

## Literature Review: Potential of Jamblang (*Syzygium Cumini* (L.) Skeels) Plants as Nephroprotectors Based on Active Compound

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### Abstract

**Introduction:** Since ancient times, the jamblang plant (*Syzygium Cumini* (L.)) has been used for traditional medicine in various regions to treat various diseases. Scientifically, this plant has proven its potential in curing blood sugar diseases. In addition to diabetes, other diseases that this plant can empirically overcome include thrush, sore throat and respiratory tract, diarrhea or dysentery and other stomach diseases, as well as a burn medicine. Another benefit of this plant is as an antibacterial, anti-inflammatory, antioxidant, antifungi, antiviral, antiallergic, antipyretic, antineoplastic. **Objective:** To know the benefits of jamblang fruit as a traditional medicine to cure some diseases. **Method:** In this study, the author used the literature review research method. **Result and Discussion:** In this study, it has been proven that jamblang fruit can be used as a traditional medicine that can cure fever, stomach pain, indigestion and anti-diabetes mellitus. **Conclusion:** it can be concluded that the potential in jamblang plants (*Syzygium cumini* (L.) Skeels) as Nephroprotective which contains active compounds. In the content of active compounds there are thirteen groups of active compounds in jamblang leaves, namely: flavonoids, phenyl propanoids, phenols, tannins, glucosides, lignans, triterpenoids, sesquiterpenoids, sterols, benzofurans, chromones, coumarins and benzoic acid

**Keywords:** Jamblang; (*Syzygium cumini* (L.)); Nephroprotective;

**Literature Review: Potential of Jamblang (*Syzygium Cumini* (L.) Skeels) Plants as Nephroprotectors Based on Active Compound**

**Introduction**

Traditional medicine is a medicinal ingredient or ingredient derived from plant ingredients, animal ingredients, mineral ingredients, with preparations or mixtures that have indeed been downhill has been used as a treatment (Jabbar & Musdalipah, 2017)

Nephroprotective is one of the compounds that can be found or derived from natural ingredients used as protection against the kidneys (Tuldjannah, Tadjio, & Tandi, 2018). Nephrotoxicity which is a kidney disease caused by free radicals. Chronic kidney disease generally becomes end-stage kidney disease or total kidney failure where the working conditions of the kidneys cannot meet the daily needs of the body. The use of medicinal plants that are indeed in Indonesia is widely found, and people have known and used traditional medicine for a long time as a legacy of ancestors. Judging from the advantages of traditional medicine as well as relatively low side effects also in one plant has many pharmacological effects corresponding to metabolic and degenerative diseases. One of the medicinal plants used is jamblang.

Jamblang (*Syzygium cumini* L.) is one of the tropical fruits that can be used as a medicine to overcome several diseases (Widjaja et al., 2014). In the countries of Pakistan, India, Sri Lanka, and Bangladesh, *Syzygium cumini* is the most important drug that can be used to treat kidney problems, indigestion, diabetes, dysentery, and is used in traditional medicine to treat inflammation. Known to anticipate antidiabetic, antihyperlipidemia, anticancer, antibacterial, antioxidant, antiulcer, hepatoprotective, antiallergic, antiartritic, antimicrobial, anti-inflammatory, antifertility, antifungal, antipyretic, antiplak, radioprotective, neuropsychopharmacologist, nephroprotective, and antidiarrheal (Himyatul Hidayah, Dadan Ridwanuloh, fatia, & Surya Amal, 2021)

Jamblang or duwet is a plant that belongs to the Myrthaceae family, the fruits, seeds, and leaves of jamblang are used as traditional medicine because they have pharmacological activity as antidiabetics (Hidayah et al., 2022) because they are able to increase insulin levels or lower blood glucose levels (Raza et al., 2015)

Jamblang fruit has a high content of flavonoids, alkaloids, resins, tannins, and astiri oil so that it has benefits for the health of the body. The seeds contain gallic acid, ellagic acid, corilagin, 3, 6-hexahydroxy diphenoylglucose, 1-galloylglucose, 3galloylglucose, quercetin,  $\beta$ -sitosterol, 4, 6-hexahydroxydiphenoylglucose (Kumawat, Damor, Kachchhwhaha, Garg, & Singh, 2018)

Jamblang bark is known to contain flavonoids, tannins, betulinic acid, ellagic acid, gallic acid, friedelin, epi-friedelanol,  $\beta$ -sitosterol, eugenin, epi fatty acid esters friedelanol,  $\beta$ -sitosterol, quercetin kaempferol, myricetin, and bergenin (Jageti, 2017).

