Research Progress on Non-volatile Chemical Constituents and Pharmacological Activities of Eucalyptus Plants: Postprint

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Abstract

Eucalyptus L.Herit is a large genus of the Myrtaceae family, comprising approximately 600 species primarily distributed in tropical and subtropical regions worldwide. Many varieties have been introduced to China, mainly distributed in South China, with Guangdong and Guangxi serving as the primary cultivation bases for eucalyptus. Eucalyptus plants possess considerable industrial value; their wood, leaves, fruits, and other parts serve as important raw materials for the chemical industry, fragrance, and pharmaceutical sectors, and can be utilized in the development of high-performance eucalyptus reconstituted timber, bamboo-eucalyptus composite materials, pulping and papermaking, among other applications. Eucalyptus plants have been employed as folk medicinal herbs with effects such as antibacterial and anti-inflammatory, wind-dispelling and heat-relieving, antiseptic and antipruritic properties. Pharmacological studies have demonstrated that eucalyptus plants exhibit favorable pharmacological activities, including antioxidant, anti-inflammatory, antibacterial, antiviral, antitumor, and anti-cardiovascular disease effects. This study aims to provide a detailed classification and elaboration of 421 non-volatile chemical constituents from different parts of eucalyptus plants and their pharmacological activities by reviewing relevant domestic and international literature from the past three decades. These constituents include 73 flavonoids, 61 organic acid compounds, 45 terpenoids, 229 polyphenolic compounds, and 13 fatty alcohol compounds. Pharmacological activities are primarily concentrated in antioxidant, antibacterial, antiviral, and antitumor effects, though the underlying mechanisms still require further elucidation. This article focuses on the medicinal parts of eucalyptus plants, aiming to fully explore their medicinal value and conduct clinical translation and new drug research, thereby providing a scientific basis for future research, development, and utilization of eucalyptus plants.

Full Text

Preamble

Research Progress on Non-Volatile Chemical Components and Pharmacological Activities of Eucalyptus Genus Plants

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Abstract: *Eucalyptus* L' Héritier is a large genus of the Myrtaceae family comprising approximately 600 species, primarily distributed in tropical and subtropical regions worldwide. China has introduced numerous species, mainly cultivated in South China, with Guangdong and Guangxi serving as the primary planting bases. Eucalyptus plants possess significant industrial value; their wood, leaves, and fruits serve as important raw materials in chemical industry, fragrance, and pharmaceutical sectors, with applications in developing high-performance eucalyptus reconstituted timber, bamboo-eucalyptus composite materials, pulp, and paper manufacturing. As traditional folk medicine, eucalyptus exhibits antibacterial, anti-inflammatory, wind-dispelling, fever-reducing, antiseptic, and antipruritic effects. Pharmacological studies have demonstrated that eucalyptus possesses promising antioxidant, anti-inflammatory, antibacterial, antiviral, antitumor, and anti-cardiovascular disease activities. This study systematically reviews domestic and international literature from the past three decades on eucalyptus plants, providing detailed classification and description of 421 non-volatile chemical constituents from different plant parts and their pharmacological activities, including 73 flavonoids, 61 organic acids, 45 terpenoids, 229 polyphenols, and 13 fatty alcohols. Pharmacological activities primarily concentrate on antioxidant, antibacterial, antiviral, and antitumor effects, though related mechanisms require further elucidation. This review focuses on the medicinal parts of eucalyptus plants to fully explore their medicinal value and facilitate clinical translation and new drug development, aiming to provide a scientific basis for future research, development, and utilization of eucalyptus plants.

Keywords: Eucalyptus genus plants, non-volatile chemical components, structural classification, pharmacological activity, research progress

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Introduction

Eucalyptus L'Héritier, a large genus of the Myrtaceae family, is widely cultivated in Australia, Indonesia, and Papua New Guinea, commonly known as eucalyptus trees. These plants serve diverse functions: ecologically, they conserve water and soil, sequester carbon and release oxygen, accumulate nutrients, and purify the environment; pharmacologically, eucalyptus has long been used as folk medicine for influenza, dysentery, eczema, and traumatic injuries. China has nearly a century of eucalyptus cultivation history, with approximately 80 species introduced and distributed primarily in Fujian, Guangdong, Guangxi, Yunnan, and Sichuan. Major species include *Eucalyptus tereticornis*, *E. camaldulensis*, *E. citriodora*, *E. exserta*, *E. robusta*, *E. kirtoniana*, *E. globulus*, and *E. maidenii*. Eucalyptus plants exhibit rapid growth, broad adaptability, high yield, and excellent wood quality, making them important raw materials for chemical industry, fragrance, and pharmaceutical applications. As health standards improve, there is increasing demand for green, natural, safe, and low-toxicity medicines for disease treatment.

Current research on eucalyptus primarily focuses on volatile oils from leaves, which contain abundant bioactive substances with antitumor, antidiabetic, antioxidant, insecticidal, and antibacterial activities. Studies have shown that non-volatile compounds in eucalyptus mainly include flavonoids, polyphenols, terpenoids, and organic acids, exhibiting antioxidant, anti-inflammatory, antibacterial, antiviral, antitumor, and anti-cardiovascular disease activities (Chattopadhyay et al., 2002; Chen, 2002; Tang et al., 2006; Achiwa et al., 2007; Steinkamp-Fenske et al., 2007; Solmaz et al., 2014). However, comprehensive summaries of non-volatile components are lacking, and systematic organization of compound structures and corresponding bioactivities is needed. This study analyzed domestic and international research papers on eucalyptus non-volatile components from the past 30 years using Web of Science, PubMed, and CNKI databases, employing listing, comparison, and summary methods to address: (1) classification of non-volatile components; (2) sources of non-volatile components; and (3) pharmacological activities and mechanisms of non-volatile components. This review aims to organize and summarize the classification, sources, structures, and bioactivities of these compounds to provide references for in-depth research and development of eucalyptus plants.

1. Chemical Composition Classification

1.1 Flavonoid Compounds

Flavonoids are a series of compounds composed of two benzene rings connected through three carbon atoms, featuring a C6-C3-C6 structure. Researchers have isolated 73 flavonoid compounds from eucalyptus plants (Supplementary Table 1), primarily including flavones, flavonols, dihydroflavones, dihydroflavonols, isoflavones, and flavanols. Flavonoids are mainly distributed in leaves, with 62 compounds identified in this plant part.

1.2 Organic Acid Compounds

Organic acids are acidic organic compounds containing carboxyl groups, structurally classified as fatty acids and aromatic acids. Researchers have identified 61 organic acid compounds in eucalyptus plants (Supplementary Table 2), mainly including dicarboxylic acids, hydroxy acids, higher saturated fatty acids, and unsaturated fatty acids. Organic acids are primarily distributed in leaves and stems, with 28 and 19 compounds identified in these parts, respectively.

1.3 Terpenoid Compounds

Terpenoids are polymers of isoprene and their derivatives, with skeletons generally based on five-carbon units. Literature reports indicate that eucalyptus plants contain 42 triterpenoids and 3 non-volatile diterpenoids (Supplementary Tables 3 and 4). The structural skeletons of non-volatile terpenoids in eucalyptus are mainly diterpenes and triterpenes. Diterpenoids feature linear and monocyclic structures, while triterpenoids are predominantly pentacyclic, with skeletons classified as ursane, oleanane, and lupane types. Terpenoid compounds are mainly distributed in bark, with 31 compounds identified in this tissue.

1.4 Polyphenol Compounds

1.4.1 Phloroglucinols Eucalyptus plants have yielded 113 phloroglucinol compounds (Supplementary Table 5), with the basic skeleton of 1,3,5-trihydroxybenzene. Phloroglucinols exhibit distinct structural features: R1 commonly combines with ortho phenolic hydroxyl groups, predominantly forming polycyclic compounds with monoterpene, sesquiterpene, and diterpene fragments; R2 and R3 are typically aldehyde, methyl, methoxy, or methylbutanone groups. Phloroglucinol compounds are mainly distributed in leaves, with 76 compounds identified in this plant part.

