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Review Article

Chemical Constituents of Loranthaceae (Mistletoes): A Review

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ABSTRACT

This article review is designed to bring some updates on the phytochemistry of the Loranthaceae family in order to throw more light on future research priorities. Loranthaceae family is the leading pantropical semi parasitic shrubs generally termed mistletoe. They consist of about 75 genera and 1000 species growing in many countries of Africa, Asia, Australia, Europe, South America and New Zealand with diverse widespread uses in adornment, food and medication. The literatures for this review was collected from various online databases: Google Scholar, PubMed, Research gate, Science Direct, Scopus and web of Science for nine genera namely, *Globimetula, Scurrula*, *Dendrophtoe*, *Loranthus*, *Phragmanthera*, *Tapinanthus*, *Taxillus*, *Tripodanthus and Viscum* based on the type of phytochemicals, popularity and environmental setting. Chemical studies of the Loranthaceae species have produced a number of important phytochemicals belonging to different classes. The recent investigations led to the discovery of several secondary metabolites such as alkaloids, flavonoids, phenolic compounds, lignan and neolignans and triterpenes. Hence this review represents a comprehensive assessment of the phytochemical studies carried out on Loranthaceae plants and could be a source of therapeutically beneficial products.

Keywords: Loranthaceae, phytochemicals, alkaloids, triterpenes, flavonoids

1. INTRODUCTION

Medicinal plants are composed of certain substances that are active in curing and preventing precise ailments and diseases. They have played a fundamental role as the principal source of medicine in diverse ancient traditional system of medication either additively, separately, or in synergy for the treatment of various ailments (Elujoba, 1997). According to the World Health Organization (WHO), wrong handling of orthodox medicines or practices can have undesirable or dangerous effects and that further investigation is necessary to establish the effectiveness and safety of several medicinal plants used by traditional medicine system (WHO, 2014). The use of conventional medicine is conversely not limited to developing countries, surveys revealed that over 70% of population in developed countries like Canada and Germany have tried complementary or alternative medicine (CAM) at least once (Gurib-Fakim, 2006). Additionally, the growing reliance on the utilization of medicinal plants in advanced countries is substantiated by the extraction and evolution of many drugs and chemotherapeutics from these naturally occurring plants and conventionally used rural medications (UNESCO, 1998). Medicinal plants have established their contributions to the management of ailments such as anaemia, cancer, malaria, HIV/AIDS, microbial infections, mental disorders, sickle-cell, and diabetes (Okigbo and Mbajiuka, 2005). They are composed of biologically active phytochemicals such as alkaloids, essential oils, flavonoids, saponins, tannins, triterpenes and other chemical compounds, which possesses preventive and medicinal properties. These complex chemical constituents of diverse structural entities are found as secondary metabolites in one or more of these medicinal plants and are valuable to humankind. Explorations into the biological and pharmacological activities of medicinal plants throughout the past two centuries have produced compounds for the development of modern synthetic organic chemistry and the rise of medicinal chemistry as a main route for the discovery of new and more active natural products (Ogbulie et al., 2004). Natural products (secondary metabolites) are chemical compounds or substances found naturally from plants, aquatics and microbes that essentially have a biological or pharmacological activity for use in discovery and development of new drug. They are smaller molecular weight molecules below 3,000 Daltons produced by living organisms, plants, insects and have been the sources of most active ingredients of medications in the form of concoctions, lubricants, orthodox medicines and therapies with numerous bioactive compounds still being unidentified (Newman and Cragg, 2012; Kinghorn et al., 2009). The earliest known natural products records were depicted dated from 2600 BC on a Sumerian clay slabs which recorded oils from two species of plants that are still in use today as remedies for various ailments like colds, coughs and inflammations [9]. The Ebers papyrus is an aged and best known Egyptian Pharmaceutical records dating from about 2900 BC which listed hundreds of plants based medications (Cragg GM and Newman, 2009). The Chinese ‘’Materia Medica’’ dated about 1100 BC well documented the use of thousands of plants derived natural products credited to China’s famous ruler Shennong (Cragg GM and Newman, 2009). The Ayurvedic and Unanic medicinal systems of India recorded in Susruta and Charaka date from 1000 BC (Shoeb, 2006). The early Greek use of natural product can be traced back to Greek Legendary Doctor Dioscorides (100 A.D.) that described and documented the uses of more than 600 medicinal plants. His work remains the standard medical reference in most European countries for the over 1500 years (Cragg GM and Newman, 2009).

Therapeutic agents have been the most essential source of active compounds and chemical lead structures that led to the discovery and development of new drugs. Nevertheless, while many of the drugs used in the last 50 years or more have been of artificial origin, the pharmacopoeias earlier to that period were of natural origin (Jeffreys, 2005). Among the earliest important examples of medical treatment from natural sources include the discovery of salicin obtained in 1825-26 from the bark of white *willow, Salix Alba*. It was then improved to salicylic acid via hydrolysis and oxidation, and lastly to acetylsalicylic acid (ASA) via acetylation under the trade name aspirin in 1899 due to severe gastro intestinal toxicity of salicylic acid. Today, aspirin is still the most commonly used analgesic and antipyretic drug in the world (Jeffreys, 2005). Plant derived natural products such as Morphine and codeine isolated from the *Opium poppy* plant in 1804 have remained a rich source of lead compounds for effective pain killers (Beutler, 2009). The accidental discovery of antimalarial agent quinine from *Cinchona back* led to the synthesis of many classes of antimalarial drugs based on quinine structure (Beutler, 2009). Clinically essential drugs isolated recently from plants include the anti-cancer agent paclitaxel (Taxol) and antimalarial agent artemisinin isolated from the yew tree and *Artemisia annua* respectively (Goodman, 2001).

Development of drugs from natural product sources have evolved over a lengthy period, and more than 50% of the most marketable drugs in clinical use were natural products or derivatives of natural products. It has been hypothesized that approximately 80% of drug constituents were natural products or enthused by a naturally occurring compound especially when drug discovery is considered before the introduction of high-through put screening and post genomic era. Natural products are originated from the occurrence of natural biodiversity in which the acquaintances between organisms and their ecosystem devise some diverse complex chemical entities inside the organisms that augment their subsistence and attractiveness (Harvey, 2008).

2. DISTRIBUTION, BOTANICAL DESCRIPTION AND ETHNOBOTANY

The family Loranthaceae is timbered flowering plant called mistletoes. They are hemiparasitic herbs or shrubs that attaches to a tree branches or aerial parts of the host plants by haustorium, an appendage through which they siphon water and minerals from the host plant, but photosynthesize their carbohydrates by means of their ever-green leaves. Loranthaceae is an essential plant with 75 genera and about 1000 species distributed throughout tropical regions (Burkill, 1995). They are typically in widespread growing in Africa, Asia, America, Australia, Europe, South and New Zealand. Insistent stringy leaves and luminously coloured inflorescence largely characterized them. The leaves of the plants are opposite, displaced-opposite, rarely alternate, hairless, and sometimes petiolate or sessile. The flowers are bisexual and borne singly or in pairs. Their corollas are mostly red and splitting separately, the apical enlargement of the flower bud signifying maturity by changing to a darker colour; lobes twisted outwards at anthesis. The anthers are fitting below the top-shaped to peltate stigma. Their fruits are yellow or red berries with a luminously coloured seeds (Huaxing and Micheal, 2004). Members of this family parasitize a broad range of Gymnosperms and Angiosperms. Mistletoes are known all over the world to cause economic damages when infesting cultivated crops. They pose danger to plantation by parasitizing cultivated plants and tended plants (Burkill, 1985).

Loranthaceae are agents of diseases and disruption and thus affect the host physiology leading to reduced growth, existence and reproduction (Gill and Onyibe, 1990; Kolb, 2002). Despite their destructive nature to their host, the plants are used medicinally for the treatment of many diseases including cardiovascular diseases (Ouedraogo et al., 2004), hepatic illness (Al-Ghaithi et al., 2004; Phillipson and Wright, 1991), fever and removal of placenta after parturition (Sher and Alyemeni, 2011), arthritis, hypertension and infertility (Matthes et al., 2005), abdominal pains, diabetes, fever and urinary tract infections (Adesina et al., 2013), anticancer, antihypertensive, antimicrobial and antioxidant (Ja'afar et al., 2017; Lim et al., 2016; Puneetha and Amruthesh, 2016), infusion for fatigue (Puneetha and Amruthesh, 2016), mental condition, fatigue, sterility, urino-genital problems, skin diseases, rickets, fractured limbs, rheumatism, coughs, malaria, chest conditions, infertility, stomach problems, and as a laxative (Ibrahim and Ayodele, 2013; Irvine, 1961; Musa et al., 2014; Olagunju et al., 1999; Traore et al., 2004), cholera, hypertension, diabetes, blood purifier, gastrointestinal tract diseases and wound infections (Deeni, 1989; Hussain and Karatela, 1989; Obatomi, 1994; Obatomi et al., 1996; Oliver, 1987). Scientific evidences have revealed that their compositions and medicinal activities are dependent on the host plant, harvesting period and species (Fukunaga et al., 1989; Oliver, 1987; Quan-Yu et al., 2015; Quan-Yu et al., 2016). Plants of similar family characteristically synthesize the same class of compounds due to the existence of similar enzymes and thus the same synthetic pathways (Bick, 1996).

3. CHEMICAL CONSTITUENTS

The phytochemical studies of various species of Loranthaceae have successfully afforded numerous chemical components. The customary uses of the plants in traditional medicine enthused the author to write on the chemical constituents of Loranthaceae family that led to the discovery of several secondary metabolites such as alkaloids, flavonoids, phenolic compounds, lignans, neolignans and triterpenoids. As such, the chemistry of 9 genera *Globimetula*, *Scurrula*, *Dendrophtoe*, *Loranthus*, *Phragmanthera*, *Tapinanthus*, *Taxillus*, *Tripodanthus and Viscum* have been studied and reported. The selection of these genera was based on nature of the compounds, popularity and geographical location. The phytochemical studies of Loranthaceae species together with their species and host plants are shown in Table 1.

Table 1. Summary of phytochemicals isolated from Lorathanceae species

Compounds	Species	Host Plant	References
ALKALOIDS			
Theobromine **(1)**	*S. atropurpurea*	*T. sinensis*	(Kazuyoshi et al., 2003)
Caffeine **(2)**	*S. atropurpurea*	*T. sinensis*	(Kazuyoshi et al., 2003)
4,5,4′-trihydroxy-3,3′-iminodibenzoic acid **(3)**	*V. album*	*P. nigra*, *P.* x *cana-densis* *P. deltoides*	(Bashar et al., 2012)
4,5,4′,5′-tetrahydroxy-3,3′-iminodibenzoic acid **(4)**	*V. album*	*P. nigra*, *P.* x *cana-densis* *P. deltoides*	(Bashar et al., 2012)
Lupinine **(5)**	*L. micranthus*	*K. acuminata*	(Edwin et al., 2011)
FLAVONOIDS			
Quercetin 3-*O*-α-L-rhamnopyranoside	*S. parasitica*	*N. indica,*	(Quan-Yu et al., 2015)
(Quercitrin) **(6)**	*S. atropurpurea,*	*T. sinensis,*	(Kazuyoshi et al., 2003)
	D. falcate	*S. robusta*	(Mallavadhani et al., 2006)
	D. falcate	*H. fomes*	(Hasan et al., 2006)
	S. ferruginea	NR	(Francoise et al., 2002)
	P. capitata	*C. spectabili*	(Bruno et al., 2015)
	L. kaoi,	NR	(Lin and Lin, 1999)
	L. tanakae	*Quercus* and *Betula*	(Young-Kyoon et al., 2004)
	V. album	NR	(Yang et al., 2011)
	G. braunii	*P. thonningii*	(Ja'afar et al., 2017)
	G. braunii	*P. thonningii*	(Muhammad et al., 2022)
	S. parasitica	*P. pinnata*	(Muhammad et al., 2019)
	S. parasitica	*P. pinnata*	(Muhammad et al., 2019)
Naringin **(7)**	*G. braunii*	NR	(Okpuzor et al., 2009)
Apigenin **(8)**	*G. braunii*	NR	(Okpuzor et al., 2009)
Apigenin-8-*O*-β-D(2″-*O*-β-D-glucopyranosyl)-glucopyranoside **(9)**	*D. falcate*	NR	(Gangwar and Saxena, 2010)
Apigenin-8-C-β-d-glucopyranoside **(10)**	*P. capitata*	*P. insignis*	(Mfotie Njoya et al., 2020)
Kaempferol-3-*O*-α-L-rhamnopyranoside **(11)**	*D. falcate*	*S. robusta*	(Mallavadhani et al., 2006)
4″-*O*-acetylquercitrin **(12)**	*S. ferruginea*	NR	(Francoise et al., 2002)
Quercetin **(13)**	*S. ferruginea*	NR	(Francoise et al., 2002)
	P. capitata	*C. spectabilis*	(Bruno et al., 2015)
	T. theifer	*Z. serrata*	(Tung-Hu et al., 2010)
	G. braunii	*P. thonningii*	(Ja'afar et al., 2017)
	G. braunii	*P. thonningii*	(Muhammad et al., 2022)
	S. parasitica	*P. pinnata*	(Muhammad et al., 2019)
	S. parasitica	*P. pinnata*	(Muhammad et al., 2019)
	G. braunii	*T. catappa*	(Danladi et al., 2010)
	P. austroarabica	NR	(Goda et al., 2022)
	T. globiferus	*V. doniana*	(Abubakar et al., 2020)
2-(2,4-dihydroxyphenyl)-5,7-dihydroxy-3-(3-methylhexyl)-4*H*-chromen-4-one **(14)**	*T. globiferus*	*V. doniana*	(Abubakar et al., 2020)
Dihydromyricetin **(15)**	*S. liquidam-baricolous*	NR	(Shen et al., 1993)
Rutin **(16)**	*S. atropurpurea,*	*T. sinensis,*	(Kazuyoshi et al., 2003)
	T. acutifolius	NR	(Soberón et al., 2010)
	L. micranthus	*H. brasiliensis*	(Matthias et al., 2014)
	T. theifer	*Z. serrata*	(Tung-Hu et al., 2010)
	G. braunii	*P. thonningii*	(Ja'afar et al., 2017)
	G. braunii	*P. thonningii*	(Muhammad et al., 2022)
(+)-Catechin **(17)**	*S. parasitica*	*N. indica,*	(Quan-Yu et al., 2015)
	S. atropurpurea,	*T. sinensis,*	(Kazuyoshi et al., 2003)
	L. kaoi	NR	(Lin and Lin, 1999)
	L. parasiticus	NR	(Wong et al., 2012)

