

Review on Phytochemical Constituents of the Genus *Cassia*

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Abstract

Over thousands of years, an astounding number of novel medications have been identified from natural sources, many of them based on their use in conventional medical care. It is now well acknowledged that Indian medicinal herbs hold considerable promise for the production of clinically beneficial medications that may even be utilized by allopathic doctors. *Cassia* is a large genus of around 5000 species of flowering plants in the family leguminaceae / fabaceae. It is extensively distributed over the world, with only 20 species being indigenous to India. In the conventional Indian medical system, this plant has been given credit for a variety of therapeutic characteristics. There are reports indicating its antibacterial activity against a wide spectrum of bacteria, anti-tumor, hepatoprotective antifertility, antioxidant as well as its actions on the central nervous systems. The plants are important sources of tannins, glycosides and flavonoides, linoleic, oleic and stearic acid. This chemical review shows the important bioactive classes of genus *Cassia* plants extract, including anthraquinones, flavonoids, alkaloids, terpenes, essential oil and sterols.

Keywords: Fabaceae, *Cassia*, Anthraquinone.

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1. Introduction

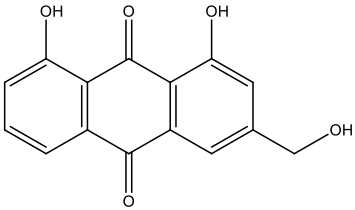
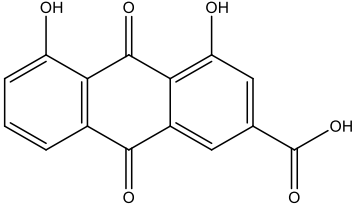
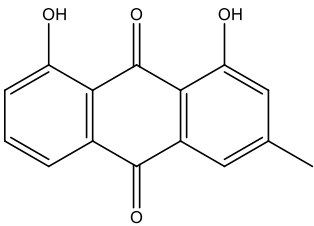
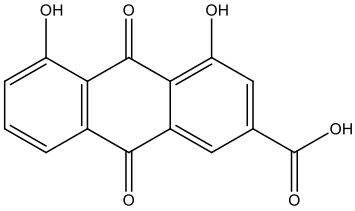
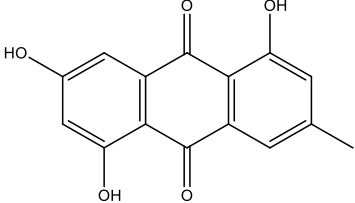
Researchers have been working to find and validate plant-derived compounds for the treatment of numerous ailments during the past few years. It's interesting to note that over 25% of contemporary medications are thought to be derived either directly or indirectly from plants. It is important to note that Indian medicinal plants are regarded as a rich source of many pharmacological principles and substances that are frequently utilized as over-the-counter treatments for a variety of diseases (Danish et al., 2011). The biggest family of flowering plants on Earth and the primary family of the genus *Cassia* is the Fabaceae or Leguminosae, generally known as the bean, pea, or legume family. The traditional medical system makes extensive use of *Cassia* species for the treatment of numerous ailments. The chemical compounds of *Cassia* species have a synergistic mechanism that makes them more advantageous.

Plants belonging to this genus are used to treat gastrointestinal issues, jaundice, anorexia, rheumatism, and skin infections such as eczema, scabies, and ringworm. Around 1854 names of different species are listed for the genus *Cassia* in "The Plant List" (TPL, 2013), and among these, some of the recognised species include *Cassia abbreviate*, *C. aciphylla*, *C. fistula*, *C. javanica*, *C. phyllodinea*, *C. renigera*, and *C. stowardii* (Khurm et al., 2021).

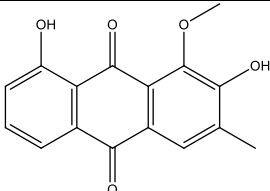
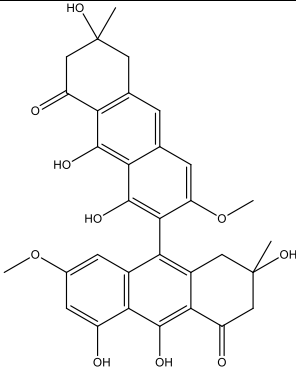
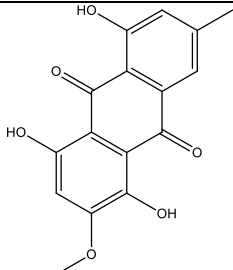
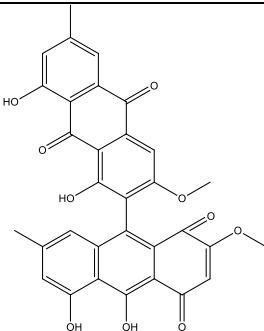
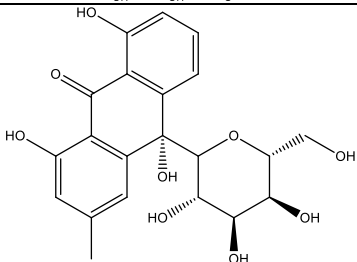
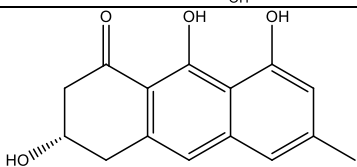
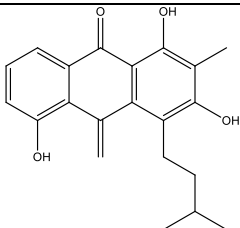
Phytochemicals are plant compounds that are not edible but have defence or disease-prevention abilities. Crude plant extracts from different plant parts such as leaves, barks, seeds, flowers, yields various active ingredients (Desphande and Bhalsing, 2013). This mini review aims to elucidate the phytochemical screening of the various medicinally important species of *Cassia*.