1.4.2 Tannins Tannins are complex polyphenolic compounds primarily composed of gallic acid and its derivatives. Eighty-two tannins have been discovered in eucalyptus plants (Supplementary Table 6), with structural skeletons mainly consisting of hydrolyzable and condensed tannins. Tannin compounds are primarily distributed in leaves and bark, with 58 and 15 compounds identified in

these tissues, respectively.

1.4.3 Phenolic Acids Studies have identified 34 phenolic acid compounds in eucalyptus plants (Supplementary Table 7), with structural skeletons mainly including benzoic acids, phenylpropenoic acids, and phenylpropanoic acids. Benzoic acids can be further classified as monohydroxybenzoic acids, dihydroxybenzoic acids, and trihydroxybenzoic acids. Phenolic acid compounds are mainly distributed in leaves, with 28 compounds identified in this plant part.

1.5 Fatty Alcohol Compounds

Thirteen fatty alcohol compounds have been identified from eucalyptus plants (Supplementary Table 8), with structural skeletons primarily consisting of linear higher fatty alcohols containing 8-29 carbon atoms, which serve as main raw materials for synthesizing alcohol-based surfactants. Fatty alcohol compounds are mainly distributed in leaves, with 11 compounds identified in this plant part.

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2. Pharmacological Activities

2.1 Antioxidant Activity

The 50% ethanol extract of *Eucalyptus globulus* leaves exhibits DPPH radical scavenging activity with a maximum clearance rate of 65%. Its mechanism involves inhibiting matrix metalloproteinase (MMPs) and interleukin-6 (IL-6) expression while increasing transforming growth factor-$ 1($TGF- 1$)$ $and type I collagen expression, thereby regulating TGF- $/Smad signaling pathways to reduce wrinkle formation and prevent skin dryness (Park et al., 2018).

Polyphenolic compounds 317, 318, 320, 324, 368, and 387 (Figure 1 [Figure 1: see original paper]) demonstrate significant antioxidant activity, protecting human liver cancer cells from oxidation and exhibiting strong scavenging activity against both DPPH and $ABTS^+$ radicals with IC_{50} values ranging from 41.4-538.7 M. Compound 352 shows the strongest antioxidant activity (IC_{50} = 41.4 M), featuring a hydrolyzable tannin structure with multiple gallic acids connected to a monosaccharide moiety; its antioxidant activity is closely related to gallic acid content (Xie et al., 2011; Xiao et al., 2012).

Phenolic acid compounds 341, 384, and 389 contain single benzene ring nuclei with phenolic hydroxyl and carboxyl groups, demonstrating strong antioxidant capacity. Compound 341 exhibits stronger DPPH, NO, and hydroxyl radical scavenging activity and lipid peroxidation inhibition than vitamin C (Ma et al., 2010b; Wang et al., 2005), protecting skin by regulating MMP and TGF-$ $1 expression. Compound 368 protects human umbilical vein endothelial cells (HUVEC) from radiation-induced oxidative stress damage, likely through regulating

PI3K and ERK signaling pathways, inducing Nrf2 activation, and increasing intracellular glutathione (GSH) and nicotinamide adenine dinucleotide phosphate (NADPH) content (Ma et al., 2010a).

Compound 389 enhances macrophage antioxidant capacity by activating Nrf2 through JNK-mediated phosphorylation, increasing glutathione peroxidase (GPx) and glutathione reductase (GR) expression (Ma et al., 2010b). Additionally, triterpenoid compound 152 protects human liver cells from tert-butyl hydroperoxide (t-BHP)-induced cytotoxicity by increasing oxidative stress-sensitive transcription factor Nrf2 and MAP kinase expression, eliminating ROS, inhibiting lipid peroxidation, and strengthening the antioxidant defense system (Ma et al., 2010a).

2.2 Anti-inflammatory Activity

Ethanol extracts of *Eucalyptus globulus* exhibit significant anti-inflammatory and analgesic effects, markedly reducing mouse auricle swelling, increasing capillary permeability, inhibiting rat cotton pellet granuloma, and preventing histamine release from RBL-2H3 cells, thereby achieving anti-inflammatory and asthma therapeutic effects (He et al., 2007; Tang et al., 2015). Additionally, phenolic acid compound 384 blocks the JNK signaling pathway, inhibiting radiation-induced U937 adhesion to HUVEC and preventing intercellular adhesion molecule-1 (ICAM-1) and vascular cell adhesion molecule-1 (VCAM-1) expression, thus exerting anti-inflammatory effects (Ma et al., 2010b).

2.3 Antibacterial Activity

Antibacterial triterpenoids in eucalyptus plants are primarily ursane and lupane types (Figure 2 [Figure 2: see original paper]). Chattopadhyay et al. (2002) found that ursolic acid (151) exhibits strong, broad-spectrum antibacterial activity against *Staphylococcus aureus*, *Staphylococcus saprophyticus*, and *Streptococcus faecalis* with minimum inhibitory concentrations (MIC) of 0.128-2 $mg \cdot mL^{-1}$. Chen (2002) reported that betulinic acid (156) and 2α-hydroxyursolic acid (153) show strong inhibitory activity against *S. aureus* and *Escherichia coli* with MIC values of 12.5-50 $g \cdot mL^{-1}$. Both ursolic acid and its hydroxyl-substituted derivatives demonstrate good antibacterial activity, with hydroxyl substitution tending to enhance activity. Additionally, phloroglucinol compounds 272 and 273 exhibit good inhibitory effects against *Staphylococcus* and *Bacillus subtilis* with IC_{50} values of 3.9 and 7.8 $g \cdot mL^{-1}$, respectively, with α-configuration showing stronger activity than β-configuration. Macrocarpal compounds demonstrate significant inhibitory activity against Gram-positive bacteria; compounds 217, 218, 219, 220, 224, and 233 show strong anti-caries and periodontal pathogen activity with MIC values of 0.39-100 $g \cdot mL^{-1}$, superior to the antibacterial agent thymol. Macrocarpals A-G (217-223) exhibit IC_{50} values of 0.78-3.13 $g \cdot mL^{-1}$ against *S. aureus*, *B. subtilis*, *Micrococcus luteus*, and *Mycobacterium smegmatis*. Compound 233 shows good inhibitory effects against *Streptococcus mutans* and *Streptococcus sanguinis* with MIC values of 12.5 and 6.25 $g \cdot$

mL^{-1}, respectively (Osawa et al., 1996; Fu et al., 2003; Liu, 2004; Huang et al., 2014). Macrocarpal-type phloroglucinols from eucalyptus exhibit broad-spectrum, potent antibacterial activity, offering promise for discovering novel natural antibacterial lead compounds.

2.4 Antiviral Activity

Eucalyptus extracts demonstrate inhibitory effects against influenza A virus, human herpesvirus, and hepatitis B virus. Wang et al. (2005) found that rutin (53) showed significant anti-influenza A virus activity in mice infected with H1N1 virus. Tang et al. (2015) reported that phloroglucinols 207, 202, and 220 (Figure 3 [Figure 3: see original paper]) exhibit significant anti-human herpesvirus activity. Triterpenoids 156, 151, and 153 show strong anti-hepatitis B virus activity, with inhibition rates of 47.0%, 39.9%, and 30.2% against hepatitis B surface antigen (HBsAg), and 12.3%, 23.6%, and 13.96% against hepatitis B e antigen (HBeAg), respectively (Chen, 2002).

2.5 Antitumor Activity

2.5.1 Anti-Leukemia Activity Leukemia is a malignant hematological tumor. Benyahia et al. (2004) found that flavonoids 13 and 14 (Figure 4 [Figure 4: see original paper]) inhibit the survival and proliferation of human promyelocytic leukemia HL-60 cells, with compound 13 ($IC_{50} = 1.7 \pm 0.1$ $mol \cdot L^{-1}$) showing stronger inhibition than compound 14 ($IC_{50} = 7.4 \pm 2.3$ $mol \cdot L^{-1}$), possibly due to hydroxyl substitution of the para-methoxy group on ring B reducing activity. Caspases play critical roles in apoptosis, with caspase-8 and caspase-3 expression significantly decreased in various cancers. Both compounds 13 and 14 induce tumor cell apoptosis by activating caspase-8, which activates caspase-3, releases cytochrome c, cleaves poly(ADP-ribose) polymerase-1 (PARP-1), and prevents DNA repair.

