to a side chain. This side chain consists of a quaternary carbon atom bonded to a methyl group, a propyl group, and an oxygen atom. The oxygen atom is part of a side chain that includes a 6-methoxy-2-pyrone ring system, which is further substituted with a furan ring.</p>	[49]

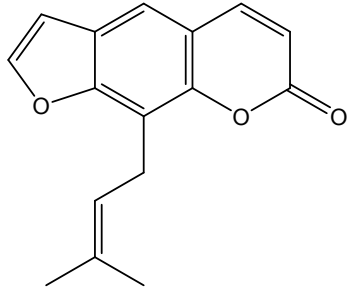
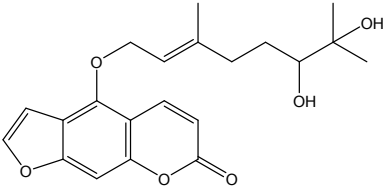
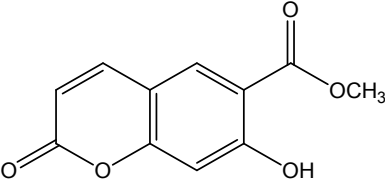
122	Byakangelicin 3''-O- $\beta$ -D-apiofuranosyl-(1 $\rightarrow$ 6)- $\beta$ -D-glucopyranoside	<i>Angelica dahurica</i> F. Apiaceae		[49]
123	2''-Sulfo-( $\pm$ )-byakangelicin	<i>Angelica dahurica</i> F. Apiaceae		[49]

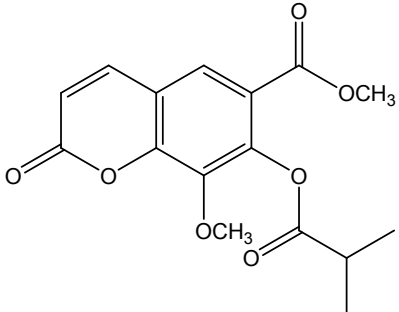
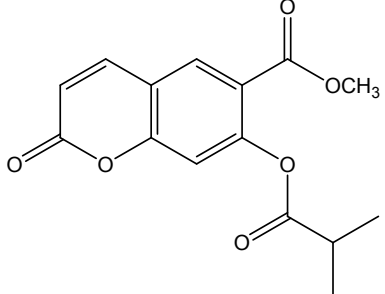
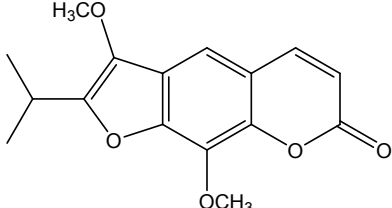
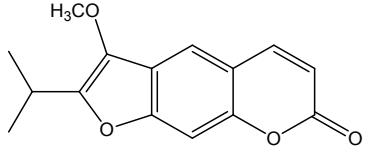
124	5,8-Bis-(2,3-dihydroxy-3-methylbutyloxy)-psoralen	<i>Angelica dahurica</i> F. Apiaceae		[49]
125	3''-O-β-D-Glucopyranosyl-5,8-bis(2,3-dihydroxy-3-methylbutyloxy)-psoralen	<i>Angelica dahurica</i> F. Apiaceae		[49]

126	2''-Sulfo-(±)-oxypeucedanin hydrate	<i>Angelica dahurica</i> F. Apiaceae		[49]
127	3''-Sulfo-(±)-oxypeucedanin hydrate	<i>Angelica dahurica</i> F. Apiaceae		[49]
128	<i>R</i> -(+)-Oxypeucedanin hydrate-3''-sucrose ether	<i>Angelica dahurica</i> F. Apiaceae		[49]



129	Hydroxylomatin	<i>Angelica purpuraeifolia</i> F. Apiaceae		[50]
130	Discophoridin	<i>Angelica purpuraeifolia</i> F. Apiaceae		[50]
131	Angelinol	<i>Angelica purpuraeifolia</i> F. Apiaceae		[50]

132	Isogospherol	<i>Ducrosia anethifolia</i> F. Apiaceae		[51]
133	6,7-Dihydroxybergamottin	<i>Peucedanum luxurians</i> F. Apiaceae		[52]
134	Officinalin	<i>Peucedanum luxurians</i> F. Apiaceae		[52]

135	Stenocarpin isobutyrate	<i>Peucedanum luxurians</i> F. Apiaceae		[52]
136	Officinalin isobutyrate	<i>Peucedanum luxurians</i> F. Apiaceae		[52]
137	8-Methoxypeucedanin	<i>Peucedanum luxurians</i> F. Apiaceae		[52]
138	Peucedanin	<i>Peucedanum luxurians</i> F. Apiaceae		[52]