	T. theifer	*Z. serrata*	(Tung-Hu et al., 2010)
	G. braunii	*P. thonningii*	(Ja'afar et al., 2017)
	G. braunii	*P. thonningii*	(Muhammad et al., 2022)
	P. austroarabica	*NR*	(Danladi et al., 2010)
(-)-*epi*-catechin **(18)**	*L. kaoi*	NR	(Lin and Lin, 1999)
(-)-epicatechin-3-*O*-gallate **(19)** [107]	*S. atropurpurea*	*T. sinensis*	(Kazuyoshi et al., 2003)
(-)-epigallocatechin-3-*O*-gallate **(20)** [107]	*S. atropurpurea*	*T. sinensis*	(Kazuyoshi et al., 2003)
Quercetin 3-*O*-α-L-arabinoside **(21)**	*S. parasitica*	*N. indica,*	(Quan-Yu et al., 2015)
	P. capitata	*C. spectabilis*	(Tung-Hu et al., 2010)
Cyanidin 3-*O*-β-glucopyranoside **(22)**	*T. buvumae*	*F. virosa*	(Roberts et al., 2011)
	T. constrictiflorus	*E. abyssinica*	(Roberts et al., 2011)
	P. usuiensis	*F. notalensis*	(Roberts et al., 2011)
Nicotiflorin **(23)**	*T. acutifolius*	NR	(Soberón et al., 2010)
Hyperoside **(24)**	*T. acutifolius*	NR	(Soberón et al., 2010)
Isoquercitrin **(25)**	*T. acutifolius*	NR	(Soberón et al., 2010)
(-)-catechin **(26)**	*L. kaoi*	NR	(Lin and Lin, 1999)
2′,6′-dihydroxydihydrochalcone **(27)**	*L. kaoi*	NR	(Lin and Lin, 1999)
2′,4′,6′-trihydroxydihydrochalcone-4′-*O*-β-D-glucoside **(28)**	*L. kaoi*	NR	(Lin and Lin, 1999)
Pinocembrin 7-*O*-β-D-glucoside **(29)**	*L. kaoi*	NR	(Lin and Lin, 1999)
	V. articulatum	NR	(Haizhen et al., 2015)
Kaempferol 3-*O*-α-D-rhamnoside **(30)**	*L. kaoi*	NR	(Lin and Lin, 1999)
Kaempferol 3,7-di-*O*-β-D-glucoside **(31)**	*L. kaoi*	NR	(Lin and Lin, 1999)
AC trimer **(32)**	*L. parasiticus*	NR	(Wong et al., 2012)
3-*O*-(3,4,5-trimethoxybenzoyl)-(-)-epicatechin **(33)**	*L. micranthus*	*H. brasiliensis*	(Matthias et al., 2014)
(-)-epicatechin-3-*O*-(3″-*O*-methyl)-gallate **(34)**	*L. micranthus*	*H. brasiliensis*	(Matthias et al., 2014)
Peltatoside **(35)**	*L. micranthus*	*H. brasiliensis*	(Matthias et al., 2014)
-(-) catechin-7-*O*-rhamnoside **(36)**	*L. micranthus*	*K. acuminata*	(Omeje et al., 2012)
4′-methoxy catechin-7-*O*-rhamnoside **(37)**	*L. micranthus*	*K. acuminata*	(Omeje et al., 2012)
-(-) catechin-3-*O*-rhamnoside **(38)**	*L. micranthus*	*K. acuminata*	(Omeje et al., 2012)
3-methoxy quercetin **(39)**	*L. micranthus*	*K. acuminata*	(Edwin et al., 2014)
Catechin-4 -*O*-gallate **(40)**	*P. austroarabica*	NR	(Goda et al., 2022)
Pectolinarigenin **(41)**	*P. austroarabica*	NR	(Goda et al., 2022)
Dillenetin-3-*O*-glucoside **(42)**	*P. austroarabica*	NR	(Goda et al., 2022)
Rhamnetin 3-*O*-α-L-rhamnoside **(43)**	*L. tanakae*	*Quercus* and *Betula*	(Young-Kyoon et al., 2004)
	G. braunii	*T. catappa*	(Danladi et al., 2010)
Rhamnetin **(44)**	*G. braunii*	*T. catappa*	(Danladi et al., 2010)
Rhamnocitrin 3-*O*-α-L-rhamnoside **(45)**	*L. tanakae*	*Quercus* and *Betula*	(Young-Kyoon et al., 2004)
Naringenin **(46)**	*V. album*	NR	(Yang et al., 2011)
	V. articulatum	NR	(Haizhen et al., 2015)
Eriodictyol **(47)**	*V. album*	NR	(Yang et al., 2011)
	V. articulatum	NR	(Haizhen et al., 2015)
Homoeriodictyol **(48)**	*V. album*	NR	(Yang et al., 2011)
	V. articulatum	NR	(Haizhen et al., 2015)
	V. colaratum	NR	(Rui et al., 2012)
7-*O*-β-D-glucopyranoside **(49)**	*V. album*	NR	(Yang et al., 2011)
Homoeriodictyol 7-*O*-β-D-glucopyranoside **(50)**	*V. album*	NR	(Yang et al., 2011)
	V. articulatum	NR	(Haizhen et al., 2015)
	V. colaratum	NR	(Rui et al., 2012)
	V. colaratum	NR	(Na et al., 2011)
3′,4′-*O*-dimethyltaxifolin **(51)**	*V. album*	NR	(Yang et al., 2011)
5,4′-dihydroxyflavanone 3,5,7,4′-tetrahydroxy-3′-methoxyflavanone **(52)**	*V. album*	NR	(Yang et al., 2011)
3,7,3′-tri-*O*-methylquercetin-4′-*O*-β-D-apiofuranosyl-(1→2)-*O*-β-D-glucopyranoside **(53)**	*V. album*	NR	(Nguyen et al., 2013)
7,3′-di-*O*-methylquercetin-4′-*O*-β-D-glucopyranosyl-3-*O*-[6‴-(3-hydroxy-3-methylglutaroyl)]-α-D-glucopyranoside **(54)**	*V. album*	NR	(Nguyen et al., 2013)
7,3′-di-*O*-methylquercetin-4′-*O*-β-D-glucopyranosyl-3-*O*-[(6‴″→5‴″)-*O*-1‴″-(sinap-4-yl)-β-D-glucopyranosyl-6‴-(3-hydroxy-3-methylglutaroyl)]-α-D-glucopyranoside **(55)**	*V. album*	NR	(Nguyen et al., 2013)

(2*S*)-5-hydroxy-7,3′-dimethoxyflavanone-4′-*O*-β-D-apiofuranosyl-(1→5)-*O*-β-D-apiofuranosyl-(1→2)-*O*-β-D-glucopyranoside **(56)**	*V. album*	NR	(Nguyen et al., 2013)
3′-methoxyapiin **(57)**	*V. album*	NR	(Nguyen et al., 2013)
Homoflavoyadorinin-B **(58)**	*V. album*	NR	(Nguyen et al., 2013)
(2*S*)-5-hydroxy-7,3′-dimethoxyflavanone-4′-*O*-β-[apiofuranosyl-(1→2)]-glucopyranoside **(59)**	*V. album*	NR	(Nguyen et al., 2013)
(2*S*)-homoeriodictyol-7-*O*-[apiofuranosyl-(1→2)]-glucopyranoside **(60)**	*V. album*	NR	(Nguyen et al., 2013)
Viscumneoside V **(61)**	*V. album*	NR	(Nguyen et al., 2013)
2*R*-Viscarticulide A **(62)**	*V. articulatum*	NR	(Haizhen et al., 2015)
2*R*-viscarticulide B **(63)**	*V. articulatum*	NR	(Haizhen et al., 2015)
2*R*-viscarticulide C **(64)**	*V. articulatum*	NR	(Haizhen et al., 2015)
2*S*-viscarticulide A **(65)**	*V. articulatum*	NR	(Haizhen et al., 2015)
2*S*-viscarticulide B **(66)**	*V. articulatum*	NR	(Haizhen et al., 2015)
2*S*-viscarticulide C **(67)**	*V. articulatum*	NR	(Haizhen et al., 2015)
Eriodictyol-7-*O*-β-D-glucoside **(68)**	*V. articulatum*	NR	(Haizhen et al., 2015)
Naringenin-7-*O*-β-D-glucoside **(69)**	*V. articulatum*	NR	(Haizhen et al., 2015)
Rhamnazin-3-*O*-β-D-apiosyl-(1→2)-β-D-[6″-(3-hydroxy-3-methylglutaric methyl ester)]-glucoside **(70)**	*V. colaratum*	NR	(Rui et al., 2012)
Rhamnazin-3-*O*-β-D-apiosyl-(1→2)-β-D-[6″-(3-hydroxy-3-methylglutarate)]-glucoside **(71)**	*V. colaratum*	NR	(Rui et al., 2012)
Isorhamnetin -3-*O*-β-D-glucoside **(72)**	*V. colaratum*	NR	(Rui et al., 2012)
Homoeriodictyol-7-*O*-β-D-apiosyl-(1→5)-β-D-apiosyl-(1→2)-β-D-glucoside **(73)**	*V. colaratum*	NR	(Rui et al., 2012)
(2*S*)-homoeriodictyol 7,4′-di-*O*-β-D-glucopyranoside **(74)**	*V. colaratum*	NR	(Hui et al., 2006)
(2*R*)-eriodictyol 7,4 -di-*O*-β-D-glucopyranoside **(75)**	*V. colaratum*	NR	(Hui et al., 2006)
Homoeriodictyol7-*O*-β-D-[6-(3-hydroxybutanoyl) glucopyranoside] (viscumneoside IX) **(76)**	*V. colaratum*	NR	(Na et al., 2011)
Homoeriodictyol7-*O*-β-D-[6-(3-hydroxybutanoyl) glucopyranosyl](1→2)- β-D-glucopyranoside (viscumneoside X) **(77)**	*V. colaratum*	NR	(Na et al., 2011)
Viscumneoside I **(78)**	*V. colaratum*	NR	(Na et al., 2011)
	T. sutchuenensis	NR	(Liyuan et al., 2017)
Viscumneoside III **(79)**	*V. album*	NR	(Jia-Kun et al., 2019)
Viscumneoside XII **(80)**	*V. album*	NR	(Jia-Kun et al., 2019)
Viscumneoside XIII **(81)**	*V. colaratum*		(Jia-Kun et al., 2019)
Viscumneoside XIV **(82)**	*V. album*	NR	(Jia-Kun et al., 2019)
4′,5-dihydroxy-3′-methoxy-7-(2-*O*-α-L-rhamnopyranosyl-β-D-glucopyranosyloxy) flava-none **(83)**	*V. colaratum*	NR	(Na et al., 2011)
Catechin-5-*O*-(6-*O*-galloyl-β-glucopyranoside) **(84)**	*T. theifer*	*Z. serrata*	(Tung-Hu et al., 2010)
Quercetin- 3-*O*-(6-*O*-galloyl-β-glucopyranoside) **(85)**	*T. theifer*	*Z. serrata*	(Tung-Hu et al., 2010)
Quercetin-3-*O*-β-glucuronide **(86)**	*T. theifer*	*Z. serrata*	(Tung-Hu et al., 2010)
Quercetin-3-*O*-β-glucuronic acid methyl ester **(87)**	*T. theifer*	*Z. serrata*	(Tung-Hu et al., 2010)
Quercetin-3-*O*-β-glucuronic acid butyl ester **(88)**	*T. theifer*	*Z. serrata*	(Tung-Hu et al., 2010)
Kaempferol-3-*O*-β- glucopyranoside **(89)**	*T. theifer*	*Z. serrata*	(Tung-Hu et al., 2010)
Quercetin-4′-*O*-β-glucopyranoside **(90)**	*T. theifer*	*Z. serrata*	(Tung-Hu et al., 2010)
Isosakuranetin **(91)**	*T. sutchuenensis*	NR	(Liyuan et al., 2017)
Sakuranetin **(92)**	*V.album*	NR	(Nonato de et al., 2018)
Naringenin-5-methyl-ether **(93)**	*V.album*	NR	(Nonato de et al., 2018)
Quercetin 3,3′,4′-trimethyl ether **(94)**	*T. sutchuenensis*	NR	(Liyuan et al., 2017)
Kaempferol-3,7-bisrhamnoside **(95)**	*T. sutchuenensis*	NR	(Liyuan et al., 2017)
Avicularin **(96)**	*G. braunii*	*P. thonningii*	(Ja'afar et al., 2017)
	G. braunii	*P. thonningii*	(Muhammad et al., 2022)
7-hydroxy-4',5,6- trimethoxyflavone **(97)**	*D. falcata*	NR	(Kumar et al., 2022)
2',4',6-trimethoxyflavone **(98)**	*L. acutifolius*	NR	(Ticona et al., 2020)
	T. acutifolius	*T. tacaca*	(Apaza et al., 2019)
3',4',5-trihydroxy-6,7,8-trimethoxyflavone **(99)**	*L. acutifolius*	NR	(Ticona et al., 2020)
	T. acutifolius	*T. tacaca*	(Apaza et al., 2019)