Solmaz et al. (2014) demonstrated that apigenin (9) shows therapeutic potential for imatinib-sensitive and -resistant chronic myeloid leukemia by inducing tumor cell apoptosis through phosphorylation of heat shock protein 27 (Hsp27), caspase activation, and mitochondrial depolarization in HL-60 cells. Additionally, apigenin induces apoptosis in K562 and K562/IMA3 cells by reducing mitochondrial membrane potential (MMP) and activating caspase-3, with high doses causing G2/M phase arrest in K562 cells.

2.5.2 Anti-Digestive System Tumors Eucalyptus flavonoids including quercetin (12), isoquercitrin (18), and luteolin (23) exhibit strong inhibitory effects on digestive system tumors (Figure 5 [Figure 5: see original paper]). Huang et al. (2014) found that compound 18 shows strong hepatoma inhibition, with its molecular mechanism likely related to mitogen-activated protein kinase (MAPK) and protein kinase C (PKC) signaling pathways. Sabry et al. (2021) reported that eucalyptus water-soluble resin polyphenols also inhibit liver cancer through suppressing MMP-9 and TEF-β gene expression. Solmaz et

al. (2014) found that isoquercitrin induces G1 phase arrest in liver cancer cells by activating caspase-3, inhibiting ERK and p38-MAPK phosphorylation, and promoting c-Jun N-terminal kinase (JNK) phosphorylation. Compound 23 inhibits human gastric cancer BGC-823 cell xenografts in nude mice more effectively than the positive control 5-fluorouracil. Compound 12 induces apoptosis in HT-29 colon cancer cells with p53 mutations by activating the 5' -AMP-activated protein kinase (AMPK)/p38-MAPK pathway, reducing mitochondrial membrane potential, and phosphorylating AMPK$ $1 to inhibit cell growth and proliferation. Additionally, quercetin induces HT-29 colon cancer cell apoptosis by regulating the AMPK/COX-2 pathway, activating AMPK phosphorylation, inhibiting COX-2 and prostaglandin expression, suppressing angiogenesis, and causing cell cycle arrest in the sub-G1 phase (Lee et al., 2009).

2.5.3 Anti-Breast and Uterine Cancer Activity Quercetin (12) activates MCF-7 breast cancer cells and induces apoptosis through the AMPK$ $1/ASK1/p38 signaling pathway (Lee et al., 2010). Luteolin (23) inhibits MCF-7 cell proliferation and suppresses Bcl-2 and matrix metalloproteinase-2 (MMP-2) protein expression, achieving anti-breast cancer effects (Jiang et al., 2013). Achiwa et al. (2007) found that ursolic acid (151) exerts anti-endometrial cancer effects by inhibiting the PI3K-Akt and MAPK-P44/42 pathways in endometrial cancer cell lines SNG-II and poorly differentiated HEC108 cells, reducing PI3K levels in SNG-II cells and thereby killing tumor cells.

2.5.4 Broad-Spectrum Antitumor Activity Total triterpenoids from *Eucalyptus globulus* exhibit broad-spectrum inhibition of tumor cell growth, showing inhibitory effects against various cancer cell types including human lung cancer A-549, gastric cancer AGS and SGC-7901, and colon cancer Caco-2 and LS-174T cells, particularly achieving 55.6% inhibition rate against mouse melanoma B16 cells (Chen, 2002; Liu, 2004). Liu (2004) found that phloroglucinol compound 218 shows significant inhibitory activity against human liver, stomach, and esophageal cancer cells. Additionally, compounds 211, 215, and 216 demonstrate significant inhibitory activity against human liver cancer Huh-7 cells, human peripheral blood leukemia T cells Jurkat, human gastric cancer BGC-823 cells, and plasma cell myeloma KE-97 cells (Tang et al., 2015). Compounds 185 and 207 reduce tumor formation by inhibiting TPA-induced cell cycle progression (Zhang et al., 2014). Solmaz et al. (2014) found that flavonoid apigenin (9) also induces apoptosis in multiple tumor cell types including breast, cervical, lung, ovarian, prostate, and liver cancers, with mechanisms closely related to the PI3K/Akt pathway.

2.6 Anti-Cardiovascular Disease Activity

Atherosclerosis and thrombotic diseases may be associated with high concentrations of plasminogen activator inhibitor type-1 (PAI-1); specific PAI-1 inhibition

can increase fibrinolysis to treat these conditions. Eucalyptus phloroglucinols 272-274, 199, 276, and 204 (Figure 7 [Figure 7: see original paper]) show strong PAI-1 inhibitory activity with IC_{50} values of 3.3, 5.3, 4.7, 138, 700, and 152 $\text{mol} \cdot \text{L}^{-1}$, respectively (Fu et al., 2003; Li, 2015). Triterpenoids also protect cardiovascular function: ursolic acid (151) protects vascular endothelial function by inhibiting reactive oxygen species production and increasing NO expression, while betulinic acid (156) exhibits anti-atherosclerotic effects by activating PI3K and ERK/Nrf2 pathways to upregulate heme oxygenase-1 (HO-1) expression in vascular smooth muscle cells (VSMC) (Steinkamp-Fenske et al., 2007; Feng et al., 2011).

2.7 Other Activities

Eucalyptus phloroglucinols show strong enzyme inhibitory activity (Figure 8 [Figure 8: see original paper]). Compound 212 inhibits P450 enzyme activity with an IC_{50} value of 38.8 $\text{mol} \cdot \text{mL}^{-1}$ (Wang, 2012). Compounds 217-221 inhibit HIV reverse transcriptase with IC_{50} values of 10, 5.3, 8.4, 12, and 8.1 $\text{mol} \cdot \text{L}^{-1}$, respectively (Li, 2015). Compounds 217, 218, 220, 221, 272, and 273 inhibit aldose reductase activity, with compounds 272 and 273 showing IC_{50} values of 1.25 and 2.47 $\text{mol} \cdot \text{L}^{-1}$ against aldose reductase (Elaissi et al., 2011). Compounds 217-220, 224-226, and 233 significantly inhibit glucosyltransferase activity at 100 $\text{g} \cdot \text{mL}^{-1}$, with stronger inhibitory effects than positive controls (Fu et al., 2003). Phloroglucinols also demonstrate anti-attachment and antifeedant properties, inhibiting egg development and repelling *Mytilus edulis galloprovincialis* attachment (Fu et al., 2003; Wang, 2012). Additionally, eucalyptus flavonoids can be applied to increase crop yields (Song et al., 1984).

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3. Discussion and Prospects

Current extraction and isolation of non-volatile chemical components from eucalyptus plants are relatively systematic and comprehensive, with 421 non-volatile compounds reported from roots, stems, leaves, bark, and fruits, mainly comprising flavonoids, organic acids, terpenoids, polyphenols, and fatty alcohols. These compounds exhibit promising antioxidant, antiviral, and antitumor pharmacological activities, though related mechanisms remain superficial and require further elucidation. Specifically: (1) Antioxidant activity primarily involves ethanol extracts, polyphenols, simple phenolic acids, and triterpenoids, with mechanisms potentially related to TGF-β/Smad, PI3K/ERK/Nrf2, and other pathways. (2) *Eucalyptus globulus* ethanol extracts and phenolic acids show anti-inflammatory and analgesic activity, but specific targets and mechanisms require detailed clarification. (3) Antibacterial activity mainly involves triterpenoids and phloroglucinols, but mechanisms remain unclear. (4) Eucalyptus extracts demonstrate strong antiviral effects, particularly against influenza A virus, human herpesvirus, and hepatitis B virus, though mechanisms are not fully understood. (5) Antitumor activity primarily involves flavonoids (apigenin, quercetin,

luteolin), total triterpenoids from *E. globulus*, and phloroglucinols, showing significant effects on leukemia, digestive system tumors, and other cancers with well-studied mechanisms worthy of clinical promotion. (6) Phloroglucinols and triterpenoids show promising anti-atherosclerotic and cardiovascular protective functions, though mechanisms remain incompletely understood. (7) Phloroglucinols exhibit strong enzyme inhibitory activity, such as inhibiting HIV reverse transcriptase, aldose reductase, and glucosyltransferase, indicating significant development potential.