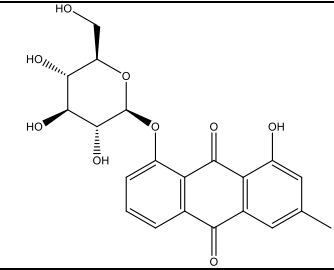
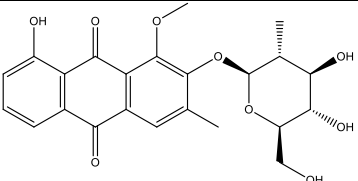
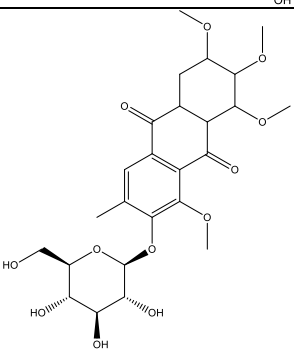
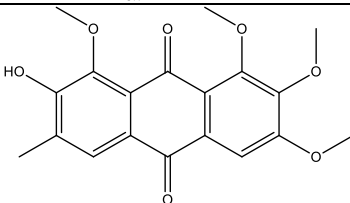
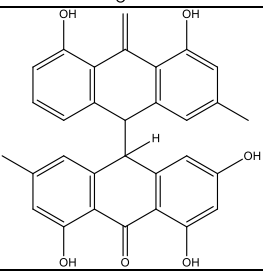
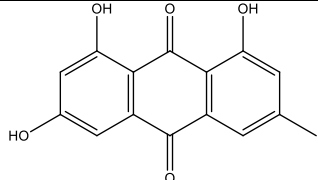
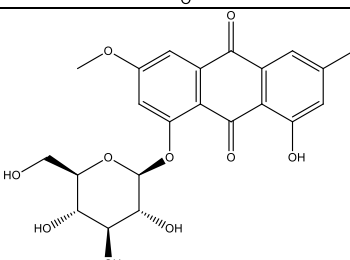
2. Chemical constituents reported from species of genus *Cassia*

Table 1: Anthraquinones reported in genus *Cassia*:

Species	Compound Name	Compound Structure	Reference
<i>C. absus</i> , <i>C. grandis</i> , <i>C. obtusifolia</i> , <i>C. abbreviata</i> , <i>C. acutifolia</i> , <i>C. alata</i> , <i>C. corymbosa</i> , <i>C. fastuosa</i> , <i>C. occidentalis</i> , <i>C. auriculata</i>	Aloe-Emodin		(Ganapaty <i>et al.</i> , 2002) (Juvekar and Halade, 2006) (Dave and Ledwani., 2012) (Desphande and Bhalsing, 2013) (Khurm <i>et al.</i> , 2021)
<i>C. laevigata</i> , <i>C. fistula</i> , <i>C. nigricans</i> , <i>C. acutifolia</i> , <i>C. didymobotrya</i> , <i>C. javanica</i> , <i>C. multiglandulosa</i> , <i>C. nodosa</i> , <i>C. occidentalis</i> , <i>C. pudibunda</i> , <i>C. sophera</i> , <i>C. spectabilis</i> ,	Emodin		(Nazif <i>et al.</i> , 2000) (Lee <i>et al.</i> , 2001) (Ganapaty <i>et al.</i> , 2002) (Obodozie <i>et al.</i> 2005) (Dave and Ledwani., 2012) (Khurm <i>et al.</i> , 2021)
<i>C. garrettiana</i> , <i>C. javanica</i> , <i>C. siamea</i> , <i>C. tora</i> , <i>C. absus</i> , <i>C. abbreviata</i> , <i>C. acutifolia</i> , <i>C. alata</i> , <i>C. biflora</i> , <i>C. renigera</i>	Chrysophanol		(Ganapaty <i>et al.</i> , 2002) (Tewtrakul <i>et al.</i> , 2007) (Dave and Ledwani., 2012) (Khurm <i>et al.</i> , 2021)
<i>C. angustifolia</i> , <i>C. didymobotrya</i> , <i>C. javanica</i> , <i>C. reticulataa</i> , <i>C. didymobotrya</i> , <i>C. fastuosa</i> , <i>C. occidentalis</i>	Rhein		(Ganapaty <i>et al.</i> , 2002) (Dave and Ledwani., 2012) (Khurm <i>et al.</i> , 2021)
<i>C. alata</i>	Alatinone		(Ganapaty <i>et al.</i> , 2002) (Dave and Ledwani., 2012) (Khurm <i>et al.</i> , 2021)

<i>C. auriculata</i>	Rubiadin		(Khurm <i>et al.</i> , 2021)
<i>C. nigricans</i>	Citreorosein		(Rashed, 2021) (Khurm <i>et al.</i> , 2021)
<i>C. didymobotrya</i> , <i>C. obtusifolia</i> , <i>C. occidentalis</i> ,	Questin		(Khurm <i>et al.</i> , 2021)
<i>C. grandis</i>	Emodin-9-anthrone		(Khurm <i>et al.</i> , 2021)
<i>C. fistula</i>	Ziganein		(Khurm <i>et al.</i> , 2021)
<i>C. nomane</i> , <i>C. grandis</i>	Physcion-9-anthrone		(Ganapaty <i>et al.</i> , 2002) (Dave and Ledwani., 2012) (Khurm <i>et al.</i> , 2021)
<i>C. italic</i> , <i>C. angustifolia</i>	Sennidine A and B		(Waltenberger <i>et al.</i> , 2008) (Dave and Ledwani., 2012) (Khurm <i>et al.</i> , 2021)
<i>C. obtusifolia</i> , <i>C. singueana</i> , <i>C. torosa</i>	Torosachryson		(Dave and Ledwani., 2012) (Khurm <i>et al.</i> , 2021)
<i>C. laevigataa</i> , <i>C. tomentosa</i> , <i>C. multiglandulosa</i> , <i>C. floribunda</i> , <i>C. sophera</i>	Floribundone		(Ganapaty <i>et al.</i> , 2002) (Dave and Ledwani., 2012) (Desphande and Bhalsing, 2013) (Khurm <i>et al.</i> , 2021)

<i>C. tora</i> , <i>C. obtusifolia</i>	Obtusifolin		(Dave and Ledwani., 2012) (Khurm <i>et al.</i> , 2021)
<i>C. torosa</i> , <i>C. sophora</i>	Phlegmacin		(Ganapaty <i>et al.</i> , 2002) (Dave and Ledwani., 2012) (Desphande and Bhalsing, 2013) (Khurm <i>et al.</i> , 2021)
<i>C. torosa</i> , <i>C. obtusifolia</i>	Xanthorin		(Dave and Ledwani., 2012)
<i>C. multiglandulosaa</i>	Sengulone		(Khurm <i>et al.</i> , 2021)
<i>C. garrettiana</i>	Cassialoin		(Khurm <i>et al.</i> , 2021)
<i>C. didymobotrya</i>	Germichryson		(Khurm <i>et al.</i> , 2021)
<i>C. siamea</i>	Lupinacidin A		(Ye <i>et al.</i> , 2014)