2’4’-dihydroxy-6’-methoxy-chalcone **(100)**	*L. acutifolius*	NR	(Ticona et al., 2020)
	T. acutifolius	*T. tacaca*	(Apaza et al., 2019)
4’,5-dihydroxy-6,7,8-trimethoxyflavone **(101)**	*L. acutifolius*	NR	(Ticona et al., 2020)
	T. acutifolius	*T. tacaca*	(Apaza et al., 2019)
Quercetin 4’-methylether **(102)**	*T. pentagonia*	Avocado tree	(Ikome et al., 2020)
4’-methoxy-3’,5,7-trihydroxyflavone **(103)**	*T. pentagonia*	Avocado tree	(Ikome et al., 2020)
Quercetin-3-O-rhamnoside **(104)**	*T. pentagonia*	Avocado tree	(Ikome et al., 2020)
Quercetin 3-O-rhamnoside 4’- methylether **(105)**	*T. pentagonia*	Avocado tree	(Ikome et al., 2020)
5-dimethoxy-7-hydroxy 8-dimethoxy flavanone **(106)**	*V.album*	*J. regia*	(Maher et al., 2021)
4,5-dimethoxy-4’-hydroxy flavanone **(107)**	*V.album*	*J. regia*	(Maher et al., 2021)
5,7-di-methoxy-4-O-β-D-glucopyranoside flavanone **(108)**	*V.album*	*J. regia*	(Maher et al., 2021)
5-methoxy-7-O-β-D-glucopyranoside flavanone **(109)**	*V.album*	*J. regia*	(Maher et al., 2021)
PHENOLIC COMPOUNDS			
(1*R*,5*S*,7*S*)-7-[2-(4-hydroxyphenyl)ethyl]-2,6-dioxabicyclo[3.3.1]nonan-3-one **(110)**	*G. dinklagei*	*M. esculenta*	(Mkounga et al., 2016)
	P. capitata	*C. spectabilis*	(Bruno et al., 2015)
	T. bangwensi	*C. occidentalis*	(Harmine et al., 2017)
	G. braunii	*P. thonningii*	(Ja’afar et al., 2017)
	G. braunii	*P. thonningii*	(Muhammad et al., 2022)
	T. globiferus	*P. biglobosa*	(Anyam et al., 2022)
4-hydroxy-3,5-dimethoxy benzoic acid **(111)**	*G. dinklagei*	*M. esculenta*	(Mkounga et al., 2016)
Gallic acid **(112)**	*D. falcate*	*S. robusta*	(Mallavadhani et al., 2006)
	P. austroarabica	*NR*	(Goda et al., 2022)
	V.album	*J. regia*	(Maher et al., 2021)
Methyl gallate **(113)**	*P. austroarabica*	*NR*	(Goda et al., 2022)
Methyl syringate **(114)**	*T. bangwensis*	NR	(Patrick-Iwuanyanwu et al., 2014)
Methyl 3,4-O-dimethyl gallate **(115)**	*T. bangwensis*	NR	(Patrick-Iwuanyanwu et al., 2014)
3,4,5-trimethoxy methyl benzoate **(116)**	*T. bangwensis*	NR	(Patrick-Iwuanyanwu et al., 2014)
3-hydroxy-4,5-dimethoxy methyl benzoate **(117)**	*T. bangwensis*	NR	(Patrick-Iwuanyanwu et al., 2014)
Dodoneine **(118)**	*T. dodoneifolius*	*V. paradoxa*	(Maurice et al., 2007)
	G. braunii	*P. thonningii*	(Ja’afar et al., 2017)
	G. braunii	*P. thonningii*	(Muhammad et al., 2022)
	T. globiferus	*P. biglobosa*	(Anyam et al., 2022)
4,6-Dihydroxy-8-[-2-(4-hydroxy-phenyl)-ethyl]-oxocan-2-one **(119)**	*G. braunii*	*P. thonningii*	(Abdullahi et al., 2014)
6-Hydroxy-8-[2-(4-hydroxy-phenyl)-ethyl]-5,6,7,8- tetrahydro-oxocin-2-one **(120)**	*G. braunii*	*P. thonningii*	(Abdullahi et al., 2014)
Tripodanthoside **(121)**	*T. acutifolius*	NR	(Soberón et al., 2010)
methyl 2, 6-dihydroxy-4-methoxybenzoate **(122)**	*G. braunii*	*L. leucocephala*	(Ayoola et al., 2020)
methyl 3,5-dihydroxy-4-methoxybenzoate **(123)**	*G. braunii*	*L. leucocephala*	(Oriola et al., 2021)
methyl 3-methyl- 4-hydroxybenzoate **(124)**	*G. braunii*	*L. leucocephala*	(Oriola et al., 2021)
Guaiacol **(125)**	*G. braunii*	*L. leucocephala*	(Oriola et al., 2021)
4-formaldehyde phenone **(126)**	*G. braunii*	*L. leucocephala*	(Oriola et al., 2021)
6-methoxy-2H-inden-5-ol **(127)**	*G. braunii*	*L. leucocephala*	(Oriola et al., 2021)
rel-(1*R*,5*S*,7*S*)-7-[2-(4-*O*-galloylphenyl)ethyl]-2,6-dioxabicyclo-[3.3.1] nonan-3-one **(128)**	*P. capitata*	*C. spectabilis*	(Bruno et al., 2015)
p-hydroxyphentylacetic acid **(129)**	*V. articulatum*	NR	(Na et al., 2011)
5,7-dihydroxychromone **(130)**	*V.album*	NR	(Yang et al., 2011)
Centrolobol **(131)**	*V.album*	NR	(Yang et al., 2011)
Acerogenin G **(132)**	*V.album*	NR	(Yang et al., 2011)
(3*S*,5*R*)-3-hydroxy-5-methoxy-1,7-bis(4-hydroxyphenyl)-6E-heptene **(133)**	*V.album*	NR	(Nguyen et al., 2013)
(3*S*,5*S*)-3-hydroxy-5-methoxy-1,7-bis(4-hydroxyphenyl)-6E-heptene **(134)**	*V.album*	NR	(Nguyen et al., 2013)
(3*S*)-3-hydroxy-1,7-bis(4-hydroxyphenyl)-6E-hepten-5-one **(135)**	*V.album*	NR	(Nguyen et al., 2013)
	T. sutchuenensis	NR	(Liyuan et al., 2017)
1,7-di-(3′,4′-dihydroxyphenyl)-4-hepten-3-one, hirsutanone **(136)**	*V. cruciatum*	*P. amygdalus*	(Carmen et al., 2001)
Taxilluside A **(137)**	*T. chinensis*	NR	(Bo et al., 2013)

Taxilluside B **(138)**	*T. chinensis*	NR	(Bo et al., 2013)
Taxilluside C **(139)**	*T. chinensis*	NR	(Bo et al., 2013)
Taxilluside D **(140)**	*T. chinensis*	NR	(Bo et al., 2013)
(+)-hannokinol **(141)**	*T. sutchuenensis*	NR	(Liyuan et al., 2017)
Meso-hannokinol **(142)**	*T. sutchuenensis*	NR	(Liyuan et al., 2017)
2,3-dihydro-4-hydroxy-3,6,9-trimethylnaphtho [1,8-bc]pyran-7,8-dione **(143)**	*D. falcata*	NR	(Kumar et al., 2022)
4-hydroxy-3-methoxybenzoic acid **(144)**	*D. falcata*	NR	(Kumar et al., 2022)
Emodin **(145)**	*P. austroarabica*	*NR*	(Goda et al., 2022)
emodin-8-*O*-glucoside **(146)**	*P. austroarabica*	*NR*	(Goda et al., 2022)
Chrysophanic acid **(147)**	*P. austroarabica*	*NR*	(Goda et al., 2022)
Chrysophanic acid-8-*O*-glucoside **(148)**	*P. austroarabica*	*NR*	(Goda et al., 2022)
3-(4-hydroxy-3,5-dimethoxy)-phenyl-2E-propenylβ-D-glucopyranoside **(149)**	*V.album*	*J. regia*	(Maher et al., 2021)
(7) 3-(4-hydroxy-3,5-dimethoxy)-phenyl-2 epropenol **(150)**	*V.album*	*J. regia*	(Maher et al., 2021)
Caffeic acid **(151)**	*V.album*	*NR*	(Nonato de et al., 2018)
Chlorogenic acid **(152)**	*V.album*	*NR*	(Nonato de et al., 2018)
syringenin 4-O-glucoside **(153)**	*V.album*	*NR*	(Nonato de et al., 2018)
syringenin 4-O-apiosyl glucoside **(154)**	*V.album*	*NR*	(Nonato de et al., 2018)
alangilignoside C and ligalbumoside A **(155)**	*V.album*	*NR*	(Nonato de et al., 2018)
LIGNANS AND NEOLIGNANS			
Aviculin **(156)**	*S. atropurpurea*	*T. sinensis*	(Kazuyoshi et al., 2003)
(1*S*, 3a*R*, 4*S*, 6a*R*)-1-[(3, 5-dimethoxyl- 4-hydroxyl) phenyl]-4-[(3-methoxyl-4-β-D-*O*-glucopyranosyl-5-hydroxyl) phenyl] -tetrahydro-1*H*, 3*H*-furo [3, 4-*c*] furan (viscoloratin) **(157)**	*V. colaratum*	NR	(Jun et al., 2007)
(+)-medioresinol **(158)**	*V.album*	NR	(Nguyen et al., 2013)
(+)-pinoresinol **(159)**	*V.album*	NR	(Nguyen et al., 2013)
	V.album	NR	(Yang et al., 2011)
(−)-lyoniresinol 3α-*O*-β-D-glucopyranoside **(160)**	*V.album*	NR	(Roberts et al., 2011)
(+)-lyoniresinol 3α-O-β-D-glucopyranoside **(161)**	*V.album*	NR	(Roberts et al., 2011)
Syringin **(162)**	*V.album*	NR	(Roberts et al., 2011)
Syringenin 4′-*O*-β-D-apiofur-anosyl-(1→2)-β-*O*-D-glucopyranoside **(163)**	*V.album*	NR	(Roberts et al., 2011)
Syringaresinol **(164)**	*V.album*	NR	(Yang et al., 2011)
Syringaresinal-4′-*O*-β-D-glucopyranoside **(165)**	*V.album*	NR	(Yang et al., 2011)
Curuilignan D **(166)**	*V.album*	NR	(Yang et al., 2011)
threo-(7*R*, 8*R*)-7-acetoxy-3′,4′-dimethoxy-3,4-dimethoxy-D-8′-8.*O*.6′-neolignan **(167)**	*T. theifer*	NR	(Lie-Chwen et al., 2011)
threo-7-acetoxy-3′-methoxy-3,4-dimethoxy-D-7′-8.*O*.4′-neolignan **(168)**	*T. theifer*	NR	(Lie-Chwen et al., 2011)
7*R*, 8*R*, 3′*R*)-7-acetoxy-3′,4′-dimethoxy-3,4-dimethoxy-6′-oxo-D-1′,4′,8′-8.3′ lignin **(169)**	*T. theifer*	NR	(Lie-Chwen et al., 2011)
Tremulacin **(170)**	*T. sutchuenensis*	NR	(Liyuan et al., 2017)
TRITERPENES			
13,27-cycloursane **(171)**	*G. braunii*	*L. leucocephala*	(Ayoola et al., 2020)
Phyllanthone **(172)**	*G. braunii*	*L. leucocephala*	(Oriola et al., 2021)
Globraunone **(173)**	*G. braunii*	*L. leucocephala*	(Oriola et al., 2021)
Globraunine A **(174)**	*G. braunii*	*P. thonningii*	(Muhammad et al., 2020)
	G. braunii	*P. thonningii*	(Muhammad et al., 2020)
Globraunine B **(175)**	*G. braunii*	*P. thonningii*	(Muhammad et al., 2022)
	G. braunii	*P. thonningii*	(Muhammad et al., 2020)
Globraunine C **(176)**	*G. braunii*	*P. thonningii*	(Muhammad et al., 2022)
	G. braunii	*P. thonningii*	(Muhammad et al., 2020)
Globraunine D **(177)**	*G. braunii*	*P. thonningii*	(Muhammad et al., 2022)
	G. braunii	*P. thonningii*	(Muhammad et al., 2020)
Globraunine E **(178)**	*G. braunii*	*P. thonningii*	(Muhammad et al., 2022)
	G. braunii	*P. thonningii*	(Muhammad et al., 2020)
Globraunine F **(179)**	*G. braunii*	*P. thonningii*	(Muhammad et al., 2022)
	G. braunii	*P. thonningii*	(Muhammad et al., 2020)
Globimetulin A **(180)**	*G. dinklagei*	*M. esculenta*	(Mkounga et al., 2016)
Globimetulin B **(181)**	*G. dinklagei*	*M. esculenta*	(Mkounga et al., 2016)
Globimetulin C **(182)**	*G. dinklagei*	*M. esculenta*	(Mkounga et al., 2016)
	S. parasitica	*N. indicum*	(Quan-Yu et al., 2015)
Friedelin **(183)**	*G. dinklagei*	*M. esculenta*	(Mkounga et al., 2016)

