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# A review on phytochemical and pharmacological potentials of *Antidesma bunius*

## Abstract

*Antidesma bunius* (Family- Euphorbiaceae), also popularly known in the Philippines as bignay and is a found in several Asian countries. This plant is famous in South Asia. In the traditional medicine, various plant parts such as root, bark, leaves, fruits which are used in traditional system of medicine for a long time, for the treatment of various disease due to having cytotoxic, anti-diabetic, antioxidant, antiradical, thrombolytic activity, antiplatelet, anticoagulant, anti-dysenteric, antimicrobial, antihypertensive, anticancer and sudorific activity. This plant can also be used as pesticide agents. This plant also has a role in improvement of blood circulation. It is a good remedy for snakebite, coughs, flatulence and intestinal colic. Phytochemical analysis of the *Antidesma bunius* has confirmed presence of different kinds of flavonoids, terpene, sugar, saponin, tannin, toxic alkaloids, phenolic acids, procyanidin B1, procyanidin B2 and anthocyanins. This present study gives an insight to the pharmacogonstical, phytochemical and pharmacological properties of *Antidesma bunius*.

**Keywords:** *Antidesma bunius* Linn, euphorbiaceae, phytochemical, pharmacological activity

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## Introduction

*Antidesma bunius* is a genus of about 150 species distributed in Asia, Africa, Australia and Islands of pacific.[1] *Antidesma bunius* (Family- Euphorbiaceae), also known as *bignai* in the Philippines; *buni* or *berunai* in Malaya (India); *wooni* or *hooni,* in Indonesia; *ma mao luang* in Thailand; *kho lien tu* in Laos; *choi moi* in Vietnam; *moi-kin* and *chunka* by the aborigines in Queensland. The English names are Chinese laurel, currant tree, nigger's cord, and salamander tree which is a native of India and other countries like Nepal, Myanmar, Singapore, Sri Lanka, Pakistan, and Bangladesh. *Antidesma bunius* has various synonyms like *Stilago bunius* L., *Antidesma rumphii* Tulasne, *Antidesma dallachyanum* Baillon. *Antidesma bunius* has various common names bignay, Chinese laurel, blackcurrant tree, salamander tree, antidesme, antidesma da China, cardoeira, buni, wuni, huni, bunch, paginga, isip, kho liên tu, baa mao ruesee, mamao dong, mao chaang, chiòi mòi.[2] The *Antidesma bunius* is common medicinal plants in many dipterocarp forests in Thailand and widespread in the Philippines.[3] There claims that the plant is common in the wild from the lower Himalayas in India, Ceylon and Southeast Asia and northern Australia. The plant is also grown in Indonesia, and cultivated in Malaya.[2] The fresh fruit wine has considerably antioxidant properties.[4] Wine has considerably been associated with chemo protection and cardio protection than other alcoholic beverage,[5] it was hypothesized that some phenolic compounds in red wine which such as polyphenols, flavonoids and anthrocyanins play an important role in the prevention of coronary heart diseases.[4] On the other hand, *A. bunius* contains lactic acid, acetic acid, caffeic acid and ascorbic acid have also shown a positive effect on type 2 diabetes.[3,6] Roots and leaves extract have antihelminthic property and also used in the treatment of indigestion cough and stomach ache. The seeds are commonly employed as antihelminthic and said to be effective against round worms and threadworms. The barks extracts are used as anti-toxins which are used in tribal areas as human herbal medication. They are also given in coughs, flatulence, intestinal colic. It is also used as pesticide. *Antidesma bunius* is traditionally used as sudorific and in the treatment of snakebite; decoction is used to promote perspiration in febrile condition; fruit juice of the plant is useful in the treatment of insomnia.[2]

### Habit and habitat

*Antidesma bunius* plant grows all over Bangladesh in many wet evergreen forest, dipterocarp forest, teak forest; at forest edges, on river bank, roadsides, in bamboo thickets; in semi-cultivated and cultivated areas. The tree growing to 6 m tall but can reach 15-30m high. The rich green leafage provides a good shade and the bark is reddish grey[2] (Figure 1).