<i>C. siamea</i>	Chrysophanol 1-O-β-D-glucopyranoside (Pulmatin)		(Ye <i>et al.</i> , 2014)
<i>C. obtusifolia</i>	Obtusifolin 2-O-β-glucopyranoside		(Khurm <i>et al.</i> , 2021)
<i>C. obtusifolia</i>	Chryso-obtusin 2-O-β-glucopyranoside		(Khurm <i>et al.</i> , 2021)
<i>C. obtusifolia</i> , <i>C.tora</i>	Chrysoobtusin		(Dave and Ledwani., 2012)
<i>C. longiracemosa</i>	Chrysophanolbianthrone		(Ganapaty <i>et al.</i> , 2002)
<i>C. acutifolia</i> , <i>C. nigricans</i> , <i>C. occidentalis</i>	Emodol		(Dave and Ledwani., 2012)
<i>C. occidentalis</i>	Physcion-8-O-beta-D-glucoside		(Dave and Ledwani., 2012)

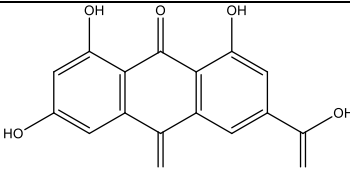
<i>C. mimosoides</i> , <i>C. nigricans</i>	Emodic acid		(Dave and Ledwani., 2012)
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Table 2: Chromones and Stilbenes reported in genus *Cassia*:

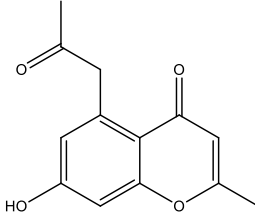
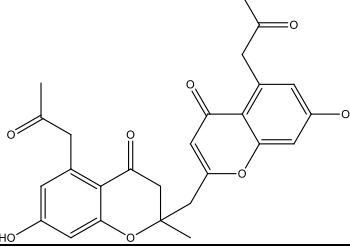
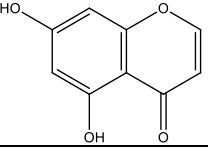
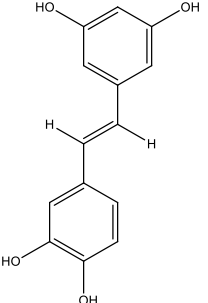
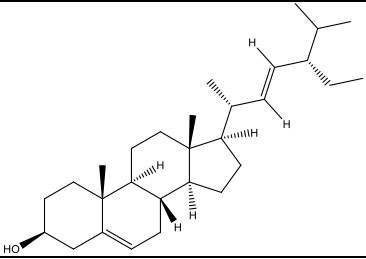
Species	Compound Name	Compound Structure	Reference
<i>C. siamea</i> , <i>C. muttijuga</i>	5 - acetyl - 7 - hydroxy - 2 - methyl chromone		(Ganapaty <i>et al.</i> , 2002) (Khurm <i>et al.</i> , 2021)
<i>C. torosa</i> , <i>C. siamea</i>	Chrobisiamone		(Khurm <i>et al.</i> , 2021)
<i>C. torosa</i>	5,7-dihydroxy chromone		(Khurm <i>et al.</i> , 2021)
<i>C. garrettiana</i>	3, 3', 4, 5' - tetrahydroxy stilbene (piceatannol)		(Ganapaty <i>et al.</i> , 2002) (Tewtrakul <i>et al.</i> , 2007)

Table 3: Phytosterols reported in genus *Cassia*:

Species	Compound Name	Compound Structure	Reference
<i>C. obtusifolia</i> , <i>C. reticulata</i> , <i>C. kleini</i> , <i>C. tora</i> , <i>C. racemosa</i> , <i>C. fistula</i> , <i>C. abbreviata</i>	Stigmasterol		(Ganapaty <i>et al.</i> , 2002) (Khurm <i>et al.</i> , 2021)

