

## Effect of *Bilvapatra Lepa* (Aegle Marmelos) over unknown insect bite Poisoning - A Single Case Study

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### ABSTRACT

*Ayurveda* is the ancient science of life, has eight branches. According to *Ayurved* there are two main types of poison – Natural and Artificial. Natural poison is of two types – *Sthavar* and *Jangam*. <sup>(1)</sup> *Danstrachikita* is a *Ayurveda* toxicology branch. Insect bite is comes under *Jangam Visha*. A 9 year boy, while playing cricket affect with unknown insect bite complying of itching, swelling, redness and burning pain over upper back region. He was treated by local application of *Bilvapatra Lepa* (Aegle marmelos). Aegle marmelos is one of the important plants which have medicinal as well as other properties. This study shows that external application of *Bilvapatra Lepa* is effective in the treatment of unknown insect bite (*Kitakadansha*)

**Keywords :** Aegle Marmelos, *Bilvapatra Lepa*, Insect bite

### I. INTRODUCTION

#### History

*Bilva* is a deciduous sacred tree, associated with Gods having useful medicinal properties, especially as a cooling agent. This tree is popular in 'Shiva' and 'Vishnu' temples and it can be grown in every house. Its leaves are trifoliate symbolizing the 'Trimurties' – *Brahma*, *Vishnu*, *Shiva* with spear shaped leaflets resembling "trishulam" the weapon of Lord Shiva. Many legends, stories and myths are associated with this tree. The leaflets are given to devotees as 'prasadam' in Shiva temples. <sup>(2)</sup>.

#### Habitat

Found all over India, from sub-Himalayan forests, Bengal, Central and south India and in Burma. Two kinds of fruits are available in the market. The full grown fruit of either variety, when it just begins to ripen, is best for medicinal purpose. <sup>(3)</sup>

#### Botanical Inforation <sup>(4)</sup>

##### Bark

The bark is pale brown, smooth or finely fissured and flaking, armed with long straight spines, 1.2 – 2.5 cm singly or in pairs, often with slimy sap oozing out from cut parts. The gum is also described as a clear, gummy sap, resembling gum Arabic, which exudes

from wounded branches and hangs down in long strands, becoming gradually solid. It is sweet at first taste and then irritating to the throat.

### Leaf

The Leaf is trifoliate, alternate, each leaflet 5-14 x 2-6 cm, ovate with tapering or pointed tip and rounded base, untoothed or with shallow rounded teeth. Young leaves are pale green or pinkish, finely hairy while mature leaves are dark green and completely smooth. Each leaf 4-12 pairs of side vein which are joined at the margin.

### Flower

The flowers are 1.5 to 2 cm, pale green or yellowish, sweetly scented, bisexual, in short drooping unbranched clusters at the end of twinges and leaf axils. They usually appear with young leaves. The calyx is flat with 4 (5) small teeth. The four or five petals of 6-8 mm overlap in the bud. Many stamens have short filaments and pale brown, short style anthers. The ovary is bright green with an inconspicuous disc.

### Fruit

The *bael* fruit typically has a diameter or between 5 and 12 cm. It is ball shaped or slightly pear-shaped with a thick, hard rind and does not split upon ripening. The woody shell is smooth and green, gray until it is fully ripe when it turns yellow. Inside are 8 to 15 or 20 sections filled with aromatic orange pulp, each section with 6(8) to 10(15) flattened-oblong seeds each about 1 cm long, bearing woolly hairs and each enclosed in a sac of adhesive, transparent mucilage that solidifies on drying. The number of seeds varies. It takes about 11 months to ripen on the tree and can reach the size of large pomelo, and some are even larger. The shell is so hard it must be cracked with a hammer.