In summary, eucalyptus extracts possess numerous biological activities, though research has primarily focused on volatile components, with limited studies on non-volatile components. Based on current research, further investigation and promotion in suitable regions are warranted to isolate and purify active components, elucidate their chemical structures, pharmacological activities, and mechanisms of action, which will facilitate the development and utilization of eucalyptus plant resources.

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Supplementary Tables

Supplementary Table 1: Flavonoids from Eucalyptus Species

Compound	Source	Position	Reference
Myricetin hexoside	*E. gompho-cephala*	Leaf	Al-sayede et al., 2012
Quercetin hexoside	*E. gompho-cephala*	Leaf	Al-sayede et al., 2012
Valoneic acid dilactone	*E. gompho-cephala*	Leaf	Al-sayede et al., 2012
Myricetin pentoside	*E. gompho-cephala*	Leaf	Al-sayede et al., 2012
Quercetin pentoside	*E. gompho-cephala*	Leaf	Al-sayede et al., 2012
Isovaloneic acid dilactone	*E. gompho-cephala*	Leaf	Al-sayede et al., 2012
4’ ,5,7-Trimethoxykaempferol	*E. gompho-cephala*	Leaf	Al-sayede et al., 2012
Mearnsetin	*E. globulus*	Leaf	Tang et al., 2015
Apigenin	*E. globulus*	Bark	Bhuyandj et al., 2018
Quercitrin	*E. globulus*	Leaf	Liu et al., 2004
Quercetin	*E. globulus*	Fruit	Liu et al., 2004
Anthocyanidin	*E. microcorys*	Leaf	Chen et al., 2016
6,8-Di-C-methylkaempferol 3,4’ -dimethyl ether	*E. occidentalis*	Leaf	Benyahias et al., 2004
6,8-Di-C-methylkaempferol 3-methyl ether	*E. occidentalis*	Leaf	Benyahias et al., 2004
Engeletin	*E. occidentalis*	Leaf	Benyahias et al., 2004
Kaempferol	*E. sideroxylon*	Leaf	Okba et al., 2017
Isoquercitrin	*E. microcorys*	Leaf	Bhuyandj et al., 2018
Luteolin	*E. citriodora*	Leaf	Wang et al., 2014
Citriodorol	*E. occidentalis*	Leaf	Benyahias et al., 2004
Rhamnazin	*E. occidentalis*	Leaf	Benyahias et al., 2004
Rhamnetin	*E. occidentalis*	Leaf	Benyahias et al., 2004
Distylin	*E. sideroxylon*	Leaf	Okba et al., 2017
Leucoanthocyanidin	*E. microcorys*	Leaf	Bhuyandj et al., 2018
Brevifolincarboxylic acid	*E. gompho-cephala*	Leaf	Al-sayede et al., 2012

Compound	Source	Position	Reference
Galloylglucopyranose	*E. gompho-cephala*	Leaf	Al-sayede et al., 2012
Quercetin glycoside	*E. gompho-cephala*	Leaf	Al-sayede et al., 2012
Myricetin	*E. citriodora*	Leaf	Chen et al., 2016
Isomyricitrin	*E. citriodora*	Leaf	Chen et al., 2016
Myricitrin	*E. robusta*	Leaf	Guan et al., 2015
Taxifolin	*E. robusta*	Leaf	Guan et al., 2015
Daucosterol	*E. robusta*	Leaf	Guan et al., 2015
Guaijaverin	*E. robusta*	Leaf	Guan et al., 2015
Kaempferol-7-methyl ether	*E. robusta*	Leaf	Guan et al., 2015
Aromadendrin dimethyl ether	*E. robusta*	Leaf	Guan et al., 2015
Kaempferol 3-O-β-D-galactoside	*E. globulus*	Leaf	Chen et al., 2016
Quercetin 3-O-β-D-galactopyranoside	*E. globulus*	Leaf	Chen et al., 2016
Apigenin glucuronide	*E. robusta*	Leaf	Guan et al., 2015
Quercetin-3-O-glycoside	*E. robusta*	Leaf	Guan et al., 2015
Quercetin rhamnoside	*E. globulus*	Leaf	Chen et al., 2016
Quercetin-3-O-glucoside	*E. globulus*	Leaf	Chen et al., 2016
Quercetin-3-O-arabinoside	*E. globulus*	Leaf	Chen et al., 2016
Quercetin-3-O-glucuronide	*E. globulus*	Leaf	Chen et al., 2016
Myricetin-3-O-rhamnoside	*E. globulus*	Leaf	Chen et al., 2016
Myricetin-3-O-glucoside	*E. globulus*	Leaf	Chen et al., 2016
Procyanidin dimer B-type	*E. globulus*	Leaf	Chen et al., 2016
Rutin	*E. globulus*	Leaf	Chen et al., 2016
4’ ,3,5,7-Tetrahydroxyflavone	*E. globulus*	Leaf	Chen et al., 2016
Dihydroquercetin (astilbin)	*E. globulus*	Leaf	Chen et al., 2016
Benzyl-digalloylglucopyranose	*E. globulus*	Leaf	Chen et al., 2016

Compound	Source	Position	Reference
Quercetin galloylpentoside	*E. globulus*	Leaf	Chen et al., 2016
5-Hydroxy-4,7-dimethoxy-6-methylflavone	*E. globulus*	Leaf	Chen et al., 2016
5-Hydroxy-4' ,7-dimethoxy-6,8-dimethylflavone	*E. globulus*	Leaf	Chen et al., 2016
Quercetin-3-O-(6' -n-butyl)-glucuronide	*E. globulus*	Leaf	Chen et al., 2016
Quercetin-3-O-α-arabopyranose-2" -gallate	*E. globulus*	Leaf	Chen et al., 2016
Kaempferol-3-O-α-L-arabinoside	*E. globulus*	Leaf	Chen et al., 2016
Myricetin-digalloyl-rhamnoside	*E. globulus*	Leaf	Chen et al., 2016
Quercetin-3-O-(2'' -galloyl)-α-L-arabinosidase	*E. globulus*	Leaf	Chen et al., 2016
Kaempferol-3-O-α-L-arabinoside	*E. globulus*	Leaf	Chen et al., 2016
(-)-2S-8-Methyl-5,7,4' -trihydroxydihydroflavone-7-O-α-D-glucoside	*E. globulus*	Leaf	Chen et al., 2016
(-)-2S-8-Methyl-5,7,4' -trihydroxyflavone-7-O-β-D-galactoside	*E. globulus*	Leaf	Chen et al., 2016
5' -Hydroxy-7' -O-(6-O-acetyl-β-D-glucopyranosyl)-2' -methylchromone	*E. globulus*	Leaf	Hakki et al., 2010
5' -Hydroxy-7' -O-(-D-glucopyranosyl)-2' -methylchromone	*E. globulus*	Leaf	Hakki et al., 2010

Compound	Source	Position	Reference
5' -Hydroxy-7' -O-(β-D-allopyranosyl)-2' -methylchromone	*E. globulus*	Leaf	Hakki et al., 2010
5' -Hydroxy-7' -O-(2,3,4,6-tetra-O-Acetyl-β-D-allopyranosyl)-2' -methylchromone	*E. globulus*	Leaf	Hakki et al., 2010
Cypellocarpin C	*E. globulus*	Fruit	Liu et al., 2004
5' -Hydroxy-7' -O-(2,3,4,6-tetra-O-Acetyl-β-D-glucopyranosyl)-20-methylchromone	*E. globulus*	Leaf	Hakki et al., 2010