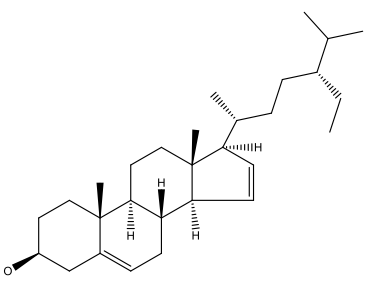
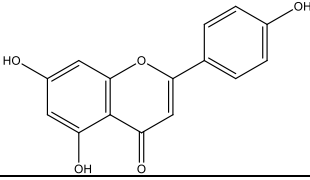
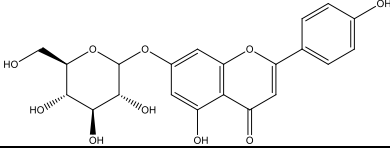
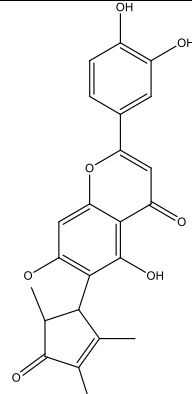
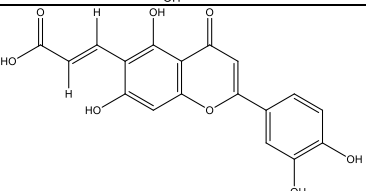
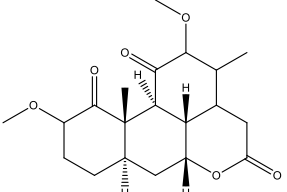
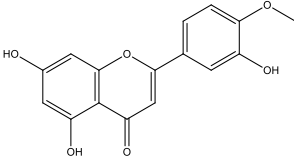
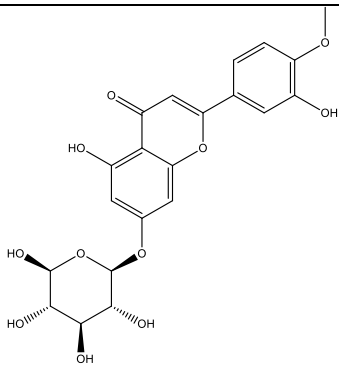
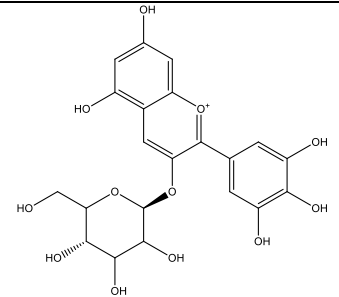
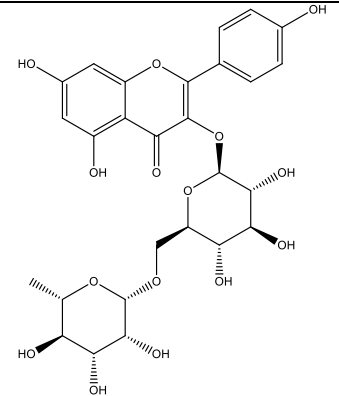
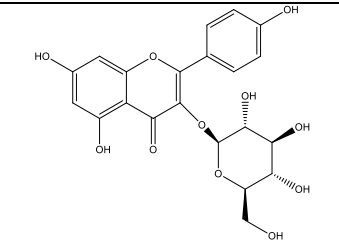
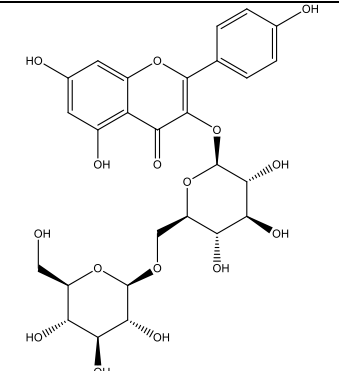
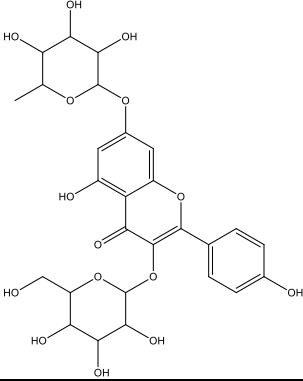
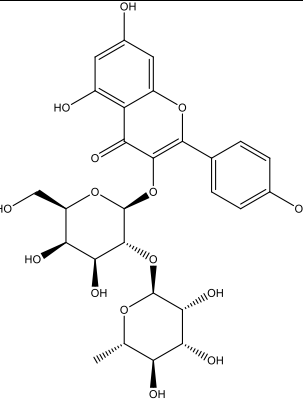
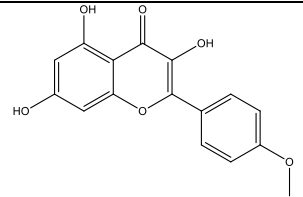
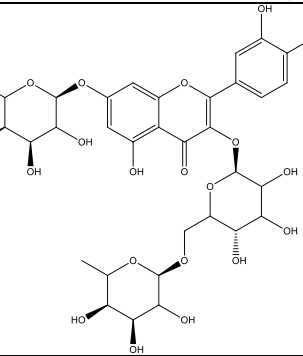
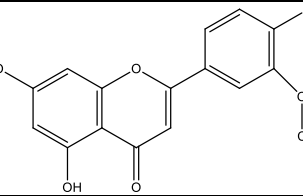
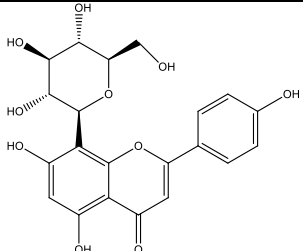
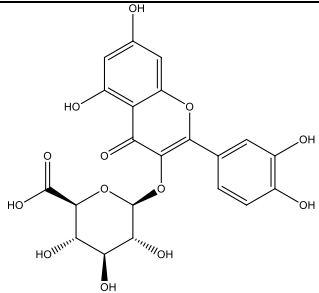
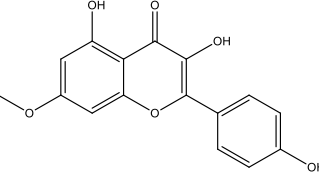
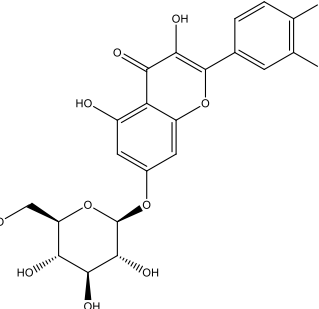
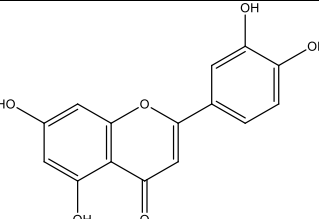
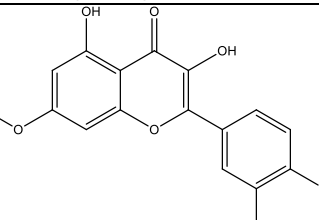
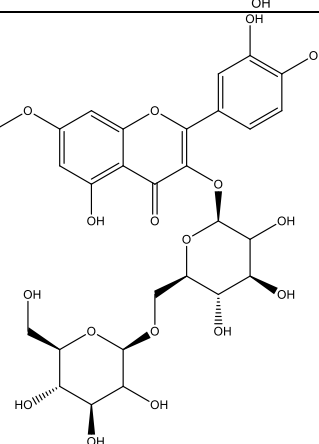
<p><i>C. obtusifolia</i>, <i>C. reticulata</i>, <i>C. kleini</i>, <i>C. tora</i>, <i>C. racemose</i>, <i>C. fistula</i>, <i>C. nigricans</i>, <i>C. didymobotrya</i>, <i>C. abbreviata</i>, <i>C. glauca</i>, <i>C. pudibunda</i>, <i>C. siamea</i>, <i>C. tomentosa</i></p>	<p>β-sitosterol</p>		<p>(Ganapaty <i>et al.</i>, 2002) (Khurm <i>et al.</i>, 2021)</p>
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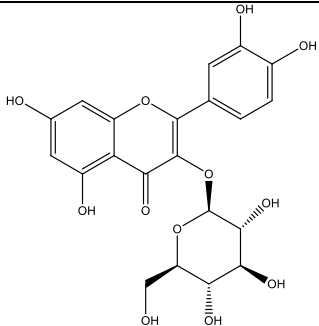
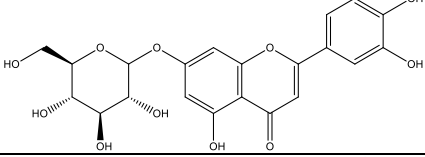
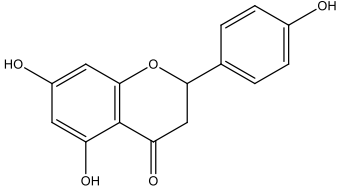
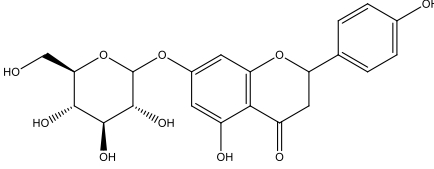
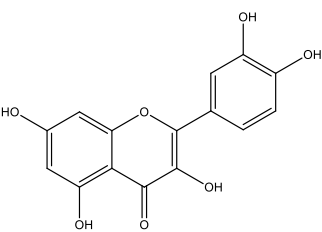
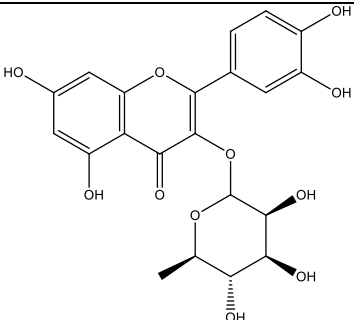
Table 4: Flavonoids reported in genus *Cassia*:

Species	Compound Name	Compound Structure	Reference
<p><i>C. italica</i>, <i>C. siamea</i>, <i>C. absus</i></p>	<p>Apigenin</p>		<p>(Khurm <i>et al.</i>, 2021) (Ganapaty <i>et al.</i>, 2002)</p>
<p><i>C. italica</i></p>	<p>Apigenin-7-glycoside</p>		<p>(Khurm <i>et al.</i>, 2021)</p>
<p><i>C. nomame</i></p>	<p>Demethyltorosaflavone C</p>		<p>(Kitanaka and Takido, 1992)</p>
<p><i>C. nomame</i></p>	<p>Demethyltorosaflavone D</p>		<p>(Kitanaka and Takido, 1992)</p>
<p><i>C. javanica</i></p>	<p>Javanicin</p>		<p>(Ganapaty <i>et al.</i>, 2002)</p>
<p><i>C. torosa</i></p>	<p>Diosmetin</p>		<p>(Ganapaty <i>et al.</i>, 2002)</p>

<i>C. torosa</i>	Diosmetin 3' - O - β - D - glucopyranoside	 <p>The structure shows a flavone core with a methoxy group at C-7, a hydroxyl group at C-5, and a glucose moiety attached to the 3' position of the B-ring.</p>	(Ganapaty <i>et al.</i> , 2002)
<i>C. torosa</i>	Torsaf flavone 3' - O - β - D glucopyranoside	 <p>The structure shows a flavone core with hydroxyl groups at C-5 and C-7, and a glucose moiety attached to the 3' position of the B-ring.</p>	(Ganapaty <i>et al.</i> , 2002)
<i>C. hirsuta</i> , <i>C. montana</i>	Kaempferol 3-O- β -D-rutinoside	 <p>The structure shows a flavone core with hydroxyl groups at C-5 and C-7, and a rutinoside moiety (a glucose unit linked to a galactose unit) attached to the 3' position of the B-ring.</p>	(Ganapaty <i>et al.</i> , 2002) (Khurm <i>et al.</i> , 2021)
<i>C. nodosa</i> , <i>C. angustifolia</i>	Kaempferol 3-O- β -D-glucoside	 <p>The structure shows a flavone core with hydroxyl groups at C-5 and C-7, and a glucose moiety attached to the 3' position of the B-ring.</p>	(Ganapaty <i>et al.</i> , 2002)
<i>C. angustifolia</i>	Kaempferol 3-O-gentiobioside	 <p>The structure shows a flavone core with hydroxyl groups at C-5 and C-7, and a gentiobioside moiety (a glucose unit linked to another glucose unit) attached to the 3' position of the B-ring.</p>	(Khurm <i>et al.</i> , 2021)

<p><i>C. spectabilis</i></p>	<p>Kaempferol rhamnoside - 7 - O - glucoside</p>	 <p>The structure shows a kaempferol core with a rhamnose sugar attached at the 7-position and a glucose sugar attached at the 3-position. The glucose sugar is in its cyclic form with multiple hydroxyl groups.</p>	<p>(Ganapaty <i>et al.</i>, 2002)</p>
<p><i>C. tomentosa</i></p>	<p>Kaempferol - 3 - O - galactorhamnoside</p>	 <p>The structure shows a kaempferol core with a galactose sugar attached at the 3-position and a rhamnose sugar attached at the 7-position. Both sugars are in their cyclic forms.</p>	<p>(Ganapaty <i>et al.</i>, 2002)</p>
<p><i>C. glauca</i></p>	<p>Kaempferide</p>	 <p>The structure shows a kaempferol core with a methoxy group (-OCH₃) attached at the 7-position.</p>	<p>(Khurm <i>et al.</i>, 2021)</p>
<p><i>C. italica</i></p>	<p>Tamarixetin 3-rutinoside-7-rhamnoside</p>	 <p>The structure shows a tamarixetin core with a rutinoside sugar attached at the 3-position and a rhamnose sugar attached at the 7-position. The rutinoside is a disaccharide of rhamnose and glucose.</p>	<p>(Ganapaty <i>et al.</i>, 2002) (Khurm <i>et al.</i>, 2021)</p>
<p><i>C. torosa</i></p>	<p>Chrysoeriol</p>	 <p>The structure shows a chrysoeriol core with a methoxy group (-OCH₃) attached at the 7-position.</p>	<p>(Khurm <i>et al.</i>, 2021)</p>
<p><i>C. nomane</i></p>	<p>Vitexin</p>	 <p>The structure shows a vitexin core with a glucose sugar attached at the 3-position and a rhamnose sugar attached at the 7-position. The glucose sugar is in its cyclic form.</p>	<p>(Ganapaty <i>et al.</i>, 2002)</p>

<i>C. tora</i>	Quercetin-3- <i>O</i> - β -D-glucuronide		(Vijayalakshmi <i>et al.</i> , 2016)
<i>C. javanica</i>	Kaempferol 7-methylether		(Khurm <i>et al.</i> , 2021)
<i>C. italica</i>	Quercetin 7-glucoside		(Khurm <i>et al.</i> , 2021)
<i>C. nigricans</i> , <i>C. siamea</i> , <i>C. nomane</i> , <i>C. torosa</i> , <i>C. absus</i> , <i>C. biflora</i>	Luteolin		(Ganapaty <i>et al.</i> , 2002) (Desphande and Bhalsing, 2013) (Khurm <i>et al.</i> , 2021)
<i>C. garrettiana</i> ,	Rhamnetin		(Ganapaty <i>et al.</i> , 2002)
<i>C. fistula</i>	Rhamnetin 3- <i>O</i> -gentiobioside		(Ganapaty <i>et al.</i> , 2002) (Desphande and Bhalsing, 2013) (Khurm <i>et al.</i> , 2021)

