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A Literary Study of *Bilwa (Aegle marmelos)* Medicinal Plant – A Review Article

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ABSTRACT: -

One of the most significant plants in the medical area is *Aegle marmelos*, which belongs to the Rutaceae family and has therapeutic qualities. *Bilwa* is used to cure a variety of illnesses. This plant has existed from the beginning of time. All parts of the plant, including the fruits, leaves, bark, stem, and root, are used to cure a range of illnesses since it generates a multitude of alkaloids. Its therapeutic qualities include anti-diarrheal, anti-dysenteric, anti-pyretic, and anti-inflammatory effects. Fruit-derived chemicals have showed promise in the treatment of illnesses like diabetes, stomach ulcers, and hyperlipidemia. This review paper discusses the architecture, distribution, nutritional effect, Ayurvedic uses, and pharmacological characteristics of this plant.

Keywords: pharmacological properties, antidiabetic, antidysentery etc.



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INTRODUCTION

Many plants have been utilised for medical purposes for thousands of years. Around 85 percent of the world's population, either fully or partially, rely on traditional medicine for basic health care^[1]. These plants are used in Ayurveda, Siddha, and other healing systems. Our ancient literature has highlighted their characteristics and applications for curing different ailments, such as the Rigveda, Yajurveda, *Charaka Samhita*, and *Sushruta Samhita*, *Astanga Hridaya*. *Bilwa*, commonly known as the wood apple vine, is one of them.

Bilwa is a holy plant in Hinduism. Leaves have been presented in prayers to Shiva and Parvati since ancient times^[2]. Trifoliate leaves with spear-shaped leaflets resemble Lord Shiva's shield, Trisula. Many stories and myths surround this tree^[3]. Another noteworthy feature of *Bilwa* is that the Sattva component of its *patra* is higher, allowing it to absorb and emit *Sattvika* frequencies more effectively. This can result in a number of different results. One of them is the elimination of *Raja-Tama* particles from the environment. When a *Sattvika leaf*, such as *Bilwa Patra*, is placed near someone who is experiencing bad emotions, the dark energy within them is reduced^[4]. *Bilwa* has antibacterial, anti-diabetic, anti-inflammatory, analgesic, anti-pyretic, and wound-healing effects, according to reports.^[5]

MATERIAL AND METHOD

The info about the *Bilwa (Aegle marmelos)* plant was gathered from reliable websites, publications, and books.

Plant Morphology According to Modern Science

Aegle marmelos is a slow-growing medium-sized tree with a short trunk, dense, fuzzy, flaking bark, and occasionally spiky branches

that can reach heights of 12-15 metres. Young suckers frequently have stiff, straight spines. *Bael* is a deciduous tree with alternate leaves that are borne individually or in clusters and are composed of 3-5 oval, pointed, shallowly notched leaflets that are 10 cm long and 2-5 cm thick, with a long petiole.

Classification^[6]

- *Kingdom- Plantae*
- *Family- Rutaceae*
- *Subfamily- Aurantioideae*
- *Genus- Aegle*
- *Species- marmelos*

Ayurvedic Pharmacodynamics of *Bilwa*

- *Rasa – Madhura, Katu*
- *Guna -Guru*
- *Virya -Sheeta*
- *Vipaka- Madhura*
- *Karma - Vedanasthapana, Raktastambhana, Deepana, Mutrala, Tridoshaghna, Shothahara*

Plant Habitat and Geographical Distribution

Bilwa is a native of India, with the Himalayan and West Bengal areas being the most prevalent locations. Uttar Pradesh, Chhattisgarh, Bihar, Madhya Pradesh, and Jharkhand are among the states where it grows. *Bilwa* may be found in Egypt, Malaysia, Bangladesh, and Sri Lanka, among other exotic locations.

Bilwa's Nutritive Value:

According to a physiochemical research, *bilwa* has incredible nutritional value. *Bilwa* pulp is high in glucose and sugar, and it may be made into an energy drink by mixing it with milk. *Bilwa* also contains proteins, lipids, fibre, calcium, minerals, iron, vitamin A, vitamin B1, vitamin C, and riboflavin, among other nutrients. The leaves and shoots are used as a green vegetable in Indonesia^[7,8]

Bilwa's Pharmacological Properties

Antioxidant activity:

Bilwa is claimed to contain antioxidant

qualities that protect the body from a variety of free radicals. According to a recent *Bilwa* research, immature fruit had a greater proportion of free radical inhibition than ripe fruit. The antioxidant activity of an aqueous extract of *Bilwa* berries was tested by DPPH radical scavenging^[9,10,11].

Antimicrobial Activity

Antibacterial activity was highest in *Bacillus subtilis*, *Staphylococcus aureus*, *E. coli*, and *Pseudomonas aeruginos*. The essential oil extracted from the leaves of the *Aegle marmelos* tree has been shown to have antifungal activity against *Trichophyton mentagrophytes*, *Trichophyton rubrum*, *Microsporum gypseum*, *Microsporum audouinii*, *Microsporum cookie*, *Epidermophyton floccosum*, *Aspergillus niger*, *Aspergillus flavus*, and *Histoplasma capsulatum*^[12]. Using the agar well diffusion method, the antibacterial activity of different extracts was also determined.^[13]

