

Morphological and Physicochemical Studies of *Mimusops elengi* L. (Kha - Yay)

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Abstract

The selected specimen, *Mimusops elengi* L. locally known as Kha-Yay, was collected from *Mimusops elengi* L. (Kha-Yay Tree) in front of Zoology Department on Patheingyi University Campus. *Mimusops elengi* L. belongs to the family Sapotaceae. The morphological characters of vegetative and reproductive parts of the specimen have been studied and identified. The specimens were pressed for the barium sheets during flowering period. The collected flowers were washed with water and dried at room temperature and then crushed into powder. The physicochemical properties of the powdered flowers, such as the moisture content, the solubility of petroleum ether, ethyl acetate, acetone, methanol, ethanol and distilled water were investigated. The result showed that the highest percentage of methanol soluble matter content was about 13.0%.

Key words: *Mimusops elengi* L., Morphology, Physicochemical characters

INTRODUCTION

Plants have been an important source of medicine for thousands of years. Even today, the World Health Organization estimates that up to 80 percent of people still rely mainly on traditional medicines. Herbal medicines have been increasingly produced from indigenous plants and some of these are now used as substitutes for western synthetic drugs. Natural products are known to play an important role in pharmaceutical biology. *Mimusops elengi* L. possesses several medicinal properties.

These species may have medicinal properties and may also be poisonous. According to Dr Kyaw Soe and Tin Myo Ngwe (2000), the barks are used to cure mental disorder, gum diseases, heart diseases and thrush. Moreover they increase cardiac muscle contractility, and promote digestion and antiseptic. The fresh flowers are used for dental disease, heart disease, leucorrhoea and pediatric cough. The fruits are good for metrorrhagia, tooth disease, heart disease and strong teeth. They also promote peristalsis of the intestine. The seeds are used for strong teeth. The present work aims to promote Myanmar traditional medicinal broadly, verify the identification and morphology of *Mimusops elengi* L., determine the physicochemical properties of the flowers, and study medicinal and other uses of *Mimusops elengi* L. of Myanmar.

MATERIALS AND METHODS

Botanical Study

The specimens in this study were collected from Patheingyi University Campus, during the months of June-September in 2013. The collected specimens were identified by Hooker (1882), Kirtikar and Basu (1935), Backer (1965), Dassanayake (1995) etc. The morphological characters of specimens were studied, measured and recorded. The detailed study of floral parts was done by using dissecting microscope. The herbarium sheets were prepared and mounted.

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Chemical study

Preparation of Powered Samples

The flowers of *Mimusops elengi* L. used in this research were collected from Pathein University Campus. The flower samples were washed with water and air-dried at room temperature for several days. Dried samples were pulverized by grinding to get fine power and stored in air tight container to prevent moisture and contamination. The physicochemical properties such as moisture content, solubility in petroleum ether, ethyl acetate, acetone, methanol, ethanol and distilled water were carried out.

Physicochemical Properties of Powdered Flowers of *Mimusops elengi* L.

Determination of Moisture Content and soluble matter Contents

Five grams of powder were weighed accurately in a crucible and dried in an oven at the temperature of 110°C for 1 hour. After drying, the crucible was removed from the oven and cooled in a desiccator, weight of sample was obtained and the percentage of the moisture content was calculated in Figure 1 – 4.



Figure 1. Powdered flowers



Figure 3. Conical flask with powdered flowers and solvents



Figure 2. Digital balance



Figure 4. Mixed powdered and various solvents boiled on the water bath

RESULTS

Scientific name - *Mimusops elengi* L.

English name - Star-flowers, Spanish cherry

Myanmar name - Kha-Yay

Family - Sapotaceae

Morphological Characters of *Mimusops elengi* L.