Supplementary Table 2: Organic Acids from Eucalyptus Species

Compound	Source	Position	Reference
Succinic acid	*E. globulus*	Leaf	Puig et al., 2018
Fumaric acid	*E. globulus*	Leaf	Puig et al., 2018
Benzoic acid	*E. globulus*	Leaf	Puig et al., 2018
Glutaric acid	*E. citriodora*	Leaf	Liang et al., 1985
Malic acid	*E. citriodora*	Leaf	Liang et al., 1985
Quinic acid	*E. viminalis*	Leaf	Pavlova et al., 2017
Shikimic acid	*E. globulus*	Leaf	Puig et al., 2018
Caprylic acid	*E. globulus*	Stem	Silvério et al., 2011
Nonanoic acid	*E. urograndis*	Bark	Domingues et al., 2011
Azelaic acid	*E. globulus*	Bark	Benouadah et al., 2018
Undecanoic acid	*E. globulus*	Leaf	Chen et al., 2016
Lauric acid	*E. gunnii*	Stem	Silvério et al., 2011
Decanoic acid	*E. globulus*	Stem	Silvério et al., 2011
2,6-Octadienoic acid	*E. urograndis*	Bark	Domingues et al., 2011
Trans-p-coumaric acid	*E. globulus*	Leaf	Pavlova et al., 2017
2-Phenylpropanoic acid	*E. globulus*	Leaf	Guimarães et al., 2009

Compound	Source	Position	Reference
Myristic acid	*E. globulus*	Leaf	Abdel-moein et al., 2011
Pentadecanoic acid	*E. globulus*	Bark	Domingues et al., 2011
Pentadec-9-enoic acid	*E. globulus*	Bark	Benouadah et al., 2018
Hexadecanoic acid	*E. viminalis*	Leaf	Kahla et al., 2017
Heptadec-9-enoic acid	*E. urograndis*	Bark	Domingues et al., 2011
Linoleic acid	*E. globulus*	Leaf	Silvério et al., 2011
Linolenic acid	*E. globulus*	Leaf	Silvério et al., 2011
α-Linolenic acid	*E. gunnii*	Stem	Guimarãe et al., 2009
γ-Linolenic acid	*E. globulus*	Leaf	Abdel-moein et al., 2011
Stearic acid	*E. globulus*	Bark	Domingues et al., 2011
Oleic acid	*E. globulus*	Leaf	Silvério et al., 2011
Hydroxy octadecatrienoic acid	*E. camaldulensis*	Stem	Benouadah et al., 2018
Hydroxy octadecatrienoic acid isomer	*E. sideroxylon*	Leaf	Okba, 2017
Hydroxy octadecadienoic acid	*E. sideroxylon*	Leaf	Okba, 2017
Trans-9-Octadecenoic acid	*E. sideroxylon*	Leaf	Okba, 2017
Octadeca-9,12-dienoic acid	*E. grandis*	Bark	Domingues et al., 2011
Trihydroxy stearic acid	*E. globulus*	Stem	Silvério et al., 2011
Trihydroxy octadecenoic acid	*E. globulus*	Stem	Silvério et al., 2011
Arachidic acid	*E. gunnii*	Stem	Guimarãe et al., 2009
Eicos-9-enoic acid	*E. camaldulensis*	Stem	Benouadah et al., 2018
Heneicosanoic acid	*E. camaldulensis*	Stem	Benouadah et al., 2018
Behenic acid	*E. globulus*	Leaf	Okba, 2017

Compound	Source	Position	Reference
Tricosylic acid	*E. globulus*	Leaf	Boulekbache et al., 2013
Globulusin A	*E. globulus*	Bark	Benouadah et al., 2018
Globulusin B	*E. globulus*	Bark	Okba, 2017
Lignoceric acid	*E. cinerea*	Leaf	Kahla et al., 2017
Hydroxy tetracosanoic acid	*E. sideroxylon*	Leaf	Okba, 2017
Pentacosanoic acid	*E. camaldulensis*	Stem	Benouadah et al., 2018
Di-hydroxycypellocarpine C (isomer)	*E. sideroxylon*	Leaf	Okba, 2017
Heptacosanoic acid	*E. camaldulensis*	Stem	Benouadah et al., 2018
Ctacosanoic acid	*E. sideroxylon*	Leaf	Okba, 2017
Triacontanoic acid	*E. urograndis*	Bark	Domingues et al., 2011
3,3' -Di-O-ellagicacid4' -glucoside	*E. grandis*	Bark	Domingues et al., 2011
β-Amirinpalmitic	*E. urograndis*	Bark	Domingues et al., 2011
2-Hydroxy octadecanoic acid	*E. globulus*	Leaf	Pan et al., 2019
16-Hydroxy hexadecanoic acid	*E. globulus*	Leaf	Hakki et al., 2010
19-Hydroxy nonadecanoic acid	*E. globulus*	Leaf	Hakki et al., 2010
21-Hydroxy heneicosanoic acid	*E. globulus*	Leaf	Hakki et al., 2010
22-Hydroxy docosanoic acid	*E. globulus*	Leaf	Hakki et al., 2010
23-Hydroxy tricosanoic acid	*E. globulus*	Leaf	Hakki et al., 2010
4-Hydroxy tetracosanoic acid	*E. urograndis*	Bark	Domingues et al., 2011
25-Hydroxy pentacosanoic acid	*E. globulus*	Stem	Silvério et al., 2011

Supplementary Table 3: Diterpenoids from Eucalyptus Species

Compound	Source	Position	Reference
Phytol	*E. globulus*	Bark	Tang et al., 2015
Cembrene	*E. torquata*	Bark	Nikbakht et al., 2015
Camphorene	*E. globulus*	Bark	Tang et al., 2015

Supplementary Table 4: Triterpenoids from Eucalyptus Species

Compound	Source	Position	Reference
Squalene	*E. camaldulensis*	Leaf	Guimarães et al., 2009
Rhodomyrtosone E	*E. citriodora*	Leaf	Wang et al., 2014
Asiatic acid	*E. citriodora*	Leaf	Wang et al., 2014
Madasiatic acid	*E. citriodora*	Leaf	Wang et al., 2014
Euscaphic acid	*E. citriodora*	Leaf	Wang et al., 2014
Ursonic acid	*E. citriodora*	Leaf	Wang et al., 2014
Dilelatifol D	*E. globulus*	Bark	Tang et al., 2015
α-Amyrin	*E. globulus*	Bark	Tang et al., 2015
α-Amyrin acetate	*E. urograndis*	Bark	Domingues et al., 2011
β-Amyrin	*E. globulus*	Whole plant	Ibrahim et al., 2014
Uvaol	*E. globulus*	Bark	Domingues et al., 2012
Erythrodiol	*E. globulus*	Bark	Tang et al., 2015
Maslinic acid	*E. globulus*	Bark	Tang et al., 2015
Ursolic acid	*E. globulus*	Bark	Tang et al., 2015
Oleanolic acid	*E. camaldulensis*	Leaf	Tsiri et al., 2008
Colosolic acid	*E. hybrida*	Leaf	Vuong et al., 2015
Ursolic acid methyl ester	*E. nitens*	Bark	Parreira et al., 2017
Betulinic acid	*E. globulus*	Bark	Tang et al., 2015
Betulinic acid methyl ester	*E. globulus*	Bark	Domingues et al., 2011
Acetylursolic acid	*E. maidenii*	Bark	Domingues et al., 2011
3-Acetylursolic acid	*E. nitens*	Bark	Parreira et al., 2017
3-Acetyloleanolic acid	*E. nitens*	Bark	Parreira et al., 2017
3-Acetylbetulinic acid	*E. globulus*	Bark	Nikbakht et al., 2015