## References

1. Fortin, H.; Tomasi, S.; Jaccard, P.; Robin, V.; Boustie, J. A prenyloxycoumarin from *Psiadia dentate*. *Chem. Pharm. Bull.* **2001**, *49*, 619-621.
2. Hassan, M.Z.; Osman, H.; Ali, M.A.; Ahsan, M.J. Therapeutic potential of coumarins as antiviral agents. *Eur. J. Med. Chem.* **2016**, *123*, 236-255.
3. Huang, S.C.; Wu, P.L.; Wu, T.S. Two coumarins from the root bark of *Clausena excavata*. *Phytochemistry* **1997**, *44*, 179–181.
4. Chattopadhyay, S.K. Pharmacological potentiality of coumarins as anti-viral agent. *Int. J. Res. Anal. Rev.* **2018**, *5*, 281–291.
5. Mishra, S.; Pandey, A.; Manvat, S. Coumarin: An emerging antiviral agent. *Heliyon* **2020**, *6*, e03217.
6. Dissanayake, K.G.C.; Perera, W.P.R.T. Medicinal importance of *Ferula asafetida* oligogum resins against infective diseases. *J. Med. Plants Stud.* **2020**, *8*, 135-139.
7. Venugopala, K.N.; Rashmi, V.; Odhav, B. Review on natural coumarin lead compounds for their pharmacological activity. *Biomed. Res. Int.* **2013**, 963248.
8. Shokoohinia, Y.; Sajjadi, S.-E.; Gholamzadeh, S.; Fattahi, A.; Behbahani, M. Antiviral and cytotoxic evaluation of coumarins from *Prangos ferulacea*. *Pharm. Biol.* **2014**, *52*, 1543-1549.
9. Bedoya, L.M.; Beltran, M.; Sancho, R.; Olmedo, D.A.; Sanchez-Palomino, S.; Olmo, D.E.; Lopez-Perez, J.L.; Munoz, E.; San A.F.; Alcami J. 4-Phenylcoumarins as HIV transcription inhibitors. *Bioorg. Med. Chem. Lett.* **2005**, *15*, 4447-4450.
10. Nahar, L.; Talukdar, A. D.; Nath, D.; Nath, S.; Mehan, A.; Ismail, F.M.D.; Sarker, S.D. Naturally Occurring Calanolides: Occurrence, biosynthesis, and pharmacological properties including therapeutic potential. *Molecules* **2020**, *25*, 4983.
11. Kostova, I.; Mojzic, J. Biologically active coumarins as inhibitor of HIV-1. *Future HIV Therapy* **2007**, *1*, 315-329.

12. Patil, A.D.; Freyer, A.J.; Eggleston, D.S.; Haltiwanger, R.C.; Bean, M.F.; Taylor, P.B.; Caranfa, M.J.; Breen, A.L.; Bartus, H.R.; Johnson, R.K.; Hertzberg, R.P.; Westley, J.W. The inophyllums, novel inhibitors of HIV-1 reverse transcriptase isolated from the Malaysian tree, *Calophyllum inophyllum* Linn. *J. Med. Chem.* **1993**, *36*, 4131-4138.
13. Silveira, C.S.; Martins, F.O.; Romanos, M.T.V.; Costa, C.S.; Kaplan, M.A.C.; Menezes, F.S. In vitro cytotoxic, antioxidant and antiviral effects of *Pterocaulon alopecuroides* and *Bidens segetum* extracts. *Rev. Bras. Farmacogn.* **2009**, *19*, 343-348.
14. Houghton, P.J.; Woldemariam, T.Z.; Khan, A.I.; Burke, A.; Mahmood, N.A. Antiviral activity of natural and semi-synthetic chromone alkaloids. *Antivir. Res.* **1994**, *25*, 235-244.
15. Nonaka, G.; Nishioka, I.; Nishizawa, M.; Yamagishi, T.; Kashiwada, Y.; Dutschman, G.E.; Bodner, A.J.; Kilkuskie, R.E.; Cheng, Y.; Lee, K. Anti-AIDS agents, 2. Inhibitory effects of tannins on HIV reverse transcriptase and HIV replication in H9 lymphocyte cells. *J. Nat. Prod.* **1990**, *53*, 587-595.
16. WO1988008707A3.
17. Barkat, M.A.; Rizwanullah, M.; Naim J.; Pottoo, F.H.; Kumar, R. Phytoconstituents as potential anti-HIV agents: A systematic review. *Int. J. Biomed. Res.* **2014**, *5*, 299-313.
18. Rajtar, B.; Skalicka-Woźniak, K., Świątek, Ł., Stec, A.; Boguszevska, A.; Polz-Dacewicz, M. Antiviral effect of compounds derived from *Angelica archangelica* L. on *Herpes simplex virus-1* and *Coxsackievirus B3* infections. *Food Chem. Toxicol.* **2017**, *109*, 1026-1031.
19. Hussain, H.; Hussain, J.; Al-Harrasi, A.; Shinwari, Z.K. Chemistry of Some Species Genus *Lantana*. *Pak. J. Bot.* **2011**, *43*, 51-62.
20. El-Sayyad, S.M.; Sayed, H.M.; Mousa, S.M. Chemical constituents and preliminary anthelmintic activity of *Ficus platyphylla* (Del.). *Bull. Pharm. Sci. (Assiut Univ.)* **1986**, *8*, 164-177.

