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# Pharmacognostic Evaluation of *Aegle Marmelos* linn. Leaf

**Hiral K Modi[*1], Vishnu M Patel[2]**

1 *JJT University Research Scholar, Jhunjhunu, Rajasthan-333001,India*

*2.APMC College of Pharmaceutical Education & Research , Himmatnagar, Gujarat, India*

## ABSTRACT

*Aegle marmelos*, commonly known as Bael tree belonging to family Rutaceae is moderately sized, deciduous tree throught in dry forest hill of India & Central & Southern Asian countries. The different parts of plant contain numerous phytoconstituents like alkaloids, flavonoids, coumarins, essential oil etc. In this present study pharmacognostic evaluation is carried out which includes macroscopy, quantitative analysis & Phytochemical Screening. The various leaf extracts were subjected to preliminary phytochemical screening which will help in future for the standardization of formulation containing *A.marmelos.*

**Keywords**: *Aegel marmelos*, Rutaceae, Phytoconstituents

*Corresponding Author Email: starhir86@gmail.com

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# INTRODUCTION

*Aegle marmelos* (L.) (Rutaceae) commonly known as bael or koovalam (Malyalam, India) growing wildly throughout deciduous forest of India, ascending to an altitude of 1,200 m in western Himalayas and also occurring in Andaman Islands. The fruits and leaves are valued in indigenous medicine [1] In this work, we carried out on Inndian species which was collected from gandhinagar, Guajrat.

**Family:** Rutaceae

**History**

Bael or Bengal quince 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 '*Thrimurthies*'- *Brahma, Vishnu, Shiva*, with spear shaped leaflets resembling "*Thrisoolam*" 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 and as '*Tulasi*' in *Vishnu* temples. It has many Indian names, depending on the geographical region or the language as shown in Table 1.

# MATERIALS AND METHODS

**Plant material**

The leaves of *Aegle marmelos* (*Rutaceae*) were collected from botanical garden Gandhinagar, Gujarat, India. The plant materials were cleaned with distilled water and shade dried at room temperature.

**Morphological studies**

The morphological studies were carried out for shape, size, colour, odour, taste and fracture of the *A. marmelos* leaves.

**Microscopic studies and powder analysis**

The transverse section of leaf and stem were prepared by standard method. Slides of powdered leaf material were also prepared and studied.

**Quantitative microscopy**

Leaf constants such as stomatal index, stomata number, vein islet, vein termination and palisade ratio of the drug were determined according to the method described[4]

**Phytochemical screening[2,3]**

The shade dried plant material was powdered by using electric blender. The Petroleum ether, Alcoholic, Chloroform and aqueous extract were made using following methods.

**Successive Soxhlet Extraction**

The dried and coarsely powdered material (100gm) was subjected to successive extraction in a Soxhlet apparatus with different solvents like petroleum ether, chloroform and methanol. After each extraction, the solvent was recovered using distillation assembly. In vacuum after evaporation of solvent from the extract, residues were obtained and were stored in desiccators.[4]

**Aqueous Extract (Cold Percolation)**

The dried and coarsely powdered material (100gm) was taken with 500 ml of distilled water in cold percolator for overnight at room temperature. Residues was removed by filtration and concentrated to get solid yield.[5]

These extract were used for the analysis of different phyto-constituents *viz*. alkaloids, carbohydrates, phenolics, flavonoids, proteins, amino acids, saponins, mucilage and resins [6] etc.

## RESULTS AND DISCUSSION

**Morphological evaluation**

The proper examination of the leaves was carried out under sun light and artificial source similar to day light.