Compound	Source	Position	Reference
Acetylbetulinic acid	*E. globulus*	Bark	Domingues et al., 2010
Alphitolic acid	*E. sideroxylon*	Leaf	Okba, 2017
Corosolic acid	*E. globulus*	Bark	Tang et al., 2015
Robustanic acid	*E. exserta*	Bark	Wang et al., 2014
Acetyloleanolic acid	*E. citriodora*	Leaf	Wang et al., 2014
2α,3α,19α-Trihydroxyurs-12-en-28-oic acid	*E. globulus*	Fruit	Wang et al., 2016
3β-Hydroxy-ursol-11-ene-28,13β-lactone	*E. globulus*	Fruit	Tang et al., 2015
3β-O-trans-p-hydroxycinnamoyl-12-ene-28-oleanolic acid	*E. globulus*	Fruit	Tang et al., 2015
3β-O-trans-p-hydroxycinnamoyl-2α-hydroxy-12-ene-28-ursolic acid	*E. globulus*	Fruit	Tang et al., 2015
cis-p-Methoxy-cinnamoyloxyoleanolic acid methyl ester	*E. globulus*	Bark	Tang et al., 2015
trans-p-Methoxycinnamoyloxyursolic acid methyl ester	*E. globulus*	Bark	Tang et al., 2015
cis-p-Methoxy-cinnamoyloxyursolic acid methyl ester	*E. globulus*	Bark	Tang et al., 2015
Methyl-3β,23-diacetoxy-12-ursen-28-oate	*E. globulus*	Bark	Tang et al., 2015
3β-Formyloxyurs-11-en-28,13-olide	*E. globulus*	Bark	Tang et al., 2015
3β-Dihydroxyurs-12-en-28-oic acid	*E. exserta*	Bark	Li et al., 2014
11α-Methoxyacetylursolic acid methyl ester	*E. globulus*	Bark	Tang et al., 2015

Compound	Source	Position	Reference
3-O-Methylellagicacid-4 -O-α-L-rhamnopyranoside	*E. globulus*	Bark	Tang et al., 2015
2α,3α-Isopropylidenedioxy-lup-20(29)-en-28-oic acid	*E. globulus*	Bark	Tang et al., 2015

Supplementary Table 5: Phloroglucinols from Eucalyptus Species

Compound	Source	Position	Reference
Grandinol	*E. pulverulenta*	Fruit	Li, 2015
Jensenone	*E. jensenii*	Leaf	Li, 2015
Isotorquatone	*E. apodophylla*	Leaf	Li, 2015
Torquatone	*E. apodophylla*	Leaf	Li, 2015
Isobaeckeol	*E. miniata*	Leaf	Li, 2015
Euglobal-G1	*E. tereticornis*	Leaf	Li, 2015
Euglobal-G2	*E. tereticornis*	Leaf	Li, 2015
Euglobal-G3	*E. tereticornis*	Leaf	Li, 2015
Euglobal-T1	*E. tereticornis*	Leaf	Li, 2015
Euglobal-G4	*E. grandis*	Leaf	Li, 2015
Euglobal-G5	*E. grandis*	Leaf	Li, 2015
Euglobal-G6	*E. grandis*	Leaf	Li, 2015
Euglobal-G7	*E. grandis*	Leaf	Li, 2015
Euglobal-G8	*E. robusta*	Leaf	Li, 2015
Euglobal-G9	*E. grandis*	Leaf	Li, 2015
Euglobal-G10	*E. robusta*	Leaf	Li, 2015
Euglobal-G11	*E. loxophleba*	Leaf	Li, 2015
Euglobal-G12	*E. globulus*	Leaf	Li, 2015
Euglobal-Ia1	*E. blakelyi*	Bud, leaf	Li, 2015
Euglobal-Ia2	*E. blakelyi*	Bud, leaf	Li, 2015
Euglobal-Ib	*E. loxophleba*	Bud, leaf	Li, 2015
Euglobal-Ic	*E. loxophleba*	Bud, leaf	Li, 2015
Euglobal-IIa	*E. robusta*	Bud, leaf	Li, 2015
Euglobal-IIb	*E. robusta*	Bud, leaf	Li, 2015
Robustadial A	*E. robusta*	Bud, leaf	Li, 2015
Robustadial B	*E. robusta*	Bud, leaf	Li, 2015
Rhodomyrtone	*E. robusta*	Bud, leaf	Li, 2015

Compound	Source	Position	Reference
Euglobal-III	*E. loxophleba*	Leaf	Li, 2015
Euglobal-V	*E. loxophleba*	Leaf	Li, 2015
Euglobal-VII	*E. loxophleba*	Leaf	Li, 2015
Euglobal-In-2	*E. globulus*	Leaf	Li, 2015
Euglobal-In-3	*E. globulus*	Leaf	Li, 2015
Euglobal-IX	*E. globulus*	Leaf	Li, 2015
Eucalyptal A	*E. incrassata*	Fruit	Li, 2015
Eucalyptal B	*E. incrassata*	Fruit	Li, 2015
Eucalyptal C	*E. globulus*	Fruit	Li, 2015
Eucalyptal D	*E. globulus*	Fruit	Li, 2015
Eucalyptal E	*E. globulus*	Fruit	Li, 2015
Macrocarpal A	*E. globulus*	Fruit	Li, 2015
Macrocarpal B	*E. globulus*	Fruit	Li, 2015
Macrocarpal C	*E. globulus*	Fruit	Li, 2015
Macrocarpal D	*E. globulus*	Fruit	Li, 2015
Macrocarpal E	*E. globulus*	Fruit	Li, 2015
Macrocarpal F	*E. globulus*	Fruit	Li, 2015
Macrocarpal G	*E. globulus*	Fruit	Li, 2015
Macrocarpal H	*E. globulus*	Fruit	Li, 2015
Macrocarpal I	*E. globulus*	Fruit	Li, 2015
Macrocarpal J	*E. globulus*	Fruit	Li, 2015
Macrocarpal K	*E. globulus*	Fruit	Li, 2015
Macrocarpal L	*E. globulus*	Fruit	Li, 2015
Macrocarpal M	*E. globulus*	Fruit	Li, 2015
Macrocarpal N	*E. globulus*	Fruit	Li, 2015
Macrocarpal O	*E. globulus*	Fruit	Li, 2015
Macrocarpal-am-1	*E. globulus*	Fruit	Li, 2015
Eucalyptone	*E. globulus*	Leaf	Li, 2015
Eucalyptone isomer	*E. globulus*	Leaf	Li, 2015
2,6-Dihydroxy-4-methoxy-3-methyl-isopropiophenone	*E. globulus*	Leaf	Li, 2015
2,6-Dihydroxy-2',3-dimethyl-4-methoxy-butyrophenone	*E. globulus*	Leaf	Li, 2015
4,6-Diformyl-2-isobutyrylphloroglucinol	*E. globulus*	Leaf	Li, 2015
4,6-Diformyl-2-isopentanoylphloroglucinol	*E. globulus*	Leaf	Li, 2015
Chartabomone	*E. globulus*	Leaf	Li, 2015