21. Mohamed, G.A.; Kamal, H.M.K.; Elhady, S.S.; Ibrahim, S.R.M.. A Review: Compounds isolated from *Cyperus* species (Part I): Phenolics and nitrogenous. *Int. J. Pharmacogn. Phytochem. Res.* **2015**, *7*, 51-67.
22. Chen, L.-W.; Cheng, M.-J.; Peng, C.-F.; Chen I.-S. Secondary metabolites and antimycobacterial activities from the roots of *Ficus nervosa*. *Chem. Biodivers.* **2010**, *7*, 1814-1821.
23. Matos, M.J.; Santana, L.; Uriarte, E.; Abreu, O.A.; Molina, E.; Yordi, E.G. Coumarins - an important class of phytochemicals. <http://dx.doi.org/10.5772/59982>, **2014**.
24. Iranshahi, M.; Farhadi, F.; Paknejad, B.; Zareian, P.; Iranshahi, M.; Karami, M.; Abtahi, S.R. Gummosin, a sesquiterpene coumarin from *Ferula assa-foetida* is preferentially cytotoxic to human breast and prostate cancer cell lines. *Avicenna J. Phytomed.* **2019**, *9*, 446-453.
25. Han, S.; Li, L.; Song, S. *Daphne giraldii* Nitsche (Thymelaeaceae): Phytochemistry, pharmacology and medicinal uses. *Phytochemistry* **2020**, *171*, 112231.
26. Parveen, M.; Ali, A.; Malla, A.M.; Silva, P.S.P.; Silva, M.R. A halogenated coumarin from *Ficus krishnae*. *Chem. Pap.* **2011**, *65*, 735-738.
27. Yin, W.; Chen, H.; Wang, T.; Cai, M. A new coumarin compound with anticancer activity. *Zhongcaoyao* **1997**, *28*, 3-4.
28. Kasaian, J.; Mosaffa, F.; Behravan, J.; Masullo, M.; Piacente, S; Iranshahi, M. Modulation of multidrug resistance protein 2 efflux in the cisplatin resistance human ovarian carcinoma cells A2780/RCIS by sesquiterpene coumarins. *Phytother. Res.* **2016**, *30*, 84-89.
29. Asghari, J.; Atabaki, V.; Baher, E.; Mazaheritehrani, M. Identification of sesquiterpene coumarins of oleo-gum resin of *Ferula assa-foetida* L. from the Yasuj region. *Nat. Prod. Res.* **2016**, *30*, 350-353.
30. A. Ghannadi, K. Fattahian, Y. Shokoohinia, M. Behbahani and A. Shahnoush, *Iran. J. Pharm. Res.* **2014**, *12*, 523-530.
31. Bandyopadhyay, D.; Banerjee, M.; Laskar, S.; Basaka, B. Asimafoetidnol: a new sesquiterpenoid coumarin from the gum resin of *Ferula assa-foetida*. *Nat. Prod. Commun.* **2011**, *6*, 209-212.

