



The Versatile Vila (Wood Apple) with Special reference to Siddha Medicine

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ABSTRACT

Limonia acidissima (known as *Vila* in Siddha medicine) belonging to the Family Rutaceae, is a well known Traditional herb used since time immemorial. From ancient days to recent civilization, human beings depend on nature for running their life smoothly. Siddha Traditional system of medicine consist large number of plants with various medicinal and pharmacological importances and hence represents the highness of bioactive molecules. The Authors of this paper decided to collect and compile the literary documents, recent Pharmacognostical aspects, and Experimental research works of *Limonia acidissima*. Plants remain a vital source of drugs and now a day's much emphasis have been given to Nutraceuticals. Various parts of the plant possess astringent, cardiotoxic, Carminative and refrigerant actions. This review will be helpful to create interest towards the less known and less documented *Limonia acidissima* and may be useful in developing new formulations with more therapeutic values.

Keywords:

Vila, Siddha Medicine, *Limonia acidissima*

INTRODUCTION

Due to the increasing awareness among the people towards natural products, Natural medicine is attracting more attention than Allopathic system. Naturally India is having rich traditions among which Traditional medicinal systems also plays an important role in the treatment and prevention of many diseases. The different Traditional medical systems of India include Siddha, Ayurveda, Unani, etc. They utilize a large number of plants for treatment of human and animal diseases. We, the Authors' chose this plant, *Limonia acidissima* belonging to the Family Rutaceae, a glabrous deciduous tree.

Taxonomy

Kingdom	:	Plantae
Sub-kingdom	:	Tracheobionta
Superdivision	:	Spermatophyta
Division	:	Magnoliophyta
Class	:	Magnoliospida
Subclass	:	Rosidae
Order	:	Sapindales
Family	:	Rutaceae
Genus	:	<i>Limonia</i> L.
Species	:	<i>L. acidissima</i> .

Other Botanical names

Feronia limonia,
Feronia elephantum,

Vernacular Names

Tamil:	Vilam Pazham
English:	Wood Apple
Assamese:	Bal, Bael
Bengali:	Koth Bael

Gujarati:	Kothu
Hindi:	Kaitha , Kath Bel
Khmer:	Kvet
Kannada:	Belada Hannu
Malayalam:	Vilam Kai
Marathi:	KavaTH
Oriya:	Kaitha or Kaintha
Sanskrit:	Kapittha
Telugu:	Vellaga Pandu

Geographical names

Vietnamese:	Quách
Sinhalese:	Divul.
Malaysia:	Belingai
Thai :	Ma-khwit
Lao (Sino-Tibetan):	Ma-fit
French :	Citron des mois, Pomme d' elephant, Pomme de bois

Distribution

Limonia acidissima Linn (*Feronia elephantum*, *Feronia Limonia*). It belongs to monotypic genus *Limonia*, native to India, Pakistan, Bangladesh, Srilanka and Southeast Asia east to Java. Common names in English include wood-apple, elephant-apple, monkey fruit, curd fruit and Kath bel. *Limonia acidissima* is a deciduous, slow-growing, erect tree with a few upward-reaching branches bending outward near the summit where they are subdivided into slender branch lets drooping at the tips. Fruit round to oval, 5-12.5 cm wide, with a woody, amazingly hard rind which can be difficult to crack, greyish-white, scurfy rind about 6 mm thick, pulp brown, mealy, odorous, resinous, astringent, acid or sweetish, with numerous small, white seeds scattered through it. There are two forms, one with large, sweet fruits and the other with small, acid fruits

Propagation is done by seed and vegetative method. But high rate of seedling mortality and out breeding nature of this plant account for poor regeneration and inferior germplasm. To overcome this, in vitro propagation through axillary bud proliferation has been developed.

Parts Used

Leaf, Bark, Fruit

According to the verse, from Clasical text ‘‘ Theraiyar Yemaga Venba’’, denotes the whole plant parts like root, leaf and fruit possess rich therapeutic qualities.