Compound	Source	Position	Reference
Miniatone	*E. globulus*	Leaf	Li, 2015
Baeckeol	*E. globulus*	Leaf	Li, 2015
Isobaeckeol	*E. globulus*	Leaf	Li, 2015
Homobaeckeol	*E. globulus*	Leaf	Li, 2015
Conglomerone	*E. globulus*	Leaf	Li, 2015
Baeckeol methyl ether	*E. globulus*	Leaf	Li, 2015
Homobaeckeol methyl ether	*E. globulus*	Leaf	Li, 2015
Loxophlebene	*E. globulus*	Leaf	Li, 2015
4-O-Demethyl miniatone	*E. globulus*	Leaf	Li, 2015
Eucalmainoside A	*E. globulus*	Leaf	Li, 2015
Eucalmainoside B	*E. globulus*	Leaf	Li, 2015
Eucalmainoside C	*E. globulus*	Leaf	Li, 2015
Eucalmainoside D	*E. globulus*	Leaf	Li, 2015
Eucalmainoside E	*E. globulus*	Leaf	Li, 2015
8-β-C-Glucopyranosyl-5,7-dihydroxy-2-isobutylchromone	*E. globulus*	Leaf	Li, 2015
Dimer of jensenone	*E. globulus*	Leaf	Li, 2015
Jensenal	*E. globulus*	Leaf	Li, 2015
Loxophlebal A	*E. globulus*	Leaf	Li, 2015
Loxophlebal B	*E. globulus*	Leaf	Li, 2015
Euglobal R1	*E. globulus*	Leaf	Li, 2015
Euglobal R2	*E. globulus*	Leaf	Li, 2015
Euglobal-Bl-1	*E. globulus*	Leaf	Li, 2015
Eucalyptone G	*E. globulus*	Leaf	Li, 2015
Eucalmaidial A	*E. globulus*	Leaf	Li, 2015
Eucalmaidial B	*E. globulus*	Leaf	Li, 2015
Euglobal-IVb	*E. globulus*	Leaf	Li, 2015
Macrocarpal P	*E. globulus*	Leaf	Li, 2015
Macrocarpal Q	*E. globulus*	Leaf	Li, 2015
Conglomerone	*E. globulus*	Leaf	Li, 2015
Baeckeol	*E. globulus*	Leaf	Li, 2015
Isobaeckeol	*E. globulus*	Leaf	Li, 2015
Homoisobaeckeol	*E. globulus*	Leaf	Li, 2015
Conglomerone	*E. globulus*	Leaf	Li, 2015
Baeckeol	*E. robusta*	Leaf	Li, 2015
Robustaol A	*E. robusta*	Leaf	Li, 2015
Sideroxylonal A	*E. robusta*	Leaf	Li, 2015
Sideroxylonal B	*E. robusta*	Leaf	Li, 2015

Compound	Source	Position	Reference
Sideroxylonal C	*E. robusta*	Leaf	Li, 2015
Grandinal	*E. robusta*	Leaf	Li, 2015
Euglobal-IIc	*E. robusta*	Leaf	Li, 2015
Globuluside	*E. globulus*	Leaf	Li, 2015
Cypellocarpin B	*E. globulus*	Leaf	Li, 2015
Methyl-trihydroxyacetophenone glucoside	*E. globulus*	Leaf	Li, 2015
Methyl-formoylphloroglucinol glucoside	*E. globulus*	Leaf	Li, 2015
Methyl-trihydroxyacetophenone glucoside	*E. globulus*	Leaf	Li, 2015
Eucalteretial A	*E. globulus*	Leaf	Li, 2015
Eucalteretial B	*E. globulus*	Leaf	Li, 2015
Eucalteretial C	*E. globulus*	Leaf	Li, 2015
Eucalteretial D	*E. globulus*	Leaf	Li, 2015
Eucalteretial E	*E. globulus*	Leaf	Li, 2015
Eucalglobuside A	*E. globulus*	Leaf	Li, 2015
Eucalglobuside B	*E. globulus*	Leaf	Li, 2015
Eucalyptin A	*E. globulus*	Leaf	Li, 2015
Eucalyptin E	*E. globulus*	Leaf	Li, 2015
Eucalyptin F	*E. globulus*	Leaf	Li, 2015
Eucalyptin G	*E. globulus*	Leaf	Li, 2015

Supplementary Table 6: Tannins from Eucalyptus Species

Compound	Source	Position	Reference
Apicatechin	*E. globulus*	Leaf	Vuong et al., 2015
3,3 -O-Dimethylellagic acid	*E. globulus*	Leaf	Vuong et al., 2015
3,4,3 -O-Trimethylellagic acid	*E. globulus*	Leaf	Vuong et al., 2015
Eucaglobulin	*E. globulus*	Leaf	Vuong et al., 2015
Methylellagic acid	*E. globulus*	Bark	Tang et al., 2015
3,3' -O-Dimethylellagic acid	*E. globulus*	Bark	Tang et al., 2015

Compound	Source	Position	Reference
Glucoside of dimethylellagic acid	*E. globulus*	Bark	Li, 2015
3-O-Methylellagic acid 3 -α-Rhamnoside	*E. globulus*	Bark	Li, 2015
3 -O-Methyl ellagic acid 4-O-β-D-glucose	*E. globulus*	Bark	Li, 2015
3,3 -di-O-Methylellagic acid	*E. urograndis*	Leaf	Chen et al., 2016
3,4,3 ,4 -O-Tetramethylellagic acid	*E. urograndis*	Bark	Tang et al., 2015
Vescalagin	*E. urograndis*	Leaf	Chen et al., 2016
4-Methoxyellagic acid-3-O-α-L-rhamnose	*E. robusta*	Leaf	Chen et al., 2016
Pentagalloylglucopyranose	*E. gompho-cephala*	Leaf	Al-sayed et al., 2012
8-Methoxyellagic Acid-2-rhamnoside	*E. globulus*	Leaf	Chen et al., 2016
1,2,3,4,6-O-Pentagalloylglucose	*E. globulus*	Leaf	Zhou et al., 2015
4-Methoxyellagic acid-3-O-α-L-rhamnose	*E. globulus*	Bark	Tang et al., 2015
Phenic acid	*E. globulus*	Bark	Tang et al., 2015
Ellagic acid	*E. citriodora*	Leaf	Shen et al., 1987
Glucogallic acid	*E. microcorys*	Leaf	Bhuyan et al., 2018
Acetic acid	*E. globulus*	Leaf	Pan et al., 2019
Tetraacetyl tannic acid	*E. cinerea*	Bark	Kahla et al., 2017
cis-p-Coumaric acid-4-O-β-D-glucopyranoside	*E. globulus*	Leaf	Tang et al., 2016
Diphenyl-6-hydroxybiphenyl diacylglucose	*E. globulus*	Leaf	Shen et al., 1987
2,5-Dihydroxybenzoic acid	*E. citriodora*	Leaf	Shen et al., 1987

Compound	Source	Position	Reference
4-Hydroxybenzoic acid	*E. globulus*	Leaf	Pan et al., 2019
Gallic acid derivative	*E. sideroxylon*	Stem	Silvério et al., 2011
Vanillic acid	*E. globulus*	Stem	Silvério et al., 2011
Syringic acid	*E. globulus*	Leaf	Chen et al., 2016
cis-p-Coumaric acid	*E. globulus*	Leaf	Pan et al., 2019
3,4-Dihydroxyhydrocinnamic acid	*E. sideroxylon*	Leaf	Okba et al., 2017
Quinol glucuronide/hydroxyphenyl glucopyranosiduronic acid	*E. globulus*	Leaf	Hakki et al., 2010
2-O-Caffeoylquinic acid	*E. globulus*	Leaf	Pan et al., 2019
trans-2-O-Coumaroylquinic acid	*E. globulus*	Leaf	Pan et al., 2019
trans-3-O-Caffeoylquinic acid	*E. globulus*	Leaf	Pan et al., 2019
cis-3-O-Coumaroylquinic acid	*E. globulus*	Leaf	Pan et al., 2019
3-O-Coumaroylquinic acid	*E. globulus*	Leaf	Pan et al., 2019
2-O-Coumaroylquinic acid	*E. globulus*	Leaf	Pan et al., 2019
4-O-Coumaroylquinic acid	*E. globulus*	Leaf	Pan et al., 2019
3-O-Methylellagic acid 3 -O-α-3 -O-acetylrhamnopyranoside	*E. globulus*	Fruit	Liu et al., 2004
3-O-Methylellagic acid 3 -O-α-2 -O-acetylrhamnopyranoside	*E. globulus*	Fruit	Liu et al., 2004