<i>C. tora</i>	Isoquercitrin		(Desphande and Bhalsing, 2013)
<i>C. tora</i>	Luteolin-7-O-glucopyranoside		(Vijayalakshmi <i>et al.</i> , 2016)
<i>C. torosa</i>	Naringenin		(Khurm <i>et al.</i> , 2021)
<i>C. javanica</i>	Naringenin - 7 - glucoside		(Ganapaty <i>et al.</i> , 2002)
<i>C. glauca</i> , <i>C. montana</i> , <i>C. obtusifolia</i> , <i>C. occidentalis</i> , <i>C. torosa</i> , <i>C. absus</i> , <i>C. corymbosa</i> , <i>C. garrettiana</i> ,	Quercetin		(Ganapaty <i>et al.</i> , 2002) (Yadav <i>et al.</i> , 2010) (Khurm <i>et al.</i> , 2021)
<i>C. nodosa</i>	Quercetin - 3 - O - rhamnoside		(Ganapaty <i>et al.</i> , 2002)

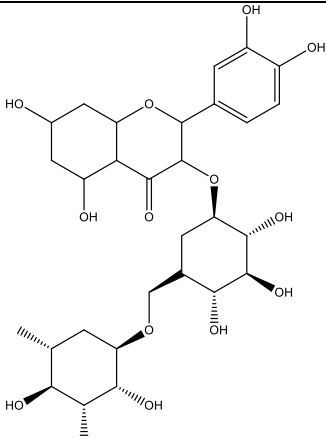
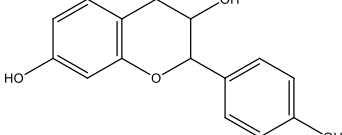
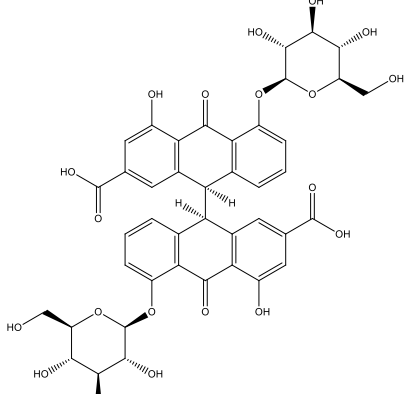
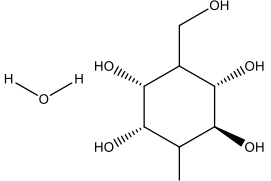
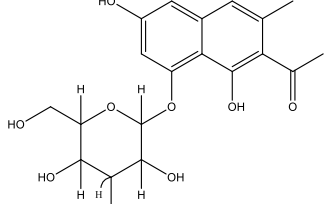
<p><i>C. hirsuta</i>, <i>C. montana</i>, <i>C. pudibunda</i>, <i>C. absus</i></p>	<p>Rutin</p>		<p>(Ganapaty <i>et al.</i>, 2002) (Khurm <i>et al.</i>, 2021)</p>
<p><i>C. abbreviata</i></p>	<p>2R,3S-guibourtinidol</p>		<p>(Khurm <i>et al.</i>, 2021)</p>

Table 5: Glycosides reported in genus *Cassia*:

Species	Compound Name	Compound Structure	Reference
<p><i>C. pumila</i>, <i>C. angustifolia</i>, <i>C. italica</i>, <i>C. podocarpa</i></p>	<p>Senoside A,B,C and D</p>		<p>(Dave and Ledwani, 2012) (Khurm <i>et al.</i>, 2021)</p>
<p><i>C. tora</i></p>	<p>Ononitol monohydrate</p>		<p>(Khurm <i>et al.</i>, 2021)</p>
<p><i>C. angustifolia</i></p>	<p>6 – hydroxy musizin glycoside</p>		<p>(Ganapaty <i>et al.</i>, 2002)</p>

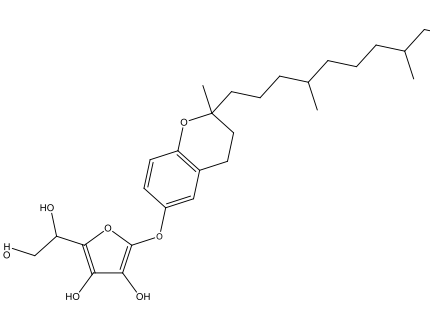
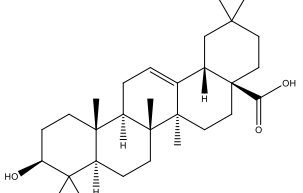
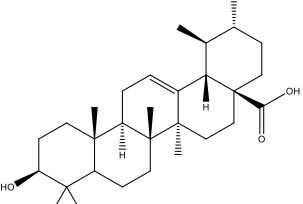
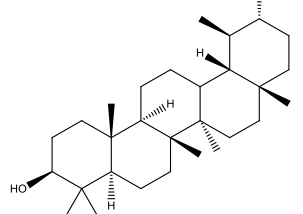
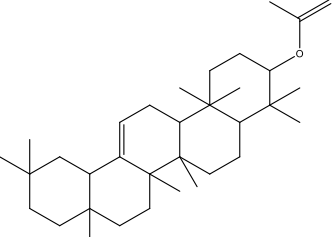
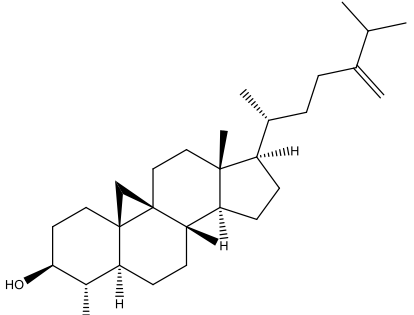
<i>C. auriculata</i>	α - Tocopherol- β -D-mannoside		(Desphande and Bhalsing, 2013)
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Table 6: Terpenes compounds reported in genus *Cassia*:

Species	Compound Name	Compound Structure	Reference
<i>C. spectabilis</i>	oleanolic acid		(Khurm <i>et al.</i> , 2021)
<i>C. spectabilis</i>	ursolic acid		(Khurm <i>et al.</i> , 2021)
<i>C. spectabilis</i> , <i>C. italic</i> , <i>C. tomentosa</i> , <i>C. renigera</i>	α -amyrin		(Ganapaty <i>et al.</i> , 2002) (Khurm <i>et al.</i> , 2021)
<i>C. spectabilis</i> , <i>C. javanica</i> , <i>C. renigera</i>	β -amyrin		(Ganapaty <i>et al.</i> , 2002) (Khurm <i>et al.</i> , 2021)
<i>C. spectabilis</i>	cycloeucaleanol		(Khurm <i>et al.</i> , 2021)