“*veliyelai yakka muthal vendiyanavarkepothum*

velliyilai yakkavaru mel” - *Theraiyar Yemaga Venba*

Table 1.1. Medicinal values of *Limonia acidissima* as per literature

Used Part	Taste (S,T,P)	Actions	Traditional Uses
Ripe Fruit	<i>S – Inippu</i>	Refrigerant	Cough
	<i>T- Thatpam</i>	Aromatic	Cold
	<i>P- Inippu</i>		Increases appetite Alleviates Thirst
Leaf	<i>S- Thuvarppu</i>	Aromatic	Constipation
	<i>T- Veppam</i>	Astringent	Vomiting
	<i>P- Karppu</i>	Carminative	Cardiotonic
Unripe Fruit	<i>S- Thuvarppu</i>	Astringent	Anti-diarhoerial
	<i>T- Thatpam</i>		
	<i>P- Inippu</i>		

S – Suvai (Taste), T – Thanmai (Character), P - Pirivu (Division); Inippu(Sweet), Pulippu (Sour), Kaippu (Bitter), Karppu (Pungent), Thuvorppu (Astringent), Veppam (Hot), Thatpam (Cold)

Phyto Chemical Constituents

The plant *Limonia acidissima* has rich Nutritive and medicinal Properties. The Ripen fruit is consumable, even today the practice of eating the Fruit is being followed by many people.

Food value per 100g of edible pulp (ripe) contains

- Moisture 74.0%;
- Protein 8.00%;
- Fat 1.45%;
- Carbohydrates 7.45%;
- Ash 5.0%;
- Calcium 0.17%;
- Phosphorus 0.08%;
- Iron 0.07% and
- Tannins 1.03% (according to analysis in India).

PLANT PARTS	PHYTO-CONSTITUENTS
Ripen fruit	Coumarins, Fatty acids and sterols
Unripe fruits	Stigmasterol
Leaves	Stigmasterol, Bergapten, orientin, vitedin, saponarin
Bark	Marmesin, limonoids, alkaloids, feronolide, feronone, benzoquinone, flavonoids, triterpenoids

Root Bark	Bergapten, Isopimpinellin, Fern oil, Osthenol, Geranyl umbelliferone
Seeds	Feronia lactone, geranylum belliferone, bargapten, osthol, isopimpinellin, marmesin and marmin.

TRADITIONAL USES

Limonia acidissima is well-known for its medicinal properties. This species has numerous described medicinal uses. It has a wide range of biological activities viz., adaptogenic activity, for blood impurities, for leucorrhoea, for dyspepsia, for jaundice and as hepato-protectant. All parts of the plants are prescribed in indigenous system of medicine for the treatment of various ailments. Leaves, barks, roots and fruit pulp are all used against snakebite. The bark is chewed with that of *Barrington* and it applied on venomous wounds. In India the fruit is used as a liver and cardiac tonic, in diarrhoea and dysentery cases, in effective treatment for Hiccough, sore throat and diseases of the gums. The pulp is poultice onto bites and stings of venomous insects. Mixture of young leaves juice, milk and candy is given as a remedy for biliousness and intestinal troubles of children. The powdered gum, mixed with honey, is given to overcome dysentery and diarrhoea in children. Oil derived from the crushed leaves is applied on itch and the leaf decoction is given to children as an aid for digestion. Traditionally, the constituents (in paste form) from the stem bark of *Limonia acidissima* is mixed with water and applied mainly to the face. It is believed that the regular application on the skin helps to keep skin cool, smooth, fair and well-textured complexion. It is also known to be protecting against skin cancer by blocking UV rays. ‘Thanaka’, a root paste made from the pulp of *L. acidissima*, is a facial cosmetic to remove small spots and lesions on the skin.

Formulation for Diabetes

Root of *Feronia*, root of cassia, root of *Flueggea*, cinnamon, root of forest jasmine. Take all with same ratio, mix and boil with buffalo buttermilk. Then drink it daily. It will reduce the diabetes.

Hiccup

Take feronia fruit, long pepper rasayanam mix and have it. Then it will reduce hiccup. If you take feronia daily, then it will reduce germs in the blood.

Other Traditional Uses

- Take 1 feronia fruit daily. It will purify blood.
- Take resin of feronia mix with garlic and grind with curd. Drink it daily. It reduces blood dysentery.
- Apply the juice of feronia tea leaf to recover from the blisters.
- Remove the rind of the fruit; eat fruit alone, it will reduce saliva, throat infection and dental problems.
- Take non-ripen feronia fruit without rind, mix with honey. If you eat daily then it will reduce diarrhea.
- Take small amount of resin and keep inside the mouth. Swallow the juice of it. It will reduce dry cough and burning sensation.
- Salad of non-ripen feronia fruit is common in our country. It will cure oral thrush.
- Take feronia fruit with palm jaggery with honey. It will increase the memory power of children. It prevents occurrence of uterus and breast cancers.
- Some medicines are prepared from the root of feronia. It is good for snake poison. Powder of Feronia bar is used to control wheezing.