	G. braunii	*P. thonningii*	(Muhammad et al., 2022)
	G. braunii	*P. thonningii*	(Muhammad et al., 2020)
	L. micranthus	*K. acuminate*	(Edwin et al., 2014)
Friedelan-3-ol **(184)**	*G. dinklagei*	*M. esculenta*	(Mkounga et al., 2016)
28-hydroxyfriedelin **(185)**	*G. dinklagei*	*M. esculenta*	(Mkounga et al., 2016)
3-O- β- D-glucopyranosyl-α-amyrin **(186)**	*G. dinklagei*	*M. esculenta*	(Mkounga et al., 2016)
3-O-β-D-glucopyranosyl-28-hydroxy-α-amyrin **(187)**	*P. capitata*	*P. insignis*	(Mfotie Njoya et al., 2020)
3β-acetoxy-1β-(2-hydroxy-2-propoxy)-11α-hydroxy-olean-12-ene **(188)**	*D. falcata*	*S. robusta*	(Mallavadhani et al., 2006)
3β-acetoxy-11α-ethoxy-1β-hydroxy-olean-12-ene **(189)**	*D. falcata*	*S. robusta*	(Mallavadhani et al., 2006)
3β-acetoxy-1β-hydroxy-11α-methoxy- olean-12-ene **(190)**	*D. falcata*	*S. robusta*	(Mallavadhani et al., 2006)
3β-acetoxy-1β,11α-dihydroxy-olean-12-ene **(191)**	*D. falcata*	*S. robusta*	(Mallavadhani et al., 2006)
3β-acetoxy-1β,11α-dihydroxy-urs-12-ene **(192)**	*D. falcata*	*S. robusta*	(Mallavadhani et al., 2006)
3β-acetoxy-urs-12-ene-11-one **(193)**	*D. falcata*	*S. robusta*	(Mallavadhani et al., 2006)
3β-acetoxy-lup-20(29)-ene **(194)**	*D. falcata*	*S. robusta*	(Mallavadhani et al., 2006)
30-nor-lup-3β-acetoxy-20-one **(195)**	*D. falcata*	*S. robusta*	(Mallavadhani et al., 2006)
(20*S*)-3β-acetoxy-lupan-29-oic acid **(196)**	*D. falcata*	*S. robusta*	(Mallavadhani et al., 2006)
7β,15α-dihydroxylup-20(29)-ene-3β-*O*-palmitate **(197)**	*S. parasitica*	*N. indicum*	(Mallavadhani et al., 2006)
	L. micranthus	*K. acuminate*	(Ogechukwu et al., 2011)
	T. globiferus	*P. biglobosa*	(Anyam et al., 2022)
Lupeol **(198)**	*S. parasitica*	*N. indicum*	(Quan-Yu et al., 2015)
	S. parasitica	*P. pinnata*	(Muhammad et al., 2019)
	S. parasitica	*P. pinnata*	(Muhammad et al., 2019)
	G. braunii	*P. thonningii*	(Muhammad et al., 2022)
	G. braunii	*P. thonningii*	(Muhammad et al., 2020)
	P. capitata	*C. spectabilis*	(Bruno et al., 2015)
	V. album	*NR*	(Yang et al., 2011)
	G. braunii	*T. catappa*	(Danladi et al., 2021)
	P. austroarabica	*NR*	(Goda et al., 2022)
	T. sessilifolius	*P.guajava*	(Tarfa et al., 2022)
Lupeol palmitate **(199)**	*S. parasitica*	*N. indicum*	(Quan-Yu et al., 2015)
	S. parasitica	*P. pinnata*	(Muhammad et al., 2019)
	S. parasitica	*P. pinnata*	(Muhammad et al., 2019)
	G. braunii	*P. thonningii*	(Muhammad et al., 2022)
	G. braunii	*P. thonningii*	(Muhammad et al., 2020)
Lupeol acetate **(200)**	*T. globiferus*	NR	(Hassan et al., 2018)
Lup-20(29)-en-3β,15α-diol **(201)**	*G. braunii*	*P. thonningii*	(Muhammad et al., 2022)
	G. braunii	*P. thonningii*	(Muhammad et al., 2020)
Squalene **(202)**	*S. parasitica*	*P. pinnata*	(Muhammad et al., 2019)
	S. parasitica	*P. pinnata*	(Muhammad et al., 2019)
3-oxolup-20(29)-ene **(203)**	*S. parasitica*	*N. indicum*	(Quan-Yu et al., 2015)
Ursolic acid **(204)**	*S. parasitica*	*N. indicum*	(Quan-Yu et al., 2015)
	P. austroarabica	*NR*	(Goda et al., 2022)
Cycloeucalenol **(205)**	*S. parasitica*	*N. indicum*	(Quan-Yu et al., 2015)
Stigmasterol **(206)**	*S. parasitica*	*N. indicum*	(Quan-Yu et al., 2015)
	D. falcata	NR	(Kumar et al., 2022)
β-sitosterol **(207)**	*S. parasitica*	*N. indicum*	(Quan-Yu et al., 2015)
	S. parasitica	*P. pinnata*	(Muhammad et al., 2019)
	S. parasitica	*P. pinnata*	(Muhammad et al., 2019)
	G. braunii	*P. thonningii*	(Muhammad et al., 2022)
	G. braunii	*P. thonningii*	(Muhammad et al., 2020)
	P. capitata	*C. spectabilis*	(Bruno et al., 2015)
	L. acacie	*NR*	(Noman et al., 2020)
β-sitosterol-3-*O*-glucoside **(208)**	*P. austroarabica*	*NR*	(Goda et al., 2022)
	S. parasitica	*N. indicum*	(Quan-Yu et al., 2015)
	V. album	NR	(Yang et al., 2011)
7β-hydroxyl-hop-22(29)-en-3β-*O*-palmitate **(209)**	*S. parasitica*	*N. indicum*	(Quan-Yu et al., 2016)
Uvaol **(210)**	*S. parasitica*	*N. indicum*	(Quan-Yu et al., 2016)
3-epi-ursolic acid **(211)**	*S. parasitica*	*N. indicum*	(Quan-Yu et al., 2016)
3β-hydroxyl-hop-22(29)-ene **(212)**	*S. parasitica*	*N. indicum*	(Quan-Yu et al., 2016)
3β, 15α-dihydroxyl-lup-20(29)-ene **(213)**	*S. parasitica*	*N. indicum*	(Quan-Yu et al., 2016)
Lup-20(29)-en-3-*O*-α-D-glucoside **(214)**	*S. parasitica*	*N. indicum*	(Quan-Yu et al., 2016)
Stigmsterol-3-*O*-β-D-glucoside **(215)**	*S. parasitica*	*N. indicum*	(Quan-Yu et al., 2016)