### Classification<sup>(5)</sup>

<i>Gana</i>	<i>Authour</i>
<i>Guduchyadi</i>	<i>Bhavaprakasha</i>
<i>Shothahar</i>	<i>Charaka</i>
<i>Arshoghna</i>	
<i>Asthapana</i>	
<i>Anuvasanopaga</i>	
<i>Bruhatpanchamul</i>	<i>Sushruta</i>
<i>Varunadi</i>	

### Synonyms<sup>(6)</sup>

<i>Bilva</i>	<i>Shailusha</i>	<i>Shandilya</i>
<i>Malur</i>	<i>Shriphala</i>	<i>Shiveshta</i>
<i>Tripatra</i>	<i>Shalya</i>	<i>Gandhaphala</i>
<i>Gandhapatra</i>	<i>Sadaphala</i>	<i>Kapittha</i>
<i>Pitaphala</i>	<i>Putivata</i>	<i>Shalatu</i>
<i>Kantaki</i>		

### Regional Names<sup>(7)</sup>

Language	Name
English	Bael fruit, Bengal Quince
Latin Name	Aegle marmelos
Marathi	Beal
Bangali	Beal
Hindi	Beal, Shriphala
Gujrathi	Bili
Telagu	Maredu, Bilvapandu

### Plant Profile – Taxonomy<sup>(8)</sup>

Kingdom	Plantea
Order	Sapindales
Family	Rutaceae
Sub family	Aurantioieae
Genus	Aegle
Species	A.marmelos

## Chemical Constituents

### Alkaloids

The alkaloids comprise the largest single class of secondary plant substances. From the leaves of *Aegle marmelos*, new alkaloids were reported.

Ethyl cinnamamide

O-3,3-(dimethylallyl) harfordinol

N-2-methoxy-2-[4-(3',3'-dimethylallyloxy)phenyl] ethyl cinnamamide etc.<sup>(9)</sup>

### Coumarins

Marmelosin, marmesin, imperatorin, marmin, alloimperatorin, methyl ether, xanthoxol, scopoletin scoparone, umbelliferon, psoralen, maemelide has also been reported in *Aegle marmelos*.<sup>(10)</sup>

### Terpenoids

In India study of the essential oil of *Aegle marmelos* leaves was done very much extensively in India by various workers since 1950.  $\alpha$ -Phellandrene was the common constituents of the essential oil found from leaves, twigs and fruits.  $\alpha$ -Phellandrene (56%) and p-cymene (17%) were reported from leaf oil. Later, similar report was published on leaf essential oil by many workers. P-menth-1-en-3,5-diol was isolated and characterized from *Aegle marmelos* leaves.<sup>(11)</sup>

## Pharmacological Properties of Leaves

### Cytoprotective Activity

The cytoprotective activity of leaves of *Aegle marmelos* was reported in *Cyprinus carpio* (freshwater fish) exposed to heavy metals. *C. carpio* was exposed to heavy metals followed by treatment with dried powder of *Aegle marmelos* leaves. The treatment resulted in cytoprotective activity by stabilization of plasma membrane and modulation of antioxidant enzyme system.<sup>(12)</sup>

### Anti-arthritis Activity

Study has shown that leaves of *Aegle marmelos* have ability to possess anti-arthritis activity against collagen

induced arthritis in Wistar rats. Paw swelling and arthritic index has reduced from the methanol extract treatment of rats. Radiological and histopathological changes were also significantly reduced in methanol extract treated rats.<sup>(13)</sup>

### Antibacterial activity:

Antimicrobial activity of different leaf extracts such as Petroleum ether, Dichloromethane, Chloroform, Ethanol and Aqueous extract of *Aegle marmelos* leaves are tested against selected Gram positive and Gram negative bacteria. Phytochemical extracts of *Aegle marmelos* exhibited significant anti-bacterial activity as depicted from results. Ethanol and Chloroform leaf extracts of *Aegle marmelos* were found to be more active towards the bacterial species tested.<sup>(14)</sup>

### Antidiabetic activity

The anti-diabetic activity of the leaves of *Aegle marmelos* was reported in alloxan diabetic rats. The methanolic extract (120 mg/kg body wt.ip) of the leaves of *Aegle marmelos* reduced the blood sugar level. Reduction in blood sugar level could be seen from 6<sup>th</sup> day after continuous administration of the extract and on 12<sup>th</sup> day sugar levels were found to be reduced by 54%.<sup>(15)</sup>