Jamblang leaves are also rich in acylated flavonol glycosides, triterpenoids, tannins, quercetin, myricetin, myricitin, myricetin 3-O-4-acetyl-L-rhamnopyranoside, esterase, and galloyl carboxylase (Kumawat et al., 2018). According to (Abd Gafur, Isa, & Bialangi, 2011) flavonoids are secondary metabolite compounds that can be used as antibacterial, antimicrobial, antiviral, antifungal, anticancer, antihypertensive, cytotoxic and antiallergic.

**Literature Review: Potential of Jamblang (*Syzygium Cumini* (L.) Skeels) Plants as Nephroprotectors Based on Active Compound**

**Plant Taxonomy**

Kingdom	: Plantae
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Myrtales
Family	: Myrtaceae
Genus	: <i>Syzygium</i>
Species	: <i>cumini</i>

**Plant Profile**

Jamblang plant (*Syzygium cumini* L.) Skeels are commonly known as Indian blackberry plants; Jaman i.e. large trees scattered throughout the Upper Ganges Plain, Bihar, Orissa, planted in West Bengal, Deccan, Konkan region; all forest districts in India Selatan. The plant is also grown in Thailand, the Philippines, Madagascar and is widely cultivated throughout Africa, the Caribbean, and Tropical America. The plant is generally along rivers and damp places and in evergreen forests. The tree is planted as a decoration in gardens and roadsides (Fahiah, Novi, & Ernawati, 2022)

**Plant Synonyms**

*S. jambolanum* DC., *Eugenia cumini* Druce, *E. Jambolana* Lam., *E. Djouat* Perr., *Myrtus cumini* L., *Calyptranthes jambolana* Wild.

**Botanical Description**

Jambolan grows fast, reaches its full size in 40 years. It ranges up to 100 feet (30 m) in India and can achieve a spread of 36 feet (11 m) and a trunk diameter of 2 or 3 feet (0.6-0.9 m). It usually branches into several stems not far from the ground. Bark - at the bottom of the tree it is rough, cracks, peels off and changes color; further it is smooth and light gray in color.

**Plant Phytochemicals**

**Bark:** betulinic acid, friedelin, friedelinol, daucosterol, kaempferol, kaempferol-3-O-glucoside, quercetin, myricetin, astragalin,  $\beta$ -sitosterol,  $\beta$ -sitosterol glucoside, sucrose, gallic acid, ellagic acid, cuminiresinol, 5'-hydroxymethyl piperitol, syzygiresinol A, syzygiresinol-B, demethyl-5-hydroxypinoresinol, dimethylpinoresinol, didemetoksipinoresinol, pinoresinol, 4'-methyl-5'-hydroxysinoresinol, bergenin.

**Leaf:** Heptacosane, nonacosane, triacontene, hentriacontane, octacosanol, triacosanol, dotriacosanol, asam betulinic, asam crotegolic, myricetin-4'-methyl ether, myricetin-3-O-(4''-O-acetyl-2''-O-galloyl)- $\alpha$ -L-rhamnopyranoside, quercetin, myricetin-3-O-(4''-asetil)- $\alpha$ -L-rhamnopyranoside, asam ferulat, catechin<sup>36</sup>, dihydromyricetin, isorhamnetin-3-O-rutinoside.

**Literature Review: Potential of Jamblang (*Syzygium Cumini* (L.) Skeels) Plants as Nephroprotectors Based on Active Compound**

**Flowers:** Myricetin-3-L-arabinoside, dihydromyricetin, quercetin-3-D-galactoside, oleanolic acid, oleanolic acetyl acid, eugeniatriterpenoid A and B, ellagic acid, isoquercetin, kaempferol, myricetin, quercetin.

**Fruits:** Delphinidin-3-gentiobioside, malvidin-3-laminaribioside, petunidin-3-gentiobioside, pconidin, pelargonidin, petunidin, malic acid, oxalic acid, tannins, cyanidin glycosides, wax components, triterpenhydroxy acid, oleanolic acid.

**Seed:** Asam galat, asam ellagic, corilagin, ellagitannins, 3,6- hexahydroxydiphenoyl glucose, 4,6-hexahydroxydiphenoyl glucose, 1-galloyl glucose, 3-galloyl glucose, quercetin, 3,3',4' tri-O-methyl ellagic acid , 3,4'-di-O-methyl ellagic acid, caffeic acid, ferulic acid, guaiacol, resorcinol dimethyl ether, veratrole, lignanglucoside, medioresinol 4''-O- $\beta$ -glucoside,(+)-pinoresinol-O- $\beta$ -glukosida,(+)-syringaresinol-O- $\beta$ -glukosida, dihydrodehydrodiconiferyl alcohol-4'-O- $\beta$ -glucoside, 5- hidroksi metil furfural, asam betulinat, 3,5,7,4'-tetrahidroksi flavanon.