Betulin **(216)**	*P. capitata*	*C. spectabilis*	(Bruno et al., 2015)
	V. album	NR	(Yang et al., 2011)
Betulinic acid **(217)**	*V. album*	NR	(Nguyen et al., 2013)
	L. acacie	NR	(Noman et al., 2020)
	T. sessilifolius	*P.guajava*	(Tarfa et al., 2022)
Bangwaoleanenes A **(218)**	*T. bangwensis*	*C. occidentalis*	(Harmine et al., 2017)
Bangwaoleanenes B **(219)**	*T. bangwensis*	*C. occidentalis*	(Harmine et al., 2017)
Bangwaoleanenes C **(220)**	*T. bangwensis*	*C. occidentalis*	(Harmine et al., 2017)
Bangwaoleanenes D **(221)**	*T. bangwensis*	*C. occidentalis*	(Harmine et al., 2017)
Bangwaoleanenes E **(222)**	*T. bangwensis*	*C. occidentalis*	(Harmine et al., 2017)
Bangwaursenes A **(223)**	*T. bangwensis*	*C. occidentalis*	(Harmine et al., 2017)
Bangwaursenes B **(224)**	*T. bangwensis*	*C. occidentalis*	(Harmine et al., 2017)
3β-acetoxy-urs-12,13-ene-11-one **(225)**	*T. bangwensis*	*C. occidentalis*	(Harmine et al., 2017)
3β-acetoxy-11α-hydroxyurs-12,13-ene **(226)**	*T. bangwensis*	*C. occidentalis*	(Harmine et al., 2017)
11α,12α - oxidotaraxeryl acetate **(227)**	*T. bangwensis*	*C. occidentalis*	(Harmine et al., 2017)
β-amyrin acetate **(228)**	*T. bangwensis*	*C. occidentalis*	(Harmine et al., 2017)
	V. album	NR	(Nguyen et al., 2013)
7β,15α-dihydroxyl-lup-20(29)-ene-3β-stearate **(229)**	*L. micranthus*	*K. acuminata*	(Ogechukwu et al., 2011)
7β,15α-dihydroxyl-lup-20(29)-ene-3β-eicosanoate **(230)**	*L. micranthus*	*K. acuminata*	(Ogechukwu et al., 2011)
Stigmast-7, 20(21)-diene-3β-hydroxy-6-one **(231)**	*L. micranthus*	*K. acuminata*	(Ogechukwu et al., 2011)
3β-hydroxy-stigmast-23-ene **(232)**	*L. micranthus*	*K. acuminata*	(Ogechukwu et al., 2011)
Erythrodiol **(233)**	*V. album*	NR	(Nguyen et al., 2013)
Oleanolic acid **(234)**	*V. album*	NR	(Yang et al., 2011)
	T. sutchuenensis	NR	(Liyuan et al., 2017)
Stigmast-4-en-3-one **(235)**	*D. falcata*	NR	(Kumar et al., 2022)
Stigmast-5-en-3β-ol **(236)**	*D. falcata*	NR	(Kumar et al., 2022)
3β-hydroxylup-20(29)-en-28-oic acid **(237)**	*D. falcata*	NR	(Kumar et al., 2022)
3β-hydroxyolean-12-en-28-oic acid **(238)**	*D. falcata*	NR	(Kumar et al., 2022)
OTHER GROUP OF COMPOUNDS			
(*Z*)-9-octadecenoic acid (Oleic acid) **(239)**	*S. atropurpurea*	*T. sinensis*	(Kazuyoshi et al., 2003)
(*Z,Z*)-octadeca-9,12-dienoic acid (Linoleic acid) **(240)**	*S. atropurpurea*	*T. sinensis*	(Kazuyoshi et al., 2003)
(*Z,Z,Z*)-octadeca-9,12,15-trienoic acid (Linolenic acid) **(241)**	*S. atropurpurea*	*T. sinensis*	(Kazuyoshi et al., 2003)
Octadeca-8,10-diynoic acid **(242)**	*S. atropurpurea*	*T. sinensis*	(Kazuyoshi et al., 2003)
Octadec-12-ene-8,10-diynoic acid **(243)**	*S. atropurpurea*	*T. sinensis*	(Kazuyoshi et al., 2003)
Octadeca-8,10,12-triynoic acid **(244)**	*S. atropurpurea*	*T. sinensis*	(Kazuyoshi et al., 2003)
Icariside **(245)**	*S. atropurpurea*	*T. sinensis*	(Kazuyoshi et al., 2003)
Gitoxigenin 3-*O*-α-L-rhamnoside **(246)**	*S. parasitica*	*N. indicum*	(Quan-Yu et al., 2015)
Digitoxigenin 3-*O*-α-L-rhamnoside **(247)**	*S. parasitica*	*N. indicum*	(Quan-Yu et al., 2015)
Gitoxigenin 3-*O*-α-D-glucoside **(248)**	*S. parasitica*	*N. indicum*	(Quan-Yu et al., 2015)
Digitoxin 3-*O*-α-D-glucose **(249)**	*S. parasitica*	*N. indicum*	(Quan-Yu et al., 2016)
Behenic acid **(250)**	*S. parasitica*	*N. indicum*	(Quan-Yu et al., 2016)
Octacosyl alcohol **(251)**	*S. parasitica*	*N. indicum*	(Quan-Yu et al., 2016)
Perseitol **(252)**	*S. fusca*	*F. riedelii*	(Takashi et al., 2001)
1-desoxyribosa **(253)**	*T. bangwensis*	*C. occidentalis*	(Harmine et al., 2017)
Myo-inisitol **(254)**	*T. bangwensis*	*C. occidentalis*	(Harmine et al., 2017)
Sorbitol **(255)**	*T. bangwensis*	*C. occidentalis*	(Harmine et al., 2017)
2,3-dimethoxy-benzo[a, b] cyclopentenyl-3′,3′,5′-trimethyl pyran-4-carboxylic acid **(256)**	*L.micranthus*	*K. acuminata*	(Edwin et al., 2011)
3,4,5-trimethoxy benzoate **(257)**	*L.micranthus*	*K. acuminata*	(Edwin et al., 2014)
Trans-phytol **(258)**	*V. album*	NR	(Nguyen et al., 2013)
Nerolidol **(259)**	*V. album*	NR	(Nguyen et al., 2013)
Nonadecan-1-ol **(260)**	*D. falcata*	NR	(Kumar et al., 2022)
Di-*iso*-octylphthalate **(261)**	*D. falcata*	NR	(Kumar et al., 2022)
2,6-Dimethylocta-2,7-diene-1,6-diol 6-*O*-[6′-*O*-β-D-apiofuranosyl]-β-D-glucopyranoside **(262)**	*V. album*	*A. ulgaris*	(Deliorman et al., 2001)
Octacosanoic acid **(263)**	*G. braunii*	*P. thonningii*	(Muhammad et al., 2022)
	G. braunii	*P. thonningii*	(Muhammad et al., 2020)
Octacosane **(264)**	*S. parasitica*	*P. pinnata*	(Muhammad et al., 2019)
Octadecane **(265)**	*S. parasitica*	*P. pinnata*	(Muhammad et al., 2019)
Eicosane **(266)**	*S. parasitica*	*P. pinnata*	(Muhammad et al., 2019)

*NR = Not Reported

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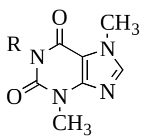
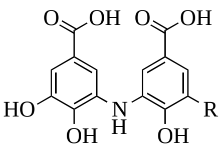
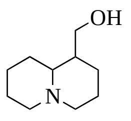


(1) R = H
(2) R = CH_3



(3) R = H
(4) R = OH



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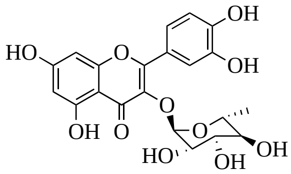

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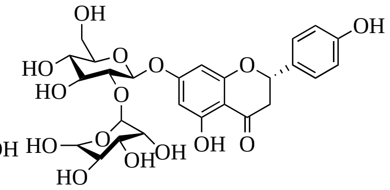

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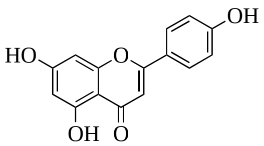

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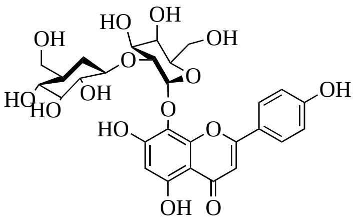

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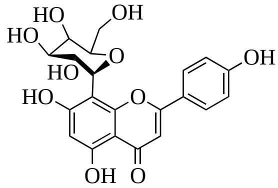

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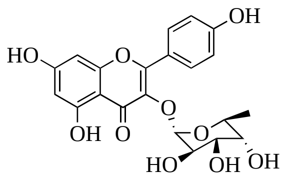

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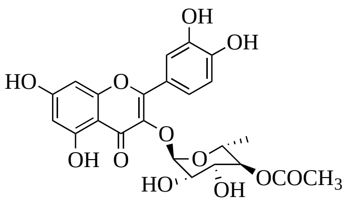

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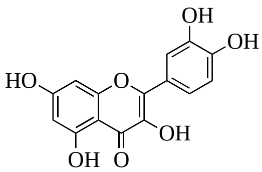

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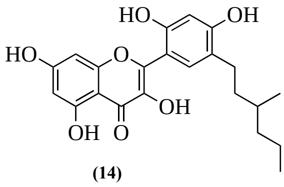

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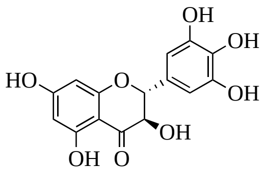

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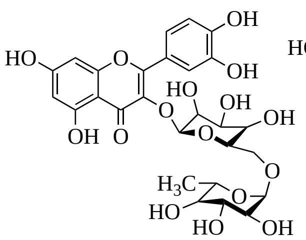

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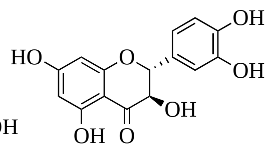

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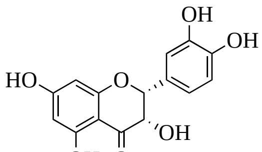

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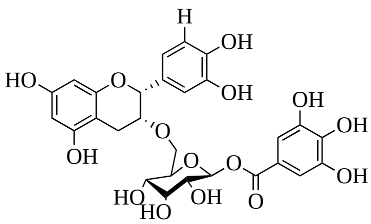

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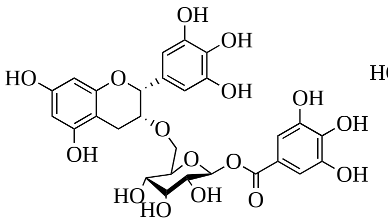

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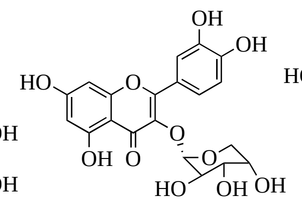

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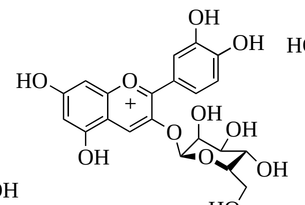

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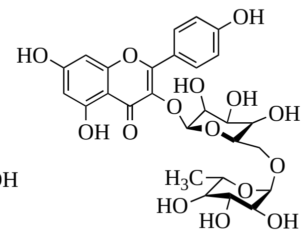

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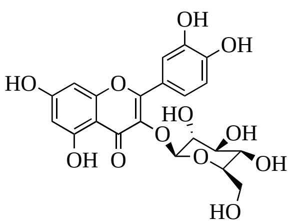

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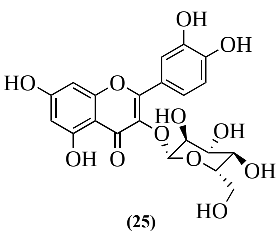

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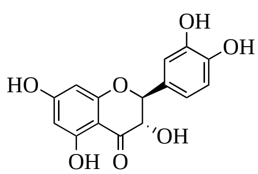

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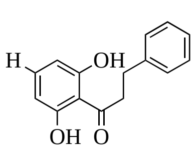

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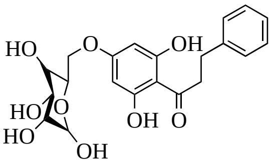

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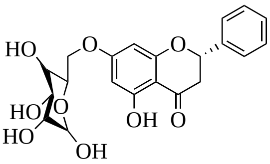

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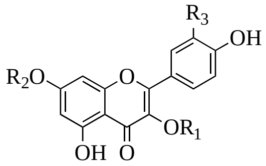
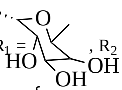
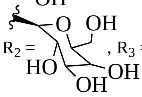
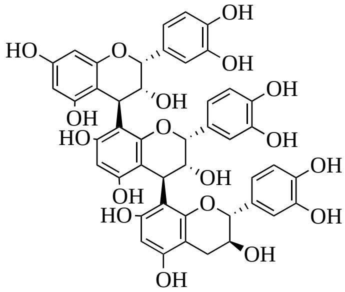


(30) R_1 =  , R_2 = R_3 =H

(31) R_1= R_2 =  , R_3 = H



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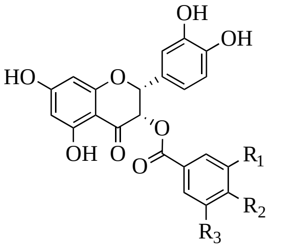
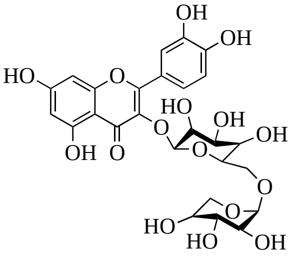


(33) R1 = R2 = R3 = OCH3
(34) R1 = OCH3, R2 = R3 = OH



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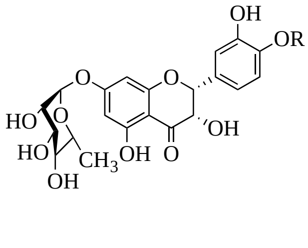
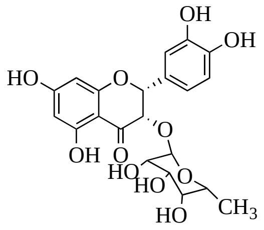


(36) R = H
(37) R = CH3



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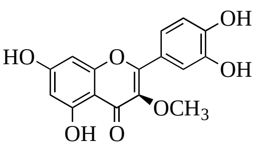

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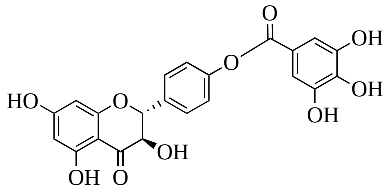

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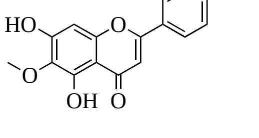

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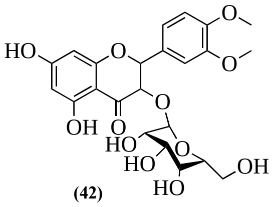

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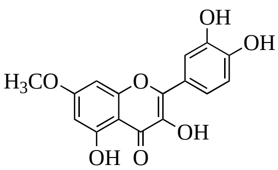

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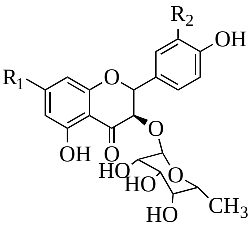
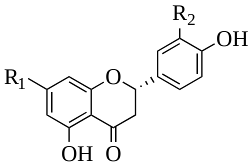
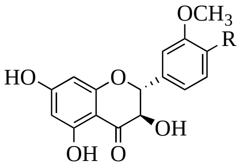