**Figure 1** Fruits, leaves, trunk of *Antidesma bunius*.

## Pharmacognostical characteristics

### Macroscopical (Plant description)

The *Antidesma bunius* is native species in the Philippines and is also common in the wild from the lower Himalayas in India, Ceylon, and Southeast Asia to Northern Australia but this plant occasionally cultivated in Malaya, grown in every village in Indonesia where the fruits are marketed in clusters. This plant may be shrubby, growing up to 6m tall, or may reach up to 15-30m high. The leaves are oblong; 4 to 9 inches (10-22.5cm) long, 2 to 3 in (5-7.5cm). The fruits is ovoid fleshy, up to 1/3 in (8mm) across, its color from green to pale yellow. The unripe fruits are very acidic and sweet when fully ripe. It has a sour sweet-bitter taste and red to blackish color as it ripens.[7] Which is a single straw-colored stone, an irregular, flattened oval, ridged or fluted, very hard, 3/8 in (1cm) long, 1/4 in (6mm) wide.[4] A 100g of the edible portion of *A. bunius* contains water 90-95g, carbohydrates 6.3g, fat 0.8g, protein 0.7g, calcium 37-120mg, phosphorus 22-40mg, vitamin C 8mg, vitamin A 10IU, iron 0.1-0.7mg. The energy value is 134kJ/100g. Citric acid is the predominant organic acid.[7]

### Taxonomy

**Kingdom:** Plantae

**Phylum:** Tracheophyta

**Class:** Magnoliopsida

**Order:** Euphorbiales

**Family:** Euphorbiaceae

**Genus:** *Antidesma*

**Species:** *A. bunius*

**Scientific name:** *Antidesma bunius*

## Active principles

*Antidesma bunius* (Linn) leaves, fruits, roots and bark contains many various polyphenols namely terpen, sugar, saponin, tannin, biflavonoid, anthocyanin, luteolin, rutin, resveratrol, quercetin, procyanidin, catechins, amentoflavone, corilagin (1-O-galloyl 3,6-O-hexahydroxydiphenoyl-βglucopyranoside), gallic acid (3, 4, 5-trihydroxybenzoic), ferrulic acid, ellagic acid, catechin, procyanidin, vicinin II (Apigenin-6, 8-di-C-β-D-glucopyranoside), tartaric acid, citric acid, benzoic acid, malic acid, lactic acid, oxalic acid, acetic acid and ascorbic acid, caffeic acid.[3,8,9]

### Traditional uses

*Antidesma bunius* Linn has been widely used in traditional medicine for a widespread range of diseases. Its leaves, fruits, bark, roots and seeds are used in different forms.[10]

**Leaves:** The leaves are used as a traditional medicine for the treatment of skin disorder, syphilis and snakebites. It is also effectively used in indigestion, cough, stomachache, hepatoprotective and hepatotoxicity activities of *A. bunius* leaves.[11–13]

**Fruits:** The Fruits are healthy alcoholic juice drink and cooked with fish or other foods. *A. bunius* fruits contain anti-toxins which are traditionally used in the management of diabetes, hypertension, gastric intestinal problems, dysentery, indigestion, constipation, remedies for animals like sheep and goats.[7,10,14]

**Roots:** Roots are used as antihelminthic and also recommended in cough and stomachache and indigestion.[12]

**Bark:** The bark of *A. bunius* Linn is traditionally used the bark for diabetic agent in Asia.[15]

**Seeds:** *A. bunius* Linn seeds are traditionally used as anthelmintic against round worms and thread worms. They are also useful in cough, flatulence, intestinal colic management. The seeds are also used recommended as pesticide agent.[11,12]

## Pharmacological activities

### Cytotoxic activity

The methanolic extract of leaves and fruits of *Antidesma bunius* was carried out to analyze its biological activity using the brine shrimp hatchability and lethality assay. Higher activity was observed in fruit extract and it was comparable to the positive control used. It is possible that *Antidesma bunius* contains compounds with potential cytotoxic activity.[12,17]