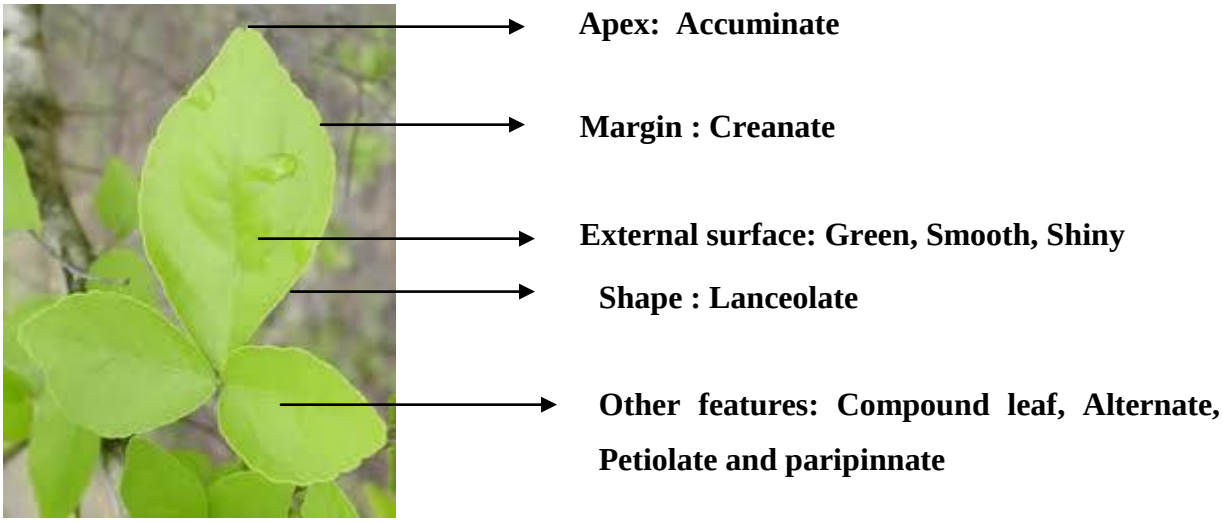


**Figure 1: Morphological evaluation of *A. marmelos* leaf**

By the morphological evaluation the morphological characters used to identify the species of the plant.

**Microscopical evaluation**

The slides of T.S of different parts of plant were prepared and subjected to microscopical examination. The histology of different parts of plant wa **Upper Epidermis** recorded.