**Root:** Myricetin-3-O-robinosida, myricetin-3-O-glukosida.

**Essential oils from leaves, stems and fruits:**  $\alpha$ -Pinene,  $\beta$ -pinene, bornyl acetate, myrcene,  $\beta$ -pinene,  $\alpha$ -terpinene, terpinolene,  $\beta$ -phellandrene, bornylene, cuminaldehyde,  $\alpha$ -terpineol, eugenol, borneol.

**Seed oils:** Oleic, myristate, linoleic, stearic, palmitic, vernolic, lauric, sterculate, malvalatous acids.

**Traditional Uses**

**Fruits and seeds:** sweet, sour, cooling, used in diabetes, diarrhea, pharyngitis, splenopathy, urinary disorders, ringworm, to strengthen teeth and gums, gastrointestinal diseases.

**Tree bark:** astringent, sweet, sour, sharp coolant, carminative, diuretic, digestive, anthelmintic, febrifuge, constipation, stomach, antibacterial, used in diabetes, vaginal discharge, intrinsic bleeding, gastric disorders, strangury, fever, skin diseases and wounds.

**Leaves:** antibacterial, prevent vomiting, strengthen teeth and gums.

**Method**

The method used in the review of this article is the library study method with the use of secondary data obtained from the google scholar and pubmed data bases containing theories that are relevant and related to the research. Aof the keywords searched for in this study are jamblang plants and neprotective. In this study, a search for research journals published on the internet was carried out in the last 10 years from 2010-2022.

**Literature Review: Potential of Jamblang (*Syzygium Cumini* (L.) Skeels) Plants as Nephroprotectors Based on Active Compound**

**Results dan Discussion**

*Syzygium cumini* is used as a traditional medicine and has been researched by many researchers. Several studies suggest that the jamblang plant has high active compounds or groups of secondary metabolites of flavonoids, alkaloids, resins, tannins, and essential oils. The group that is most widely used in jamblang plants contains flavonoid compounds, which consist of five compounds, and three flavonol compounds are found in old leaves and are absent in young leaves. One of the most important compounds in cancer chemotherapy are flavonoids. Flavonoids are classified as heterogeneous persistent polyphenol compounds in 9 classes namely flavonols, flavones, flavanones, flavan-3-ols, anthocyanins, isoflavones, proanthocyanidins, aurones and chalcones. It has a wide range of pharmacological activity with flavonoids, as antioxidants, anti-inflammatory drugs and anti-cancer agents.

The chemical content in jamblang seeds can be used in the inhibition of free radicals are ellagic acid, tannins, ellagitannins, quercetin, isoquercetin, caffeic acid, and gallicol. In traditional medicine, this jamblang plant is used to overcome vaginal discharge, stomach disorders, fever, diabetes, abdominal pain, wounds, and digestive disorders, and skin (Jagetia, 2017). The results of research have proven that the benefits of jamblang plants as anti-diabetes mellitus (Jagetia, 2017); (Yadav et al., 2011) antioxidant, antimicrobial, antiallergic, antihyperglycemic, anticancer, gastroprotective, cardioprotective and hepatoprotective (Jagetia, 2017) anti-inflammatory, antipyretic, and antioxidant (Yadav et al., 2011 )

**Conclusion**

Based on the results of research using the literature review that has been carried out, it can be concluded that the potential in jamblang plants (*Syzygium cumini* (L.) Skeels) as Nephroprotectors which contain active compounds. In the content of active compounds, there are thirteen groups of active compounds in jamblang leaves, namely: flavonoids, phenyl propanoids, phenols, tannins, glucosides, lignans, triterpenoids, sesquiterpenoids, sterols, benzofurans, chromone, coumarins and benzoic acid. Some have shown that parts of the Jamblang plant namely leaves, seeds, root bark, bark, have an anti-inflammatory effect.

In folk medicine, in jamblang plants (*Syzygium cumini* (L.) Skeels) it is used for vaginal discharge, gastric disorders, fever, diabetes, abdominal pain, wounds and indigestion, as well as for the skin, allergies, hypoglycemia, anti-cancer, gastric protector, heart and liver protector.

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**Literature Review: Potential of Jamblang (*Syzygium Cumini* (L.) Skeels) Plants as Nephroprotectors Based on Active Compound**

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