Pharmacological Aspects – Data Collection

Antimicrobial Activity

Kishor et al, evaluated the In vitro Antibacterial Activity Analysis of Leaves of Limonia acidissima against four Gram-negative (Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa, Proteus vulgaris) and five Gram-positive bacteria (Bacillus subtilis, Enterococcus faecalis, Micrococcus luteus, Staphylococcus aureus, Streptococcus

pneumoniae) by agar well diffusion method. The study result indicated that leaves of *Limonia acidissima* can be used to treat infectious diseases caused by *E. coli*, *P. vulgaris* and *S. pneumoniae*.

Wound Healing Activity

Ilango et al studied the Wound Healing Activities of the *Limonia Acidissima* Linn (Rutaceae) in rat through incision, excision and dead-space wound models against nitrofurazone. The test model shows increased wound breaking strength, decreased epithelization period, increased wound contraction, increased granulation tissue weight for the test drug. Thus the result shows significant Wound healing activity.

Anti-Diabetic Activity

Kumawat et al, carried out the Antidiabetic activity of alcoholic and aqueous stem bark extracts of *Limonia acidissima*, linn in alloxan induced diabetic rats models. The alcoholic extract (200mg/kg) showed significant activity ($P < 0.01$) in lowering blood glucose level than the aqueous extract (200mg/kg) which was comparable to glibenclamide (5mg/kg), a standard antidiabetic drug. The data suggests that the alcoholic extracts (200 mg/kg) may be effectively utilized as antidiabetic agents and supports its traditional usage in the control of diabetes.

Anti-hyperlipidemic Activity

Kumawat et al, carried out the Antidiabetic activity of alcoholic and aqueous stem bark extracts of *Limonia acidissima*, linn in alloxan induced diabetic rats models. The alcoholic and aqueous extract of the stem bark of *Limonia acidissima*, Linn has significantly ($p < 0.001$) reversed the diabetes-included hyperlipidemia compared to standard drug. Thus the result shows significant cholesterol reducing action.

Antioxidant activity

Ilango et al, studied the Antidiabetic and antioxidant activity of *Limonia acidissima* linn. in alloxan induced rats. Superoxide dismutase (SOD), Catalase (CAT) and Lipid Peroxidation (LPO) were measured in pancreatic homogenate, methanolic extract of fruit pulp of *Limonia acidissima*.Linn. The activity of antioxidant enzymes such as SOD, CAT was found to be higher in the blood serum of diabetic animals treated with the *Limonia acidissima* extract. The results indicate the reliable free radicals scavenging activities.

Anticancer Activity

Pradhan et al, evaluated the Anticancer Activity of *Limonia acidissima* Linn (Rutaceae) Fruit Extracts on Human Breast Cancer Cell Lines. They carried out to assess the anticancer activity. Breast cancer cell lines, SKBR3 and MDA MB435, were used for in-vitro cell proliferation, cell viability assay, and cell cycle analysis of the extract. The results indicate that the extract fraction could induce cell cycle arrest (Stops the cell proliferation).

Diuretic Activity

Parial et al evaluated the diuretic activity of methanolic extracts obtained through the Microwave assisted extraction (MAE) and Bath Sonicator extraction (BSE) of *Limonia acidissima* was investigated against the standard drug furosemide . The diuretic activity of the different extracts at a dose of 200mg/kg was assessed, And it possess Significant, potent diuretic activity.

Hepatoprotective activity

Ilango et al, evaluated the Hepatoprotective and Antioxidant Activities of Fruit pulp of *Limonia acidissima* Linn against carbon tetra chloride (CCl₄) induced liver damage in rats. 200 and 400 mg/kg p.o doses of MELA was administered to group of animals for 10 days. Silymarin (100mg/kg) served as a standard drug. The results indicate that MELA exhibits significant dose dependant protective effect against CCl₄-induced liver damage.

CONCLUSION

This Review paper shows that, the plant *Limonia acidissima* has more traditional medicinal uses than known and documented. It has the potent action to reduce the formation of Reactive species also. The recent studies show that, Reactive species damages the tissues including DNA and also the major cause of most of the diseases. This Plant also comes under the Kayakarpam (Anti-oxidant) concept, which prevents the body from diseases. It can be used in our day to day life for the healthy living.

Traditional medicine is undoubtedly a reliable alternative approach to the health care delivery system since it is easily accessible, time-tested, safe, efficacious and without drastic effects. Therefore, the review of plant *Limonia acidicema* revealed that it has got a variety of pharmacologically and medicinally significant constituents, which are being utilized in the

field of Siddha Medicine. It is a plant of high commercial and economical importance and its use as a bioavailability enhancer can be explored in various formulations.

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