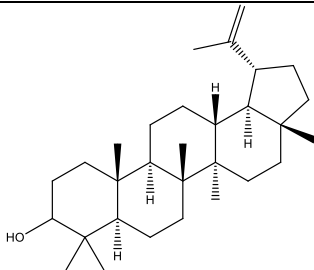
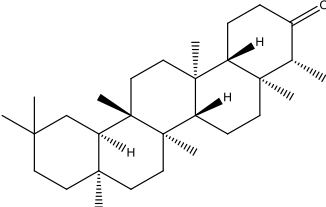
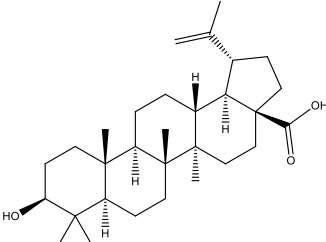
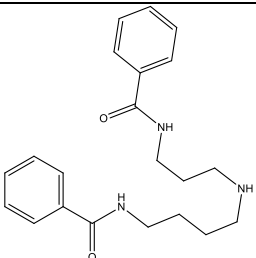
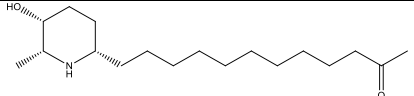
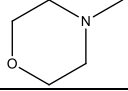
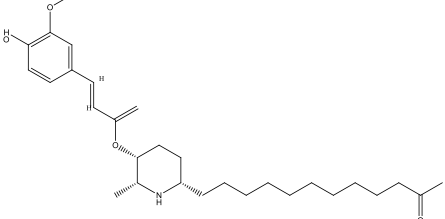
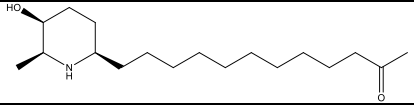
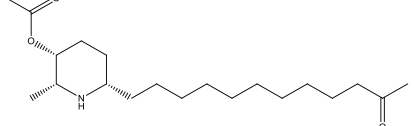
<i>C. spectabilis</i> , <i>C. fistula</i> , <i>C. obtusifolia</i> , <i>C. abbreviata</i>	lupeol		(Ganapaty <i>et al.</i> , 2002) (Khurm <i>et al.</i> , 2021)
<i>C. spectabilis</i> , <i>C. siamea</i> , <i>C. fistula</i> , <i>C. obtusifolia</i>	friedelin		(Khurm <i>et al.</i> , 2021)
<i>C. obtusifolia</i> , <i>C. garrettiana</i>	Betulinic acid		(Ganapaty <i>et al.</i> , 2002) (Khurm <i>et al.</i> , 2021)

Table 6: Alkaloids compounds reported in genus *Cassia*:

Species	Compound Name	Compound Structure	Reference
<i>C. floribunda</i>	N1,N8-dibenzoylspermidine		(Khurm <i>et al.</i> , 2021)
<i>C. racemosa</i>	Cassine		(Khurm <i>et al.</i> , 2021)
<i>C. occidentalis</i>	N-methylmorpholine		(Khurm <i>et al.</i> , 2021)
<i>C. spectabilis</i>	(+)-3-O-feruloylcassine		(Ganapaty <i>et al.</i> , 2002) (Khurm <i>et al.</i> , 2021)
<i>C. spectabilis</i> , <i>C. leptophylla</i>	Spectaline		(Khurm <i>et al.</i> , 2021)
<i>C. spectabilis</i>	(-)-3-O-acetylspectaline		(Khurm <i>et al.</i> , 2021)

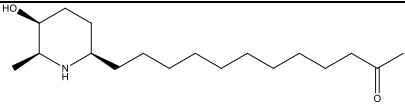
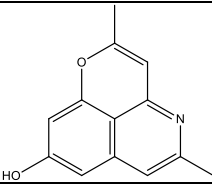
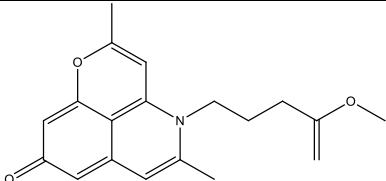
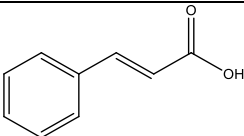
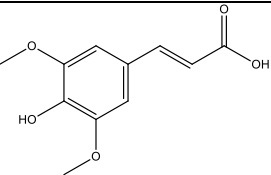
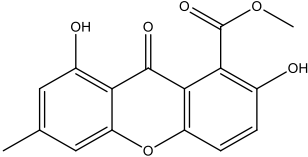
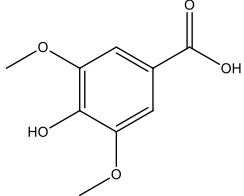
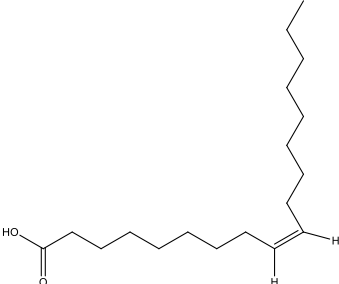
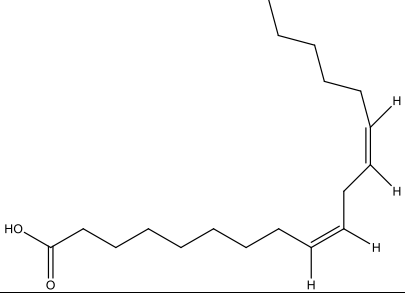
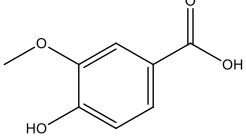
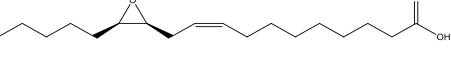
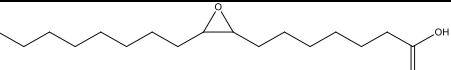
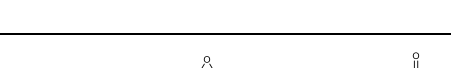
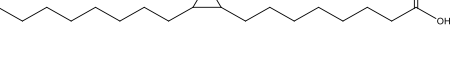
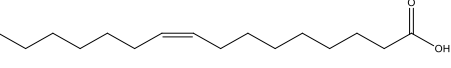
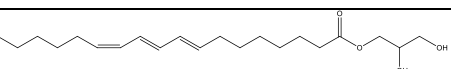
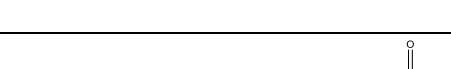
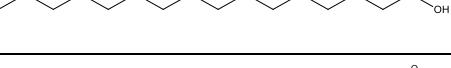
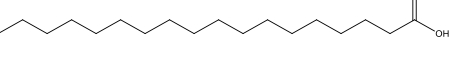
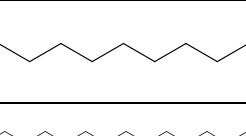
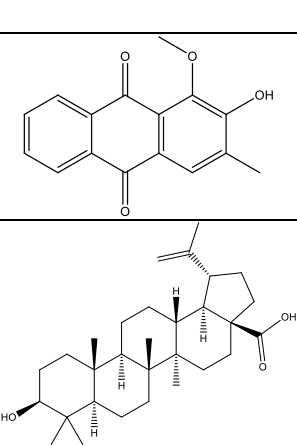