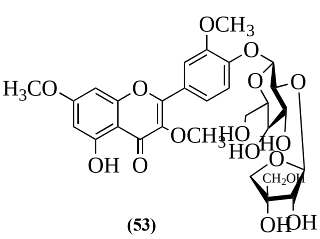
(44) R_1 = OCH_3, R_2 = OH
(45) R_1 = OCH_3, R_2 = H



(46) R_1 = OH, R_2 = H
(47) R_1 = OH, R_2 = OH
(48) R_1 = OH, R_2 = OCH_3
(49) R_1 = OGlucose, R_2 = H
(50) R_1 = OGlucose, R_2 = OCH_3



(51) R = OCH_3
(52) R = OH



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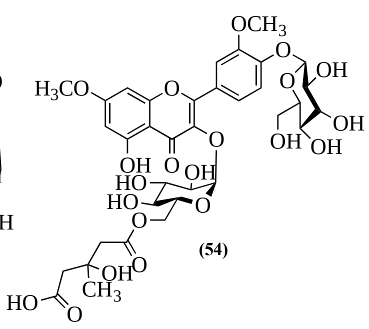

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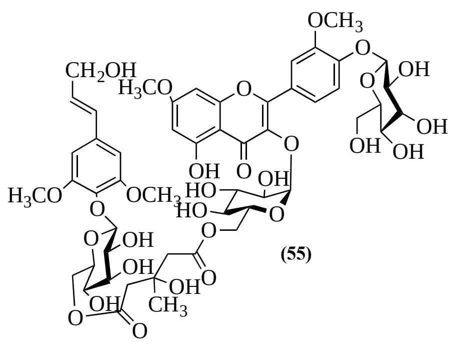

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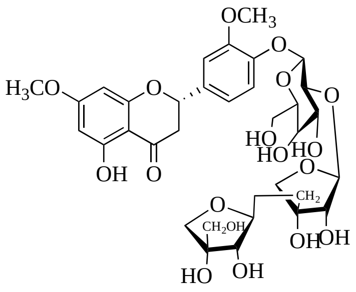
ISSN 2462-2052 | eISSN 2600-8718
DOI: https://doi.org/10.37134/jsml.vol12.2.1.2024



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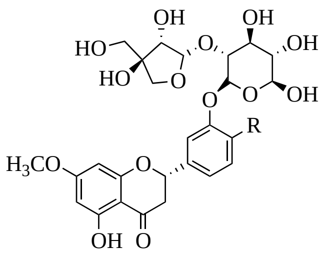
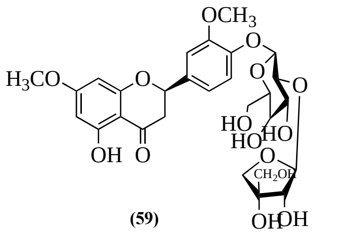


(57) R = H
(58) R = OCH_3



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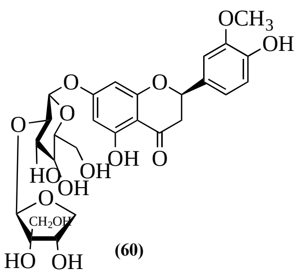

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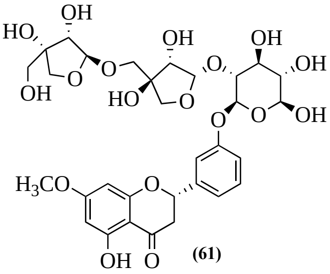

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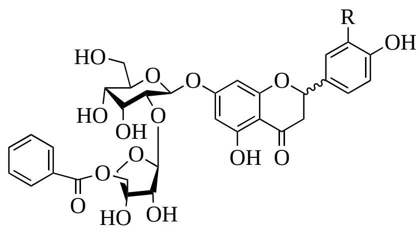
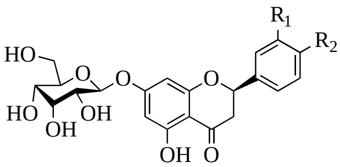
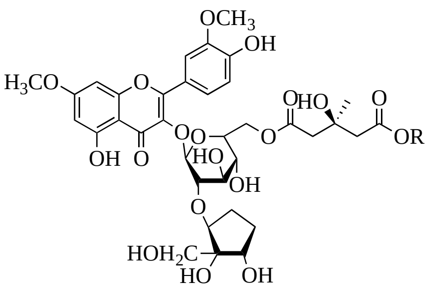


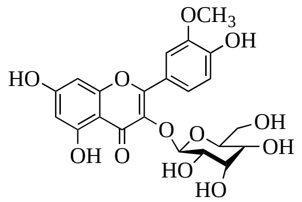
(62) R = OCH_3, (2*S*)
(63) R = OCH_3, (2*R*)
(64) R = H, (2*S*)
(65) R = H, (2*R*)
(66) R = OH, (2*S*)
(67) R = OH, (2*R*)



(68) R_1 = OH, R_2 = OH
(69) R_1 = H, R_2 = OH



(70) R = CH_3
(71) R = H



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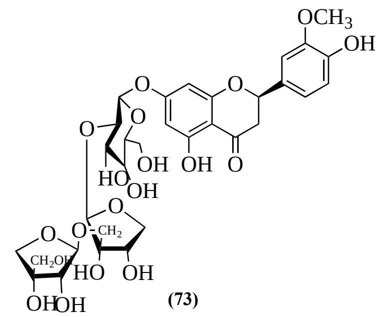

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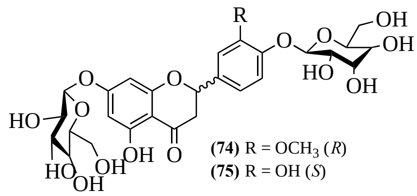
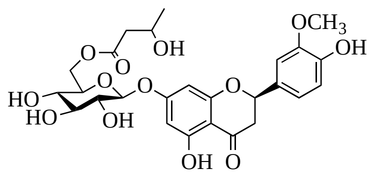


(74) R = OCH_3 (*R*)
(75) R = OH (*S*)



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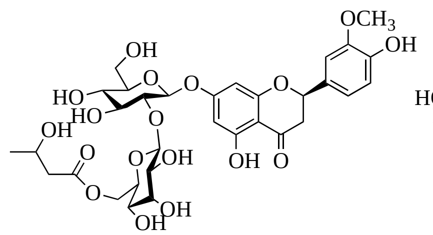

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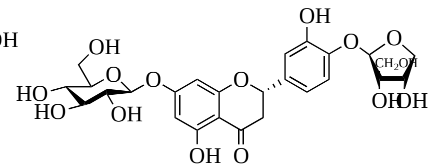

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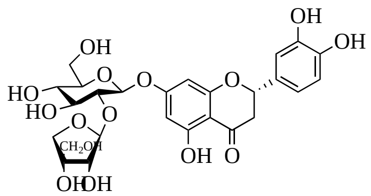

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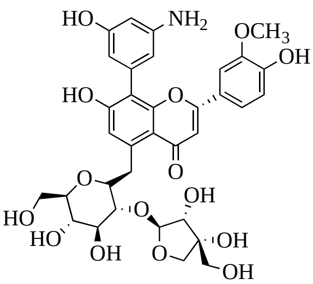

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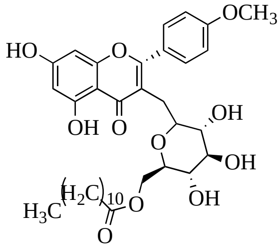

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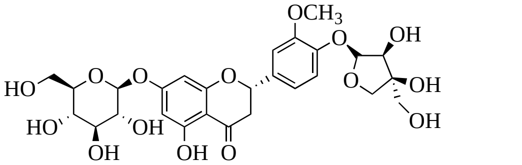

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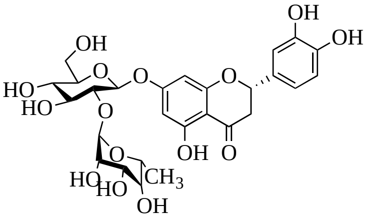

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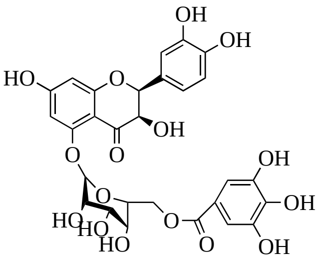
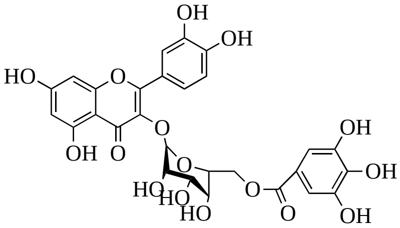
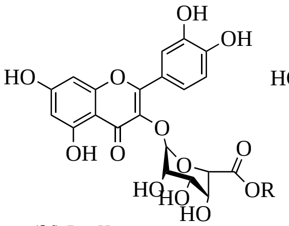


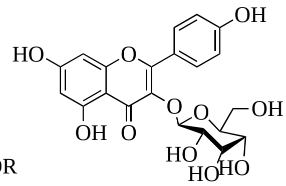
(84)



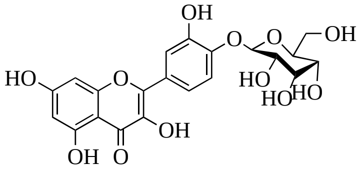
(85)



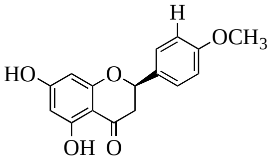
(86) R = H
(87) R = CH_3
(88) R = $CH_2(CH_2)_2CH_3$



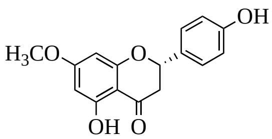
(89)



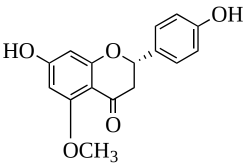
(90)



(91)



(92)



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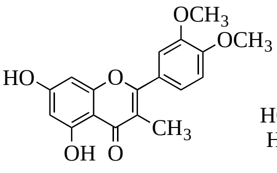

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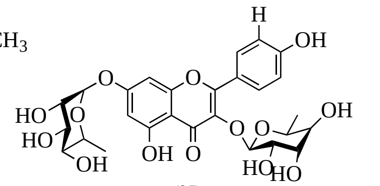

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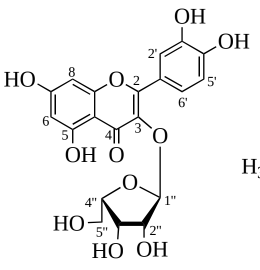

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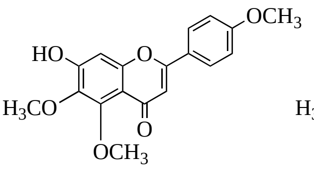

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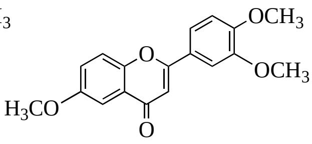

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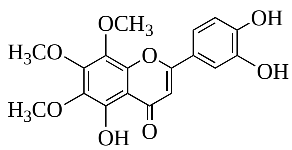
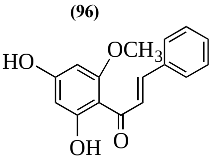


(99)



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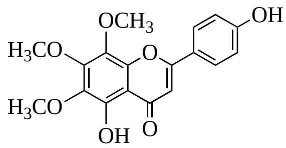

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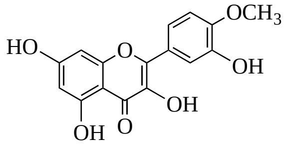

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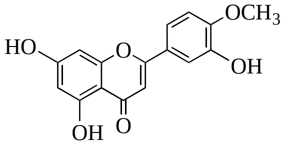

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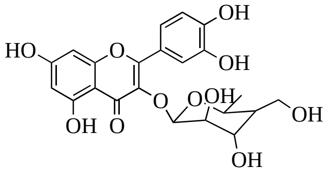
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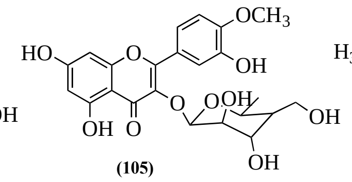
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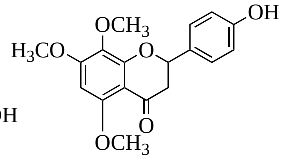
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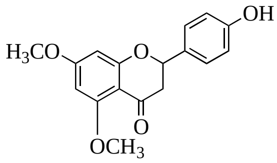
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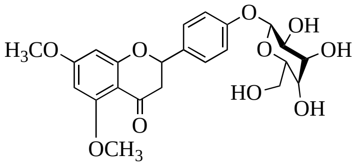
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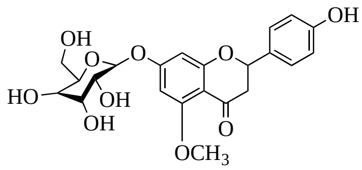
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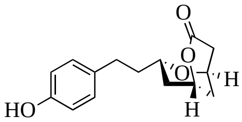
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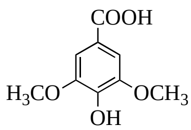
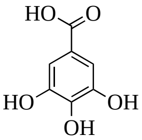