### Hypoglycemic activity

An experiment was carried out to analyze α-Glucosidase inhibitory activity of *Antidesma bunius* used to control diabetes. From that experiment this plant was screened for their potential α-glucosidase inhibitory activity and the result was positive.[17]

They carried out an experiment on methanolic extract of *Antidesma bunius* stem, barks and leaves to evaluate α-glucosidase inhibitory activity. Methanolic extraction of leaves showed the highest α-glucosidase inhibitory activity. They also carried out phytochemical analysis of ethyl acetate extract of *Antidesma bunius* stem, barks displayed the presence of sugars, terpenes, and flavonoids, while methanolic extract of *Antidesma bunius* leaves contains sugars, saponins, flavonoids, and tannins.[18]

An Experiment carried out to investigate hypoglycaemic activities of methanolic extract of *Antidesma bunius* in type 1 diabetes. The results suggested that *Antidesma bunius* extract possess anti-diabetic activity, through the enhancement of hepatic glycogen storage and regeneration of the islet of Langerhans.[19]

Diabetes is increasing day by day globally. Several herbal medicines have been studied and some are proven to have a beneficial effect against it. Some from the group of organic acids, phenolic acids and flavonoids contribute to the decreasing effect of hyperglycemia. From this experiment they saw that *Antidesma bunius* showed an evidence of having the said contents.[20]

### Antiradical activity

Studies was done on the influence of methanolic, total phenolic, total anthocyanin extract of *Antidesma bunius* on the changes in physico-chemical properties, antiradical activity *Antidesma bunius* fruits in the period of development and ripening. The Therapeutic property gradually decreased from the immature to the over ripe stages. The total anthocyanin content (TA) showed the highest content at the over ripe stage. The antiradical activity (AA) of methanolic extracts from *Antidesma bunius* fruits during development and ripening were determined with DPPH (2,2-diphenyl-1-picrylhydrazyl) radical scavenging. The highest AA was observed at the immature stage. The level of procyanidin B2, procyanidin B1, (+)-catechin, (-)-epicatechin, rutin and tran-resveratrol as the main polyphenol

compounds, increase during fruit development and ripening. Other phenolic acids such as gallic, caffeic, and ellagic acids significantly decreased during fruit development and ripening. At over ripe stage *Antidesma bunius* possess the highest antioxidants.[21]

### Pesticide activity

A study was carried out to analyze the potential of *Antidesma bunius* fruit extract as an organic pesticide against the Epilachna spp., of the family Coccinellidae. *Antidesma bunius* fruit crude extracts of 50%, 75% and 100% were used. A commercial pesticide was used as positive control and water as negative control. The commercial pesticide registered an average MTL of 10 min while majority of those treated with pure fruit extract registered a 15 min MTL. Phytochemical analysis of the fruit extract showed the presence of flavonoids and phenols that might contribute to its pesticide property. Results of this study indicate that *A. bunius* fruit extract can serve as a novel alternative source of organic pesticide and that the pure crude fruit extract was proven effective against the Epilachna spp.[22]

### Antioxidant activity

The fruits of *A. bunius* were evaluated for its antioxidant activity which revealed a positive antioxidant property.After having the result they got a good amount of antioxidant properties from the experiment of *Antidesma bunius*.[23]

## Conclusion

*A. bunius* is the traditional system of medicine and with multiple pharmacological actions. In this review, included the traditional use, phytochemistry and pharmacology in a illustrative manner. The extracts and phytoconstituents isolated from this plant have been shown to produce various pharmacological response, which include cytotoxic, anti-diabetic, antioxidant, antiradical, thrombolytic activity, antiplatelet, anticoagulant, anti-dysenteric, antimicrobial, antihypertensive, anticancer, sudorific activity and improvement of blood circulation. The multiple traditional uses and pharmacological responses of *A. bunius* authorized us to write this review article. This review will provide all the scientific knowledge in a summary manner to the scientific society.

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## Conflict of interest

The author declares that there is no conflict of interest.

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