### Anti-fertility activity

In male Albino rats, leaves of *Aegle marmelos* plant were investigated for antifertility activity. The rats were administered with aqueous extract (250/kg.body weight) of leaves of *Aegle marmelos* for 45 days. Treatment resulted in reduction of testis, epididymis and seminal vesicle. The extract also resulted in reduction of testicular sperm count.<sup>(16)</sup>

### Anti-inflammatory, Antipyretic and Analgesic

The serial extracts of leaves of *Aegle marmelos* were investigated for anti-inflammatory property. The analgesic and antipyretic properties were also evaluated. The most of the extracts derived from the plant *Aegle marmelos* caused a significant inhibition

of the carrageenan-induced paw oedema and cotton-pellet granuloma in rats. The extract also produced marked analgesic activity by reduction the early and late phases of paw licking in mice. A significant reduction in hyperpyrexia in rats was also produced by the most of the extracts. This study was established anti-inflammatory, antinociceptive and antipyretic activities of the leaves of *Aegle marmelos*.<sup>(17)</sup>

#### Acute and Sub-acute toxicity studies:

This study was designed to elucidate the toxicity of the widely used plant *Aegle marmelos* in rats. The total alcoholic, total aqueous, whole aqueous and methanolic extracts isolated from the leaves of *A. marmelos* and studied their toxic effects. Acute, subacute and LD 50 values were determined in experimental rats. The dead animals were obtained from primary screening studies, LD 50 value determination experiments and acute studies subjected to postmortem studies. The external appearance of the dead animals, the appearance of viscera, heart, lungs, stomach, intestine, liver, kidney, spleen and brain were carefully noted and any apparent and significant features or differences from the norm were recorded. Following the chronic administration of *Aegle marmelos* for 14 days, the vital organs such as heart, liver, kidney, testis, spleen and brain were carefully evaluated by histopathological studies and any apparent and significant changes or differences from the norms were studied. From the acute administration of *Aegle marmelos*, the LD50 values were determined using graphical method. The heart stopped in systolic stand- still in the acute experiments. There were no remarkable changes noticed in the histopathological studies after 50 mg/kg body wt of the extract of *Aegle marmelos* when administered intraperitoneally for 14 days successively. Pathologically, neither gross abnormalities nor histological changes were observed. After calculation of LD50 values using graphical methods, we found a broad therapeutic window and a high therapeutic index value for *Aegle marmelos* extracts.

Intraperitoneal administration of the extracts of the leaves of *Aegle marmelos* at doses of 50, 70, 90 and 100 mg/kg body wt for 14 consecutive days to male and female Wistar rats did not induce any short term toxicity. Collectively, these data demonstrate that the extract of the leaves of *Aegle marmelos* have a high margin of drug safety.<sup>(18)</sup>

#### Parts used<sup>(19)</sup>

Fruits (Both ripened and unripe)    Root bark  
Leaves    Rind of ripe fruit  
Flowers

#### Action

Ripe fruit is sweet, aromatic, cooling, and nutritive. When taken fresh it possesses laxative properties. Unripe fruit is astringent, digestive, stomachic and little constipative. Pulp is stimulant, antipyretic and antiscorbutic. Fresh juice is bitter and pungent.<sup>(20)</sup>

#### Action and Rasa Panchaka<sup>(21)</sup>

##### Tender Fruit:

*Tikta Kashaya – Rasa*

*Ushna – Virya*

*Vatakaphahara*

*Pittakara*

*Grahi*

*Ruksha*

*Laghu*

*Pachana*

*Balya*

Improves Agni

##### Ripen fruit:

*Madhura*

*Guru*

##### Root:

*Vatahara*

#### Action and Uses in Unani

Tonic- Heart, Brain and Stomach

Astringent

Haemostatic

Dysentery

Aphrodisiac

## Therapeutic uses

Fruit is very valuable in habitual constipation, chronic dysentery and dyspepsia. It is one of the ingredients in *Dashamul*. It is used in diarrhea and dysentery of children where there is no fever. It is also given to prevent the growth of piles. Decoction of root, root bark sometimes the stem bark is useful in intermittent fever, also in palpitation of heart. Leaves are made into a poultice and applied to inflamed parts. <sup>(22)</sup>

## Aims and Objective

This study intends to study the efficacy of *Bilvapatra Lepa Chikitsa* in the management of unknown insect bite (*Kitakadansha*) *vishaktata*.