(111)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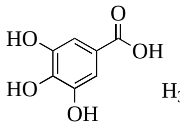
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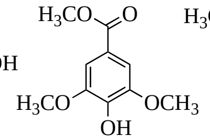
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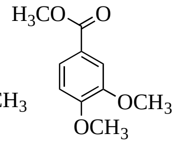
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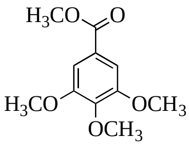
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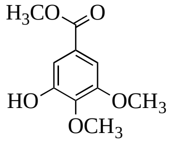
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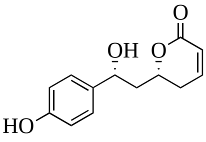
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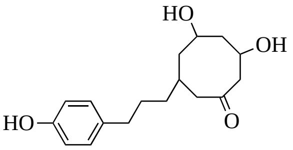
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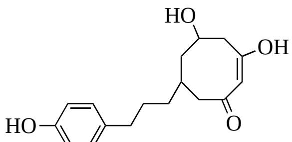
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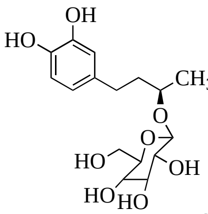
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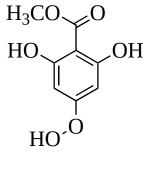
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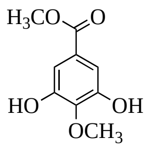
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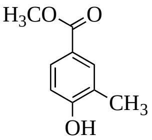
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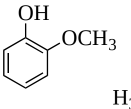
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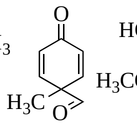
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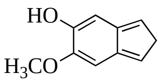
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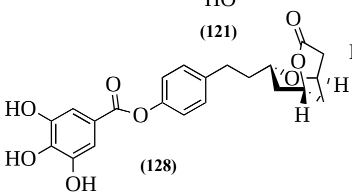
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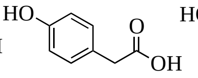
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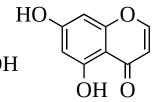
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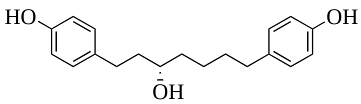
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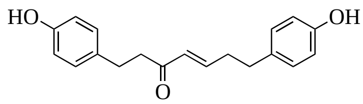
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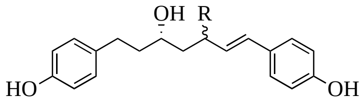
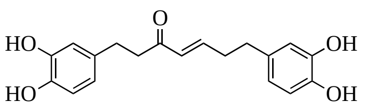

(133) R = OCH3 (*R*)
(134) R = OCH3 (*S*)
(135) R = =O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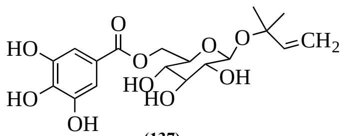
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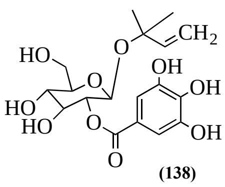
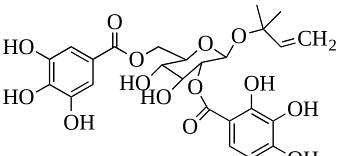

(138)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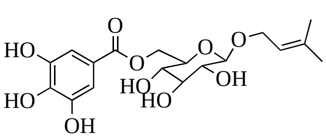
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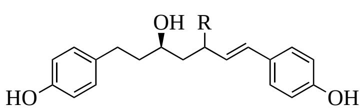
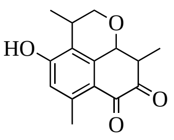
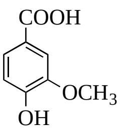

(141) R = OH (*S*)
(142) R = OH (*R*)


(143)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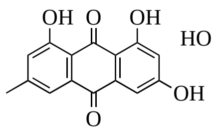
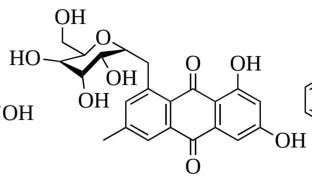

(145)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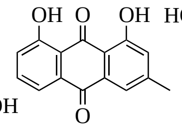
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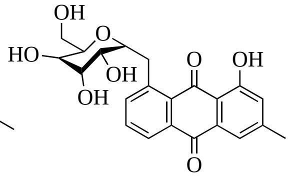
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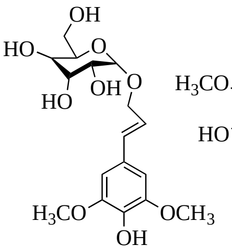
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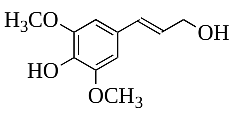
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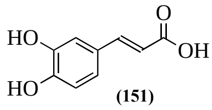
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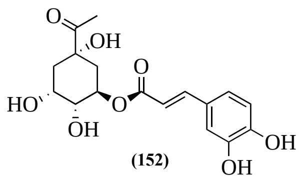
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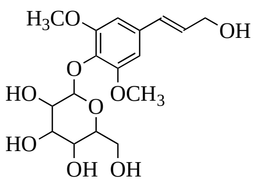
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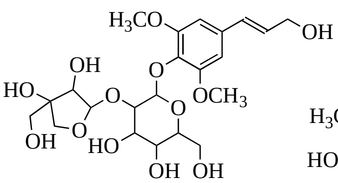
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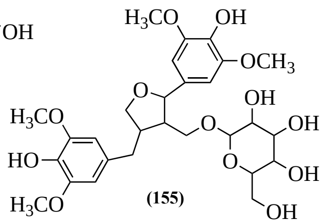
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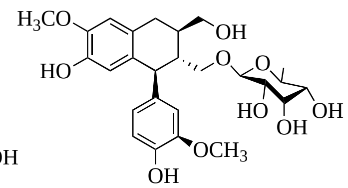
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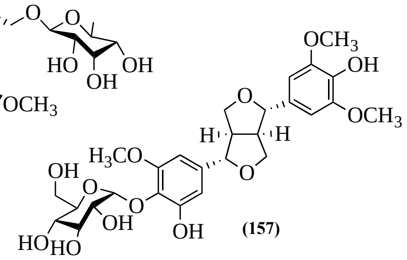
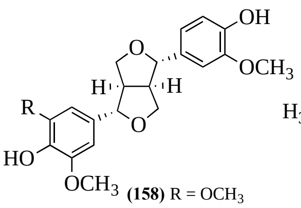
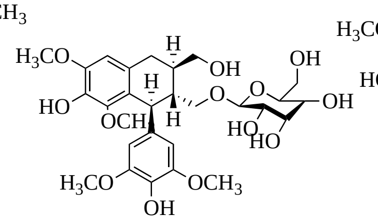

(157)


(158) R = OCH_3
(159) R = H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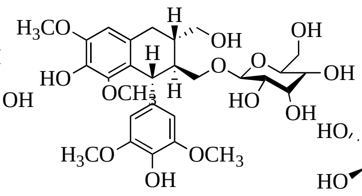
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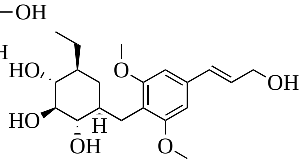
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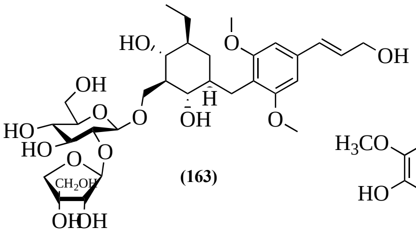
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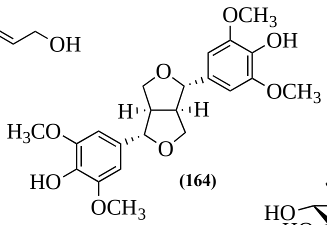
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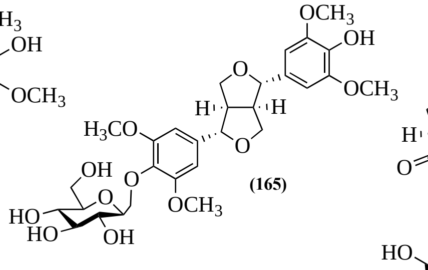
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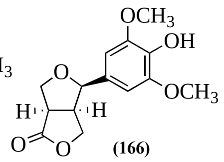
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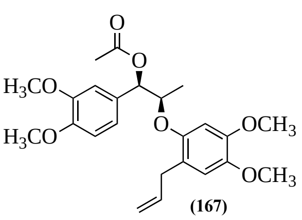
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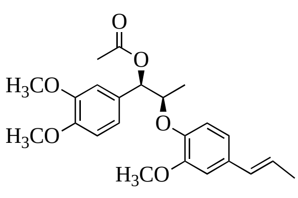
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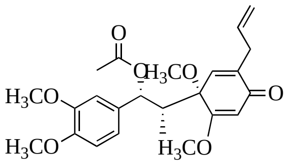
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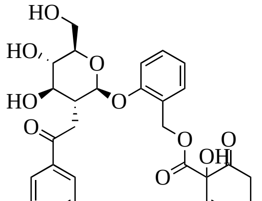
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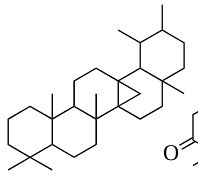

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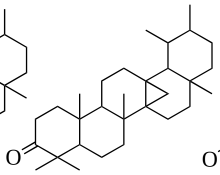

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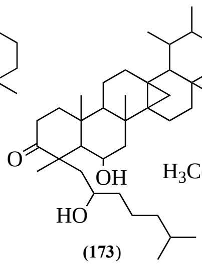

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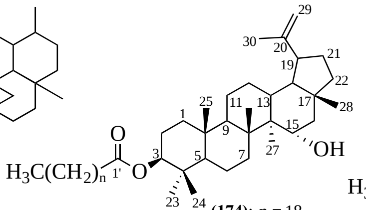
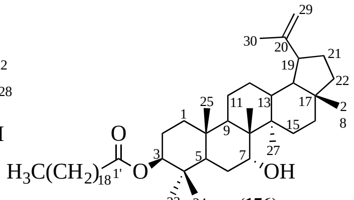


(174): n = 18
(175): n = 20



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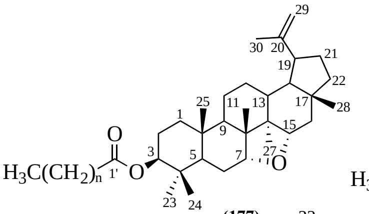
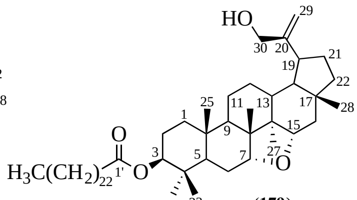


(177): n = 22
(178): n = 18



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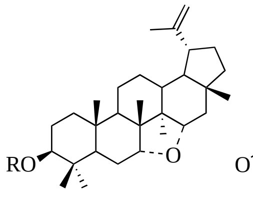
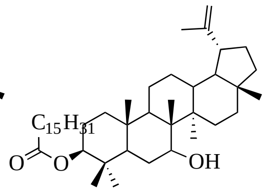
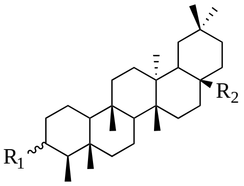


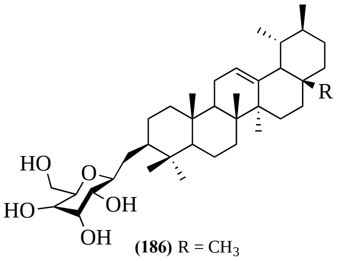
(180) R = $CH_3(CH_2)_{20}C(O)$
(181) R = H



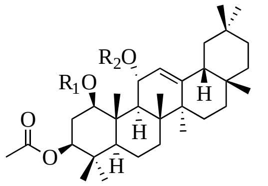
(182)