Compound	Source	Position	Reference
3-O-Methylellagic acid 3 -O-α-4 -O-acetylrhamnopyranoside	*E. globulus*	Fruit	Liu et al., 2004
1-O-Galloyl-β-D-glucose	*E. globulus*	Fruit	Liu et al., 2004
Gallic acid	*E. robusta*	Leaf	Chen et al., 2016
Ellagic acid hexose	*E. globulus*	Leaf	Al-sayed et al., 2012
Ellagic acid hexoside	*E. globulus*	Leaf	Al-sayed et al., 2012
HHDP-glucopyranose	*E. globulus*	Leaf	Al-sayed et al., 2012
Digalloylglucopyranose	*E. globulus*	Leaf	Al-sayed et al., 2012
Galloyl-HHDP-glucopyranose	*E. globulus*	Leaf	Al-sayed et al., 2012
Galloylcypellocarpin B	*E. globulus*	Leaf	Al-sayed et al., 2012
HHDP	*E. globulus*	Leaf	Al-sayed et al., 2012
Galloylglucose isomer	*E. globulus*	Leaf	Al-sayed et al., 2012
Methylellagic acid hexose	*E. globulus*	Leaf	Al-sayed et al., 2012
Ellagitannin dimer	*E. gompho-cephala*	Leaf	Al-sayed et al., 2012
Methylellagic acid-3-O-pentoside	*E. globulus*	Leaf	Al-sayed et al., 2012
Trigalloyl-HHDP-glucopyranose	*E. urograndis*	Leaf	Chen et al., 2016
3-galloyl-4,6-HHDP-D-glucose	*E. gompho-cephala*	Leaf	Al-sayed et al., 2012
Galloyl ester of methylellagic acid glucose	*E. globulus*	Bark	Tang et al., 2015
Galloyl-bis-HHDP-glucopyranose isomer	*E. globulus*	Bark	Tang et al., 2015
Tris-HHDP galloylglucose isomer	*E. globulus*	Leaf	Al-sayed et al., 2012

Compound	Source	Position	Reference
Brevifolincarboxylic acid	*E. gompho-cephala*	Leaf	Al-sayed et al., 2012
Galloylglucopyranose	*E. gompho-cephala*	Leaf	Al-sayed et al., 2012
Monogalloylglucose	*E. globulus*	Stem	Xavier et al., 2014
Tetragalloylglucose	*E. globulus*	Fruit	Liu et al., 2004
Tetragalloylglucopyranose	*E. gompho-cephala*	Leaf	Al-sayed et al., 2012
Ellagic acid rhamnoside	*E. gompho-cephala*	Leaf	Al-sayed et al., 2012
Methylellagic acid rhamnoside	*E. gompho-cephala*	Leaf	Al-sayed et al., 2012
Pedunculagin isomer	*E. gompho-cephala*	Leaf	Al-sayed et al., 2012
Trigalloylglucopyranose	*E. gompho-cephala*	Leaf	Al-sayed et al., 2012
1,2,3,6-Tetragalloylglucose	*E. globulus*	Leaf	Chen et al., 2016
Pentagalloylglucose	*E. globulus*	Leaf	Liang, 1985
1,2,3,4,6-penta-O-galloyl-β-D-glucose	*E. globulus*	Bark	Tang et al., 2015
Benzyl-galloylglucopyranose	*E. gompho-cephala*	Leaf	Al-sayed et al., 2012
Benzyl-trigalloylglucopyranose	*E. gompho-cephala*	Leaf	Al-sayed et al., 2012
Valoneoyl-digalloyl-glucopyranose	*E. gompho-cephala*	Leaf	Al-sayed et al., 2012
Methyl-valoneoyl-digalloyl-glucopyranose	*E. gompho-cephala*	Leaf	Al-sayed et al., 2012
3-O-Galloyl-4,6-O-[(S)-hexahydroxy-diphenoyl]-D-glucose	*E. globulus*	Bark	Tang et al., 2015
3-Methoxy-ellagic-acid-4’ -O-2” -O-Acetyl-α-L-pyranrhamnose	*E. globulus*	Bark	Tang et al., 2015

Supplementary Table 7: Phenolic Acids from Eucalyptus Species

Compound	Source	Position	Reference
Yangambin	*E. exserta*	Leaf	Tang et al., 2006
Syringaresinol	*E. globulus*	Leaf	Al-sayed et al., 2012
cis-Ferulic acid	*E. globulus*	Stem	Silvério et al., 2011
trans-Ferulic acid	*E. urograndis*	Bark	Domingues et al., 2011
Eucalmaidin F	*E. maidenii*	Leaf	Tian et al., 2012
p-Coumaric acid	*E. urograndis*	Bark	Domingues et al., 2011
Protocatechuic acid glucoside	*E. globulus*	Leaf	Pan et al., 2019
p-Coumaric acid derivative '1'	*E. globulus*	Leaf	Puig et al., 2018
p-Coumaric acid derivative '2'	*E. globulus*	Leaf	Puig et al., 2018
Ferulic acid	*E. viminalis*	Leaf	Puig et al., 2018
Caffeic acid	*E. robusta*	Leaf	Shen et al., 1986
4-Hydroxy-3,5-dimethoxybenzoic acid	*E. citriodora*	Leaf	Qin et al., 1986
Chlorogenic acid	*E. globulus*	Leaf	Fu et al., 2003
Gentisic acid	*E. citriodora*	Leaf	Shen et al., 1987
Protocatechuic acid	*E. citriodora*	Leaf	Shen et al., 1987
Acetic acid	*E. globulus*	Stem	Silvério et al., 2011
Tetraacetyl tannic acid	*E. sideroxylon*	Stem	Silvério et al., 2011
cis-p-Coumaric acid-4-O-β-D-glucopyranoside	*E. globulus*	Leaf	Okba et al., 2017
Diphenyl-6-hydroxybiphenyl diacylglucose	*E. globulus*	Leaf	Hakki et al., 2010
2,5-Dihydroxybenzoic acid	*E. exserta*	Bark	Li et al., 2014
4-Hydroxybenzoic acid	*E. globulus*	Leaf	Tang et al., 2015
Gallic acid derivative	*E. globulus*	Bark	Li, 2015
Vanillic acid	*E. globulus*	Bark	Li, 2015
Syringic acid	*E. globulus*	Bark	Li, 2015
cis-p-Coumaric acid	*E. urograndis*	Leaf	Chen et al., 2016

Compound	Source	Position	Reference
3,4-Dihydroxyhydrocinnamic acid	*E. exserta*	Leaf	Gao, 2017
Quinol glucuronide/hydroxyphenyl glucopyranosiduronic acid	*E. gomphocephala*	Leaf	Al-sayed et al., 2012
2-O-Caffeoylquinic acid	*E. globulus*	Leaf	Pan et al., 2019
trans-2-O-Coumaroylquinic acid	*E. globulus*	Leaf	Pan et al., 2019
trans-3-O-Caffeoylquinic acid	*E. globulus*	Leaf	Pan et al., 2019
cis-3-O-Coumaroylquinic acid	*E. globulus*	Leaf	Pan et al., 2019
3-O-Coumaroylquinic acid	*E. globulus*	Leaf	Pan et al., 2019
2-O-Coumaroylquinic acid	*E. globulus*	Leaf	Pan et al., 2019
4-O-Coumaroylquinic acid	*E. globulus*	Leaf	Pan et al., 2019

Supplementary Table 8: Fatty Alcohols from Eucalyptus Species

Compound	Source	Position	Reference
2-Methylhexadecan-1-ol	*E. globulus*	Leaf	Pan et al., 2019
Hexadecan-1-ol	*E. globulus*	Leaf	Pan et al., 2019
Z-9-Octadecen-1-ol	*E. globulus*	Leaf	Pan et al., 2019
E-9-Octadecen-1-ol	*E. globulus*	Leaf	Pan et al., 2019
Octadecan-1-ol	*E. globulus*	Leaf	Pan et al., 2019
Tetracosan-1-ol	*E. globulus*	Leaf	Pan et al., 2019
Hexacosan-1-ol	*E. globulus*	Leaf	Pan et al., 2019
Octacosan-1-ol	*E. globulus*	Leaf	Pan et al., 2019
Octan-1-ol	*E. globulus*	Leaf	Hakki et al., 2010
Docosan-1-ol	*E. globulus*	Leaf	Hakki et al., 2010

Compound	Source	Position	Reference
Triacontan-1-ol	*E. grandis*	Bark	Domingues et al., 2011
Eicosan-1-ol	*E. globulus*	Leaf	Hakki et al., 2010
Coniferilic alcohol	*E. globulus*	Stem	Silvério et al., 2011

Note: Figure translations are in progress. See original paper for figures.