32. Salehi, B.; Venditti, A.; Frezza, C.; Yüce-tepe, A.; Altunta, Ü.; Uluata, S.; Butnariu, M.; Sarac, I.; Shaheen, S.; Petropoulos, S.A.; Matthews, K.R.; Kılıç, C.S.; Atanassova, M.; Adetunji, C.O.; Ademiluyi, A.O.; Özçelik, B.; Fokou P.V.T.; Martins, N.; Cho, W.C.; Sharifi-Rad, J. *Apium* Plants: beyond simple food and phytopharmacological applications. *Appl. Sci.* **2019**, *9*, 1-39.
33. Balas, R.K.; Agha, R. Isolation of a hypoglycemic principle from the bark of *Ficus glomerata* Roxb. *Chem. Pharm. Bull.* **1985**, *2*, 13-14.
34. Jain, R.; Jain, S.C.; Bhagchandania, T.; Yadava, N. New furanocoumarins and other chemical constituents from *Ficus carica* root heartwood. *Z. Naturforsch.* **2013a**, *68c*, 3-7.
35. Lansky, E.P.; Paavilainen, H.M.; Pawlus, A.D.; Newman, R.A. *Ficus* spp. (fig): Ethnobotany and potential as anticancer and anti-inflammatory agents *J. Ethnopharmacol.* **2008**, *119*, 195-213.
36. Chang M.-S., Yang Y.-C., Kuo Y.-C., Kuo Y.-H., Chang C., Chen C.-M., Lee T.-H. Furocoumarin glycosides from the leaves of *Ficus ruficaulis* Merr. var. *antaoensis*. *J. Nat. Prod.* **2005**, *68*, 11–13.
37. Ya, J.; Zhang, X.-Q.; Wang, Y.; Zhang, Q.-W.; Chen, J.-X.; Ye, W.-C. Two new phenolic compounds from the roots of *Ficus hirta*. *Nat. Prod. Res.* **2010**, *24*, 621-625.
38. Lansky, E. P.; Newman, R. A. *Punica granatum* (pomegranate) and its potential for prevention and treatment of inflammation and cancer. *J. Ethnopharmacol.* **2007**, *109*, 177–206.
39. Ahmed, F.; Urooj, A. Hepatoprotective effects of *Ficus racemosa* stem bark against carbon tetrachloride-induced hepatic damage in albino rats. *Pharm. Biol.* **2010**, *48*, 210-216.
40. Jain, R.; Rawat, S.; Jain, S.C. Phytochemicals and antioxidant evaluation of *Ficus racemosa* root bark. *J. Pharm. Res.* **2013b**, *6*, 615-619.
41. Jia, B.X.; Ren, F.X.; Jia, L.; Chen, X.Q.; Yang, J.; Wang, Q. Baecklein E, a new bioactive C-methylated biflavonoid from the roots of *Baeckea frutescens*. *Nat. Prod. Res.* **2013**, *27*, 2069-2075.

42. Gupta, S.; Jha, B.N.; Gupta, G.K.; Gupta, B.K.; Dhar, K.L. Coumestans from seeds of *Psoralea corylifolia*. *Phytochemistry* **1990**, *29*, 2371-2373.
43. Ee, G.C.L.; Teh, S.S.; Mah, S.H.; Rahmani, M.; Yap, Y.H.T.; Awang, K.A. Novel Cyclodione Coumarin from the Stem Bark of *Mesua beccariana*. *Molecules* **2011**, *16*, 7249–7255.
44. González, A.G.; Martínez, E.A.; Iniguez, M.A.M.; Luis, F.R. New sources of natural coumarins. Products of twigs of *Ruta pinnata* L. Fil, structure of benahorin. *Awl. Quim.* **1971**, *67*, 441.
45. Cao, S.G.; Wu, X.H.; Sim, K.Y.; Tan, B.H.K.; Vittal, J.J.; Pereira, J.T.; Goh, S.H. Minor coumarins from *Calophyllum teysmannii* var. *inophylloide* and synthesis of cytotoxic calanone derivatives. *Helv. Chim. Acta* **1998**, *81*, 1404–1416.
46. El-Sharkawy, E.; Selim, Y. Three new coumarin types from aerial parts of *Ammi majus* L. and their cytotoxic activity. *Z. Naturforsch C J. Biosci.* **2018**, *73*, 1-7.
47. Elgamal, M.H.A.; Shalaby, N.M.M.; Duddeck, H.; Hiegemann, M. Coumarins and coumarin glucosides from the fruits of *Ammi majus*. *Phytochemistry* **1993**, *34*, 819-823.
48. Duh, C.-Y.; Wang, S.-K.; Wu, Y.-C. Cytotoxic pyranocoumarins from roots of *Peucedanum japonicum*. *Phytochemistry* **1992**, *31*, 1829.
49. Matsuo Y., Yamaguchi E., Hakamata R., Ootomo K., Takatori K., Fukaya H., Mimaki Y. Benzofuran and coumarin derivatives from the root of *Angelica dahurica* and their PPAR- $\gamma$  ligand-binding activity. *Phytochemistry* **2020**, *173*, 112301.
50. Lee, H.-K.; Oh, S.-R.; Kwon, O.-K.; Ahn, K.-S.; Lee, J.; Kim, J.-C.; Byung-Sun Min, B.-S.; Joung, H. Isolation of coumarins and ferulate from the Roots of *Angelica purpuraefolia* and the antitumor activity of khellactone. *Phytother. Res.* **2007**, *21*, 406-409.
51. Mottaghipisheh, J.; Nove, M.; Spengler, G.; Kusz, N.; Hohmann, J.; Csupor, D. Antiproliferative and cytotoxic activities of furocoumarins of *Ducrosia anethifolia*. *Pharm. Biol.* **2018**, *56*, 658-664.



52. Widelski, J.; Luca, S.V.; Skiba, A.; Chinou, I.; Marcourt, L.; Wolfender, J.L.; Skalicka-Wozniak, K. Isolation and antimicrobial activity of coumarin derivatives from fruits of *Peucedanum luxurians* Tamamsch. *Molecules* **2018**, *23*, 1222.