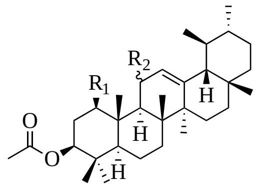
(183) R_1 = =O, R_2 = CH_3
(184) R_1 = OH, R_2 = CH_3
(185) R_1 = =O , R_2 = CH_2OH



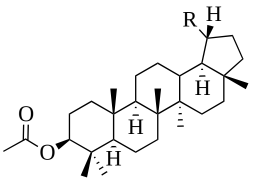
(186) R = CH_3
(187) R = CH_2OH



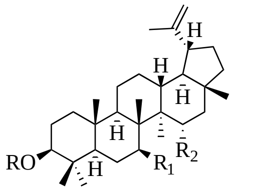
(188) R_1 = $O(CH_3)_2OH$, R_2 = H
(189) R_1 = H, R_2 = CH_2CH_3
(190) R_1 = H, R_2 = CH_3
(191) R_1 = R_2 = H



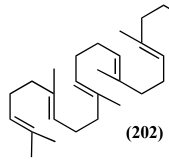
(192) R_1 = R_2 = OH
(193) R_1 = H, R_2 = =O



(194) R = $C(=CH_2)CH_3$
(195) R = $COCH_3$
(196) R = $CH(CH_3)COOH$



(197) R = $CH_3(CH_2)_{14}C(O)$, R_1 = OH, R_2 = OH
(198) R = $CH_3(CH_2)_{14}C(O)$, R_1 = H, R_2 = H
(199) R = R_1 = R_2 = H
(200) R= OCH_3, R_1 = R_2 = H
(201) R= H, R_1 = R_2 = OH



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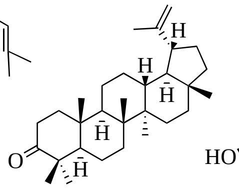

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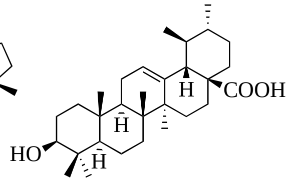

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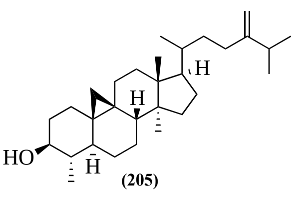

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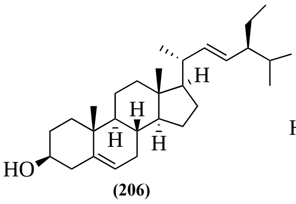

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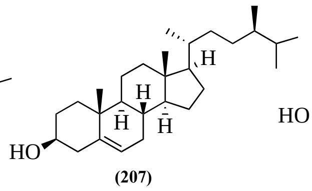

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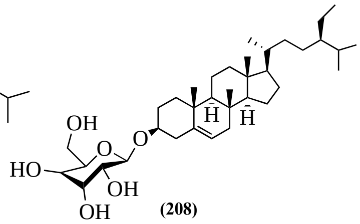

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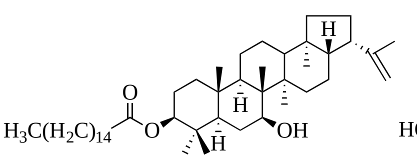

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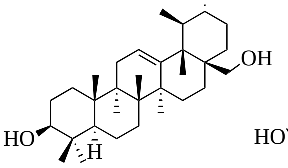

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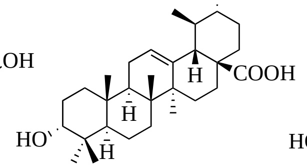

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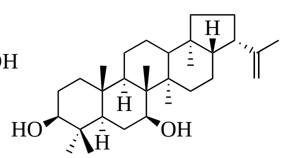

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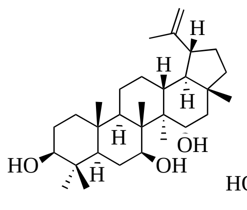

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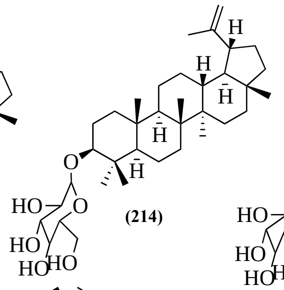

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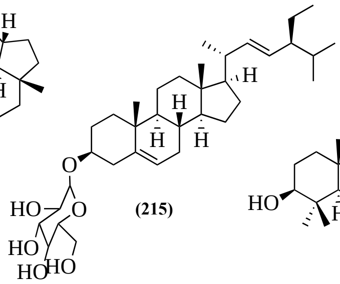

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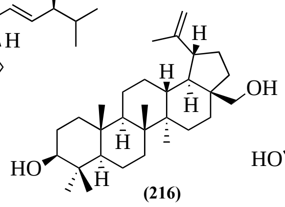

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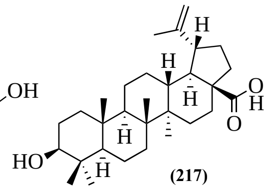

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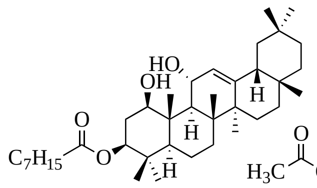

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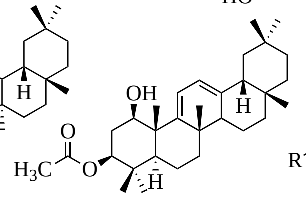

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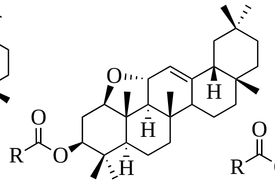
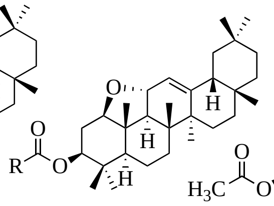
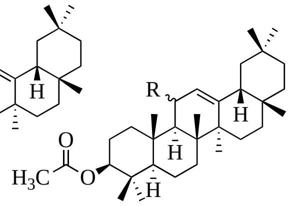


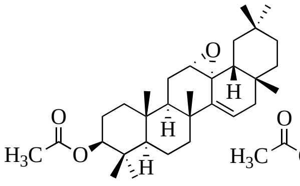
(220) R = CH_3
(221) R = C_5H_{11}
(222) R = $C_6H_{11}O$



(223) R = CH_3
(224) R = C_5H_{11}



(225) R= =O
(226) R= OH



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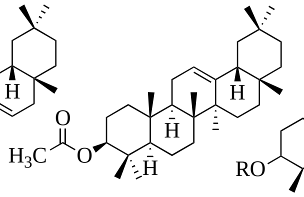

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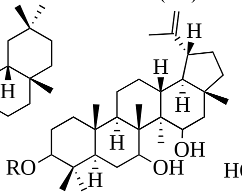
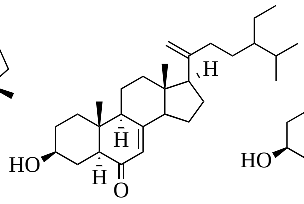


(229) R = $CH_3(CH_2)_{16}C(O)$
(230) R = $CH_3(CH_2)_{18}C(O)$



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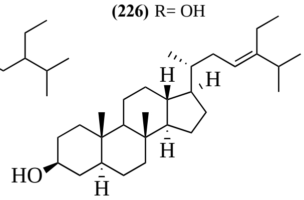

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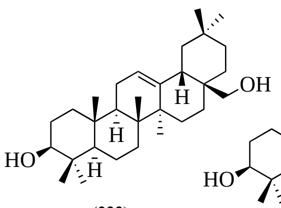

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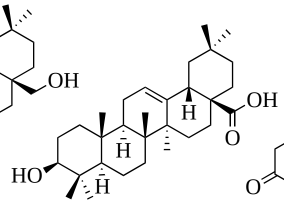

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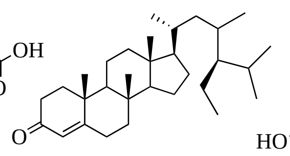

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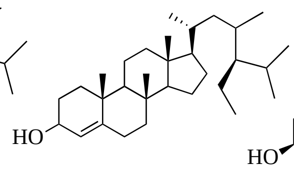

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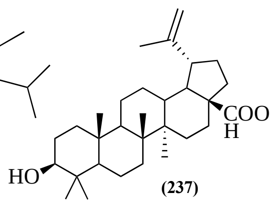

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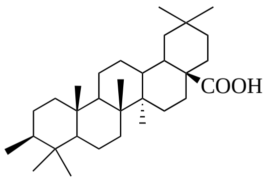

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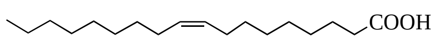

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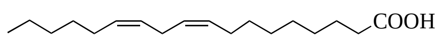

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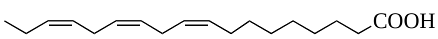

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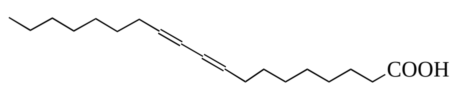
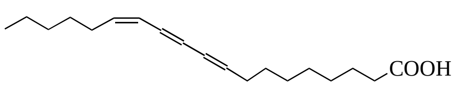
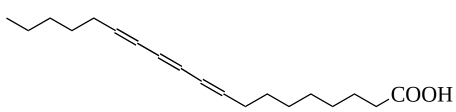


(242)



(243)



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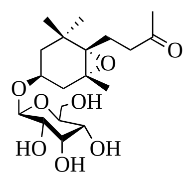

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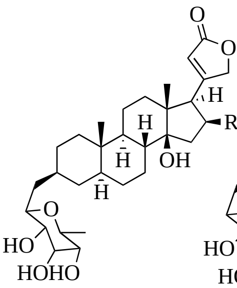
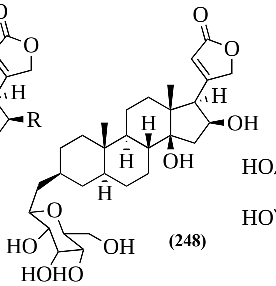


(246) R = OH
(247) R = H



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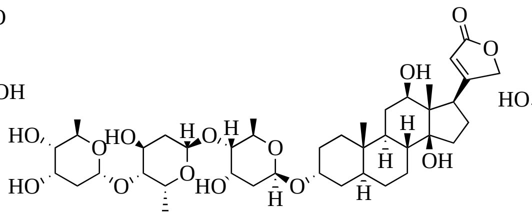

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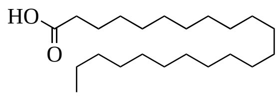

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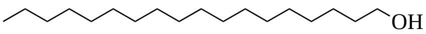

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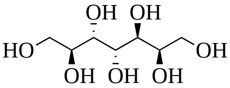

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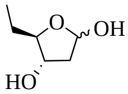

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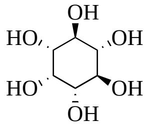

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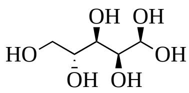

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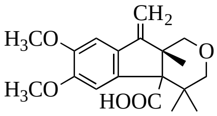

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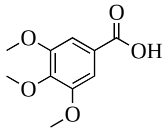

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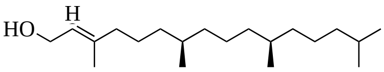

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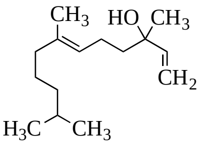

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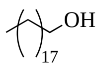

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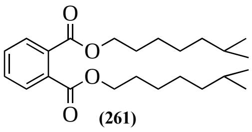

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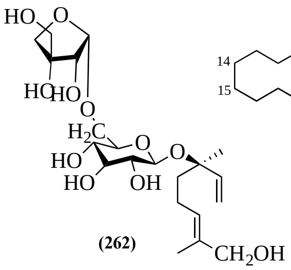

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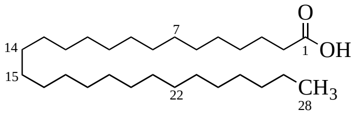

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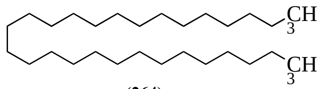

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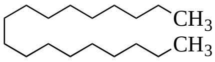

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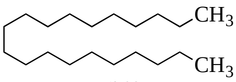

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4. CONCLUSION

This compilation includes the phytochemicals, species and the host plants of the family Loranthaceae, and specifically provides some exploration of the literatures published. Some members of the family are reported to possess medicinal properties and are used to treat various ailments. Quercetin 3-*O*-α-L-rhamnopyranoside (Quercitrin) **(6)** is the major constituent of this family, and is important chemotaxonomic marker of the Loranthaceae plant species from a phytochemical point of view.

Declaration of Interest
I declare that there is no conflict of interest.

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