Antidiarrheal Activity-

The unripe fruit of the *Bilwa* tree is a significant diarrhoea and dysentery remedy that has been utilised by people for centuries. *Bilwa* has been demonstrated in several research to have antidiarrheal properties. *Shigella boydii*, *Shigella sonnei*, and *Shigella flexneri* were all resistant to the ethanolic extract, while *Shigella dysenteriae* was only moderately resistant.^[14]

Antidiabetic Activity-

Bilwa has been found to have anti-diabetic effects in numerous studies. *Bilwa* leaves were shown to have anti-diabetic properties in alloxan diabetic rats. *Bilwa* leaf methanolic extract decreases blood sugar levels. Blood sugar levels were observed to be reduced by 54 percent following 12 days of regular administration of the concentrate^[15,16]. Leaf extract has been utilised in Ayurvedic medicine to treat diabetes. Similar to insulin, it enhances the body's ability to use higher glucose loads by increasing glucose absorption.^[17]

Anticancer Properties- Cancer is the second largest cause of mortality for both men and women in both developed and developing countries. *Bilwa* fruit extract is utilised to enhance the immune system, which helps the body fight cancer. According to a study, the *Bilwa* showed an anticancer effect in an animal model with malignancy^[18]. In preclinical investigations, *A. marmelos* leaf extracts inhibited the growth of leukemic K562, T-lymphoid Jurkat, B-lymphoid Raji, erythroleukemic HEL, melanoma Colo38, and breast cancer cell lines MCF7 and MDA-MB-23122.

Antipyretic Properties

Bilwa is an antipyretic that is used to relieve fever and pain. According to the *Bilwa* study, at dosages of 200 mg/kg body weight and 400 mg/kg body weight, the Ethanolic extract reduced high body temperature significantly in a dose-dependent manner. Antipyretic efficacy of the extracts was comparable to paracetamol (100 mg/kg body weight).^[19,20]

Hepatoprotective Properties-

In a 40-day animal study, *Aegle marmelos* leaves were utilised as a control group in four groups that were given 30 percent ethyl alcohol. The results of the study reveal that *Aegle marmelos* leaves have a significant hepatoprotective effect.^[21]

Cardio protective Properties –

Isoprenaline-induced myocardial infarction can be prevented by *Bilwa* leaf extract. *Bilwa* has also been used to treat palpitation and as a heart depressant^[22]. Fresh *Bilwa* fruit juice was utilised at various dilutions for cardiotoxic operations. *Bilwa's* greater cardiotoxic action over digoxin is supported by new studies. *Bilwa* also has antihistaminic, anti-inflammatory, insecticidal, antioxidant, immunomodulatory, wound healing activity, anticonvulsant, and antifertility activities.

Application in Ayurveda

"*Tridoshaja jwara*," stomach discomfort, heart

palpitations, urinary problems, hypochondriasis, and hypochondriasis are all treated with this root, which also removes "vata, pitta, and kapha." The leaves are astringent, digestive, laxative, and expel "vata and kapha," making them useful for ophthalmology, deafness, and inflammatory therapy. The flowers are useful in the treatment of dysentery because they alleviate thirst and vomiting. Tonic, restorative, astringent, laxative, and beneficial to the heart and soul, the mature fruit is hot and dry. Morning sherbet made from ripe fruit is soft, fragrant, and refreshing, and it helps to alleviate dyspepsia. The unripe fruit can be used to treat diarrhoea and dysentery^[23].

Pandugna, Varnya, Pitta-Kaphagna, Balya, and Rasayana are the consequences of *Bilwa Phala Majja*. It is said to improve digestion and cleanse the *strotorodha*. In this illness state, the *Bilwa Phala Majja* functions most adaptively and contributes to the repair of *Dhatubala*. *Ama dosha* may be removed with *Bilwa Phala Majja*. The medicine's action is mostly determined by its subtle elements, such as *Rasa, Guna, Veerya, Vipaka, Prabhava*, and so on.^[24]

DISCUSSION

Bilwa is a holy herb with a wide range of benefits. *Bilwa* is a toxin-fighting herb that may be used to treat a number of illnesses. In Ayurveda, it is used as an antidote for snake poison. Kashaya, Madhura, and Tikta Rasa are all present, as is Ushna Virya. As a result, the *Bilwa* fruit is said to be useful in cases of diarrhoea. Coumarins and sterols are antibacterial, anti-inflammatory, antipyretic, analgesic, anti-cancerous, antidiabetic, and hepatoprotective compounds. *Bilwa* is a native plant that may be utilised to cure a wide range of poisons^[25]. Toxicity may harm an organ or a system, and *Bilwa* has been found to help cure

a number of toxins-related diseases in studies.²⁵ Antioxidant, antibacterial, and antifungal properties of *Bilwa* can relate to antitoxic properties. Pain and inflammation are the most common symptoms of corrosive and irritant poisoning, and *Bilwa* can assist with both. It also effectively protects against genotoxicity. Furthermore, activated carbon produced from *Bael* fruit shells was shown to be an efficient adsorbent for extracting the radioactive metal chromium from the aqueous process in a recent study.

CONCLUSION

Bilwa is a high impact medicinal valued plant with several health benefits. Our environment is rich with medicinal plants, yet most people are unaware of their importance. As a result, it serves as a method of informing others about what they have left behind. *Bilwa* contains many phytochemicals that have antibacterial, antioxidant, antidiabetic, antipyretic, and anti-inflammatory properties, as well as being cost effective. A systematic research and development programme should be undertaken for enhanced economic and productive utilisation of commodities.

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