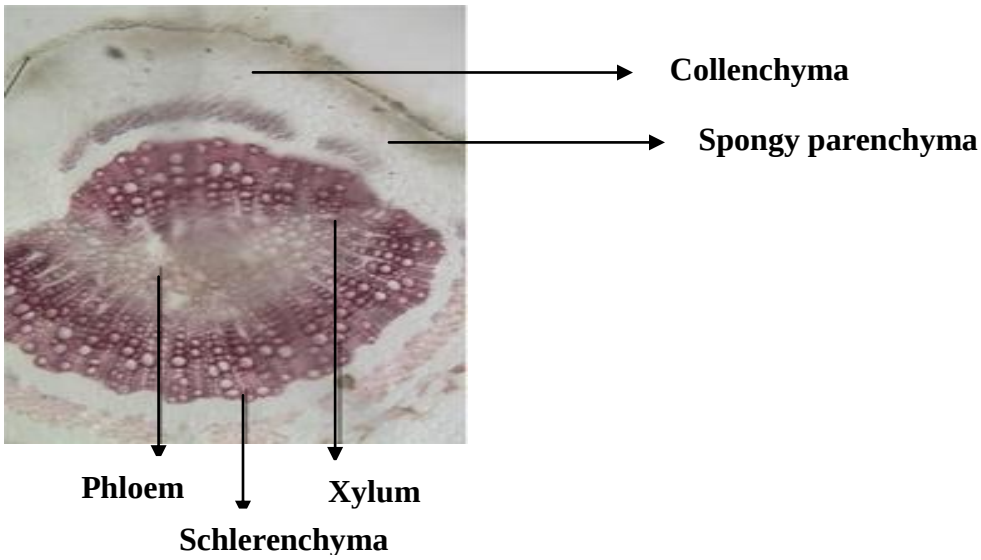


**Figure 1: Microscopical evaluation of *A. marmelos* leaf**

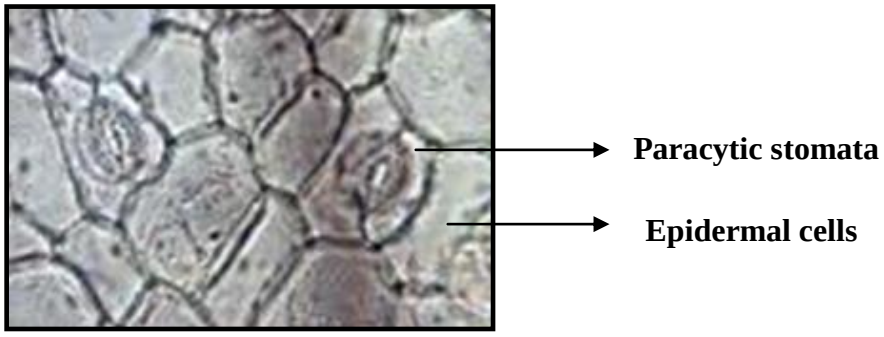


**Figure 3: Surface preparation of *A. marmelos* leaf (40X)**

The histology showed groups of fibers with calcium oxalate crystals and also exhibit outer and inner epidermis with round to oval cells, covered with striated cuticle. A multilayered strip of collenchymas (3-4 layered) appear above the lower epidermis and below the upper epidermis, midrib compose of xylem and phloem arranged in an arc. The leaves show paracytic stomata, more in number on upper epidermis and lesser in lower epidermis.

**Table 1: List of *Aegle marmelos* in different languages**

| Language | Vernacular Different Names |
|---|---|
| Hindi | Bael, Bel, Belgiri |
| Sanskrit | Bilva, Shivdruma, Shivphala |
| English | Bengal Quince |
| Urdu | Belk, Belk ham |
| Gujarati | Bilvaphala |
| Malayalam | Marredy |
| Tamil | Vivla Marum , Vivama |
| Burmese | Opesheet, Ohshit |
| French | Oranger du Malabar |
| German | Cognassier du Bengale, Bel indien |
| Portuguese | Marmelos |
| Thai | Matum, Mapin, Tum |

Calcium oxalate crystals were numerous and mainly of cluster crystal type. It contains numerous covering trichomes scattered in the powder. Some xylem vessels (pitted vessels) were also visible which were lignified. Cells of palisade and spongy parenchyma were also visible.

**Quantitative microscopy shown in Table 2**

Vein termination, Vein islet, Stomatal number, Stomatal index and Palisade ratio are important to for the standardization of *A. marmelos* leaf.

**Table 2: Quantitative Microscopy of Leaf of *Aegle marmelos***

| Plant/ Parameters | *Aegle marmelos* |
|---|---|
| Vein termination | 8-10 |
| Vein islet | 5-7 |
| Stomatal number | 8-12 |
| Stomatal index | 14 |
| Palisade ratio | 10-14 |

**Phytochemical screening**

Previously dried powdered leaves (100 gm) were extracted in a soxhlet apparatus with petroleum ether (PE), chloroform (CL), methanol (AL) and water (AQ) successively. Alkaloids, carbohydrates, phenolics compounds, flavonoids, proteins and amino acids, saponins were absent in petroleum ether, however, resins and lipids were present. Chloroform extract showed only the presence of alkaloids, phenolic compounds, and flavonoids. Moreover, in aqueous extract only resins and lipids were absent, while; only lipids were not detected in alcoholic extract as shown in Table 3

**Table 3: Phytochemical Screening of Different Extracts of Leaf of *Aegle marmelos***

| Constituents | Chemical Test | Petroleum Ether Extract | Chloroform Extract | Alcohol Extract | Aqueous extract |
|---|---|---|---|---|---|
| Alkaloids | Dragendorff Wagner's Mayer's | - | + | + | + |
| Carbohydrates | Molish's test | - | - | + | + |
| Phenolic Compounds (Tanins) | Lead acetate Dil. $KMNO_4$ | - | + | + | + |
| Flavonoids | Shinoda test | - | + | + | + |
| Proteins | Biuret test | - | - | + | + |
| Saponins | Foam test | - | - | + | + |
| Resins | Acetic Anhydride | + | - | + | - |
| Lipids/Fats | Liberrman Buchard Salkovaski | + | - | - | - |

\+ Indicate the presence of constituents, Indicates the absence of Constituents

## CONCLUSION

The results obtained in the present investigation are encouraging and will be used as reference

data for the standardization of *A. marmelos* and the formulations containing *A. marmelos* as a main ingredient. There is an urgent need for evaluation and analysis of herbal drugs using sophisticated modern techniques of standardization.

## REFERENCES


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