Recollect and arrange all the information scattered in different ancient text related to *Lepa Chikitsa*.

## Materials and Methods

This study is based on literary review collected from classical Ayurveda texts and modern text books.

In this study following heads are included :

Definition of *Visha*

Types of *Visha*

Definition of *Jangam Visha* and their sites

Signs and Symptoms of *Vishaktata*

Formation of *Lepa*

Application of *Lepa*

Before application

After application

Discussion

## Conclusion

### *Visha*

The word *Visha* originated from two different words – *Vishad* means unhappiness and *Vishvak* means everywhere. A substance which produces vitiation of *Dhaatu* can be called as *Visha*.<sup>(23)</sup> As per *Sushrut Samhita* a substance producing despair is called as *Visha*.<sup>(24)</sup> Perhaps the most comprehensive definition of *Visha* is, any substance which enters the body from any route, vitiates bodily tissues, leads to deteriorate of health or life can be called as *Visha*.<sup>(25)</sup>

### Types of *Visha*

Poisons are generally classified into two types namely *Stavara Visha* (Vegetable origin) and *Jangam Visha* (Animal origin).<sup>(26)</sup>

### Definition of *Jangam Visha* and Their Sites

Poisons which are derived from *Danshtra* (bite) are mobile, hence known as *Jangam Visha* (animate poison). Here also the term *Danshtra* includes rest of fifteen *adhithans*.

As per *Sushrut Samhita*, there are sixteen sites of poison in the body of venomous animals.<sup>(27)</sup>

- |           |           |                    |                          |
|-----------|-----------|--------------------|--------------------------|
| 1. Sight  | 5. Urine  | 9. Menstrual Blood | 13. Bones                |
| 2. Breath | 6. Stool  | 10. Stings         | 14. Bile                 |
| 3. Teeth  | 7. Semen  | 11. Flatus         | 15. <i>Shuka</i> (cilia) |
| 4. Nails  | 8. Saliva | 12. Anus           | 16. Dead body            |

### Present signs and Symptoms of *Vishaktata* ( Unknown insect bite)

Swelling

Itching

Redness

Burning pain

## Treatment

Leaves are made into a poultice and applied to inflamed parts.<sup>(28)</sup>

## Formation of Lepa

Aegle Marmelos Leaves and Small amount of water taken and crushed in *Khalabatta* later it grinds in mixer.

## Application of Lepa

### Before Application

Itching, Redness and Swelling present at bitten area.

### After Application

While application of *Bilvapatra Lepa* over affected area, Itching instantly subsided. After 2 hours of application, *Lepa* become dry and removed; then swelling and redness also subsided.



Before Application



Application of lepa



After Application



## II. DISCUSSION

Swelling around bitten area is subsided because *Charak* classified the *Bilva* as *Shothahar*. Marmelosin is found in this plant, and marmelosin have antihistaminic property, so severe itching subsided instantaneously after local application of *Bilvapatra Lepa*. India is agricultural country. Most of the population lives in rural area. Farmers do farming related business. Many times the incidence of insect biting happens. In such cases of insect biting, if *Bilvapatra Lepa* applied on the bitten part, local toxic symptoms are reduced or cured. Both the components in the above mixture are easily available and free of cost. They are easy to use. If we use this, we can not only reduce the toxicity but also save some money. In rural and workers residence the possibility of insect biting is more compare to the city area. If this *Lepa* is applied at such places a person will get relief, also the expenditure on modern and costly medicine can be avoided.

## III. CONCLUSION

It is clear from this review that Aegle marmelos is very important medicinal plant and successfully used in *Ayurveda*, Unani, Siddha and other systems also. All parts of this plant such as bark, fruit, seed, stem and leaves are used for management of diseases. The present study validates the use of Leaves of Aegle marmelos in the treatment of unknown insect bite. The results obtained in this study suggest that the *Bilvapatra Lepa* can cure the toxicity by insect bite. The *Lepa* has significant discipline for further new area of investigations. A systemic research and development work should be undertaken for invention new medicine for better economic benefit and service of mankind.

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