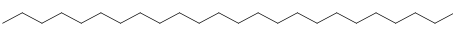
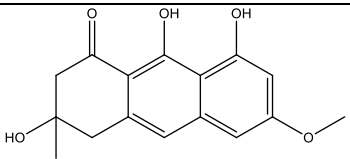
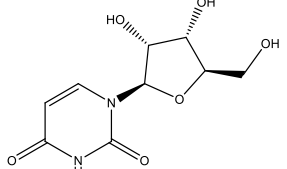
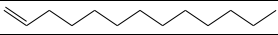
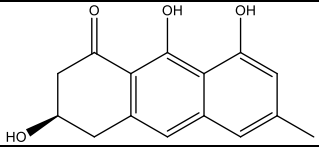
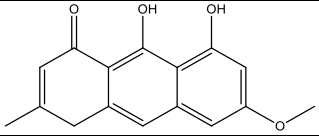
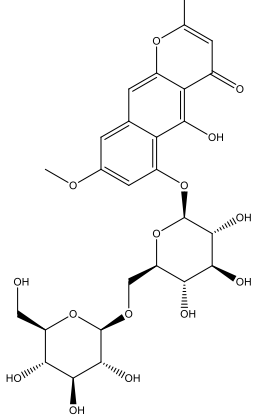
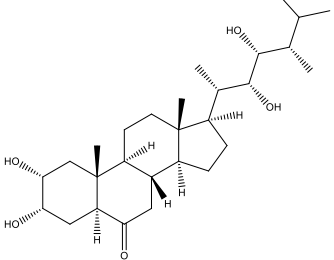
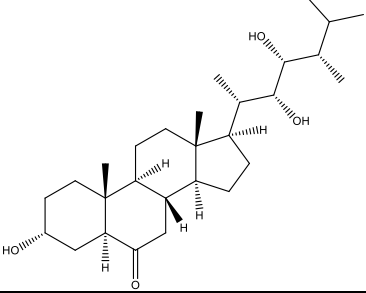
<i>C. spectabilis</i>	(-) iso-6-carnavaline (Spectalinine)		(Khurm <i>et al.</i> , 2021)
<i>C. siamea</i>	Cassiarins A		(Khurm <i>et al.</i> , 2021)
<i>C. siamea</i>	Cassiarins B		(Khurm <i>et al.</i> , 2021)

Table 7: Miscellaneous compounds reported in genus *Cassia*:

Species	Compound Name	Compound Structure	Reference
<i>C. javanica</i>	Cinnamic acid		(Khurm <i>et al.</i> , 2021)
<i>C. javanica</i>	Sinapic acid		(Khurm <i>et al.</i> , 2021)
<i>C. occidentalis</i>	Pinselin		(Khurm <i>et al.</i> , 2021)
<i>C. laevigata</i> ,	Syringic acid		(Khurm <i>et al.</i> , 2021)
<i>C. reingera</i>	Oleic acid		(Ledwani and Singh, 2005)

<i>C. reingera</i>	Linoleic acid		(Ledwani and Singh, 2005)
<i>C. laevigata</i> ,	Vanillic acid		(Khurm <i>et al.</i> , 2021)
<i>C. corymbosa</i>	Vernolic acid		(Khurm <i>et al.</i> , 2021)
<i>C. corymbosa</i>	Malvalic acid		(Khurm <i>et al.</i> , 2021)
<i>C. corymbosa</i>	Sterculic acid		(Khurm <i>et al.</i> , 2021)
<i>C. corymbosa</i>	Palmitoleic acid		(Khurm <i>et al.</i> , 2021)
<i>C. laevigata</i>	Calendin		(Khurm <i>et al.</i> , 2021)
<i>C. reingera</i> , <i>C. absus</i>	Palmitic acid		(Ganapaty <i>et al.</i> , 2002) (Ledwani and Singh, 2005)
<i>C. reingera</i> , <i>C. glauca</i>	Stearic acid		(Ganapaty <i>et al.</i> , 2002) (Ledwani and Singh, 2005)
<i>C. biflora</i>	Myristic acid		(Ganapaty <i>et al.</i> , 2002)
<i>C. biflora</i> , <i>C. javanica</i>	Behenic acid		(Ganapaty <i>et al.</i> , 2002)
<i>C. glauca</i>	Digitolutein		(Ganapaty <i>et al.</i> , 2002)
<i>C. garrettiana</i>	Betulinic acid		(Ganapaty <i>et al.</i> , 2002)
<i>C. javanica</i>	Triacontane		(Ganapaty <i>et al.</i> , 2002)

<i>C. javanica</i>	Tetracosane		(Ganapaty <i>et al.</i> , 2002)
<i>C. multiglandulosa</i>	Torosachryson		(Ganapaty <i>et al.</i> , 2002)
<i>C. obtusifolia</i>	Uridine		(Ganapaty <i>et al.</i> , 2002)
<i>C. obtusifolia</i>	Juglanin		(Ganapaty <i>et al.</i> , 2002)
<i>C. occidentalis</i>	Germichryson		(Ganapaty <i>et al.</i> , 2002)
<i>C. quinquangulata</i> , <i>C. tora</i> ,	Rubrofusarin		(Khurm <i>et al.</i> , 2021)
<i>C. obtusifolia</i>	Rubrofusarin - 6 - O - gentiobioside		(Ganapaty <i>et al.</i> , 2002)
<i>C. tora</i>	Castasterone		(Ganapaty <i>et al.</i> , 2002)
<i>C. tora</i>	Typhasterol		(Ganapaty <i>et al.</i> , 2002)

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