Evergreen trees have white milky juice; leaves are alternate, simple, exstipulate; petiolate; lamina is widely oblong, the base oblique, the margins entire, the tips acute; inflorescences axillary cymes, solitary 3-5 flowered. The flowers are light brown, bracteate, ebracteolate. The pedicels are often deflexed, ferruginous tomentose, bisexual, actinomorphic, tetramerous, hypogynous. The sepals are 4+4, brown, 8-lobed, 2-seriate, the outer has 4 valvate in bud, ovate lanceolate, ferruginous tomentose and the inner has 4 imbricate, narrower, decussate. The petal is light brown, rotate, segments 8, each on the back with forked petaloid appendages, twisted. It has stamens 8, fertile, opposite to the corolla lobes, petalostemonous, inserted, filaments short, dilated at the bases. It also has anthers which are sagittate, brown, ditheous, extrorse, basifixed, longitudinal dehiscent; staminodes 8, alternate with fertile stamens, small, petaloid; pistil 1, carpels 2-8, ovaries ovoid, locules 8, axile placentation, styles short, stigma simple. The fruits are drupes, ellipsoid and orange. It has got 1 seed which is ovoid, laterally flat and brown. The results are shown in Figure 5 to 15.

Flowering and Fruiting period - March to September

Part used - Stem barks, leaves, flowers, fruits and seeds

Uses - The fresh flowers are used to cure in dental and heart diseases. The fruits are used for tooth disease. The seeds are used for strong teeth.



Figure 5. Habits of *Mimusops elengi* L. Figure 6. Arrangement of leaves Figure 7. Flowers as seen

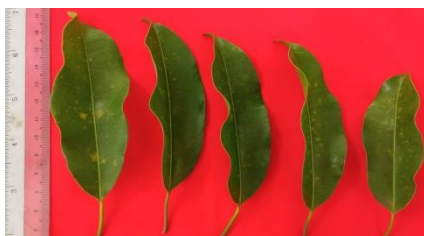


Figure 8. Upper surface view of leaves

Figure 9. Lower surface view of leaves



Figure 10. Position of inflorescence



Figure 11. L.S of flower



Figure 12. T.S of ovary

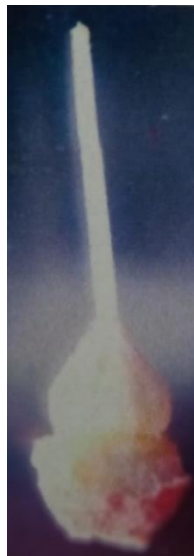


Figure 13. Pistil as seen



Figure 14. Fruits as seen



Figure 15. Seeds as seen

Physicochemical Properties of Powdered Flowers of *Mimusops elengi* L.

The moisture content was determined by drying to constant weight. The moisture content of powdered flower was about 12.2%. The solubility of powdered flowers in petroleum ether, ethyl acetate, acetone, methanol, ethanol and distilled water were carried out to determine the amount of total soluble solids in an individual solvent. The powdered flowers of *Mimusops elengi* L. were found to be significantly more soluble in methanol and ethanol than those of other solvents. The least soluble matters were found in petroleum ether and ethyl acetate. The results were shown in Table 1 and Figure 16-17.

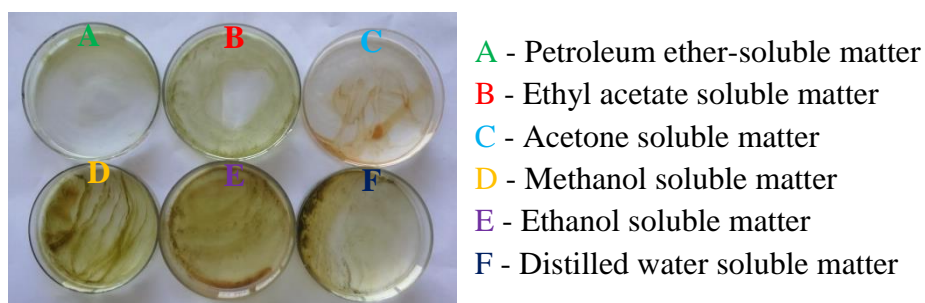


Figure 16. The solubility of powdered flowers in petroleum ether, ethyl acetate, acetone, methanol, ethanol and distilled water

Table 1. Physicochemical Properties of Powdered Flowers of *Mimusops elengi* L.

No.	Physicochemical characters	Content in %
1.	Moisture content	12.2
2.	Petroleum ether-soluble matter	1.33
3.	Ethyl acetate soluble matter	2.0
4.	Acetone soluble matter	3.33
5.	Methanol soluble matter	13.0
6.	Ethanol soluble matter	11.67
7.	Distilled water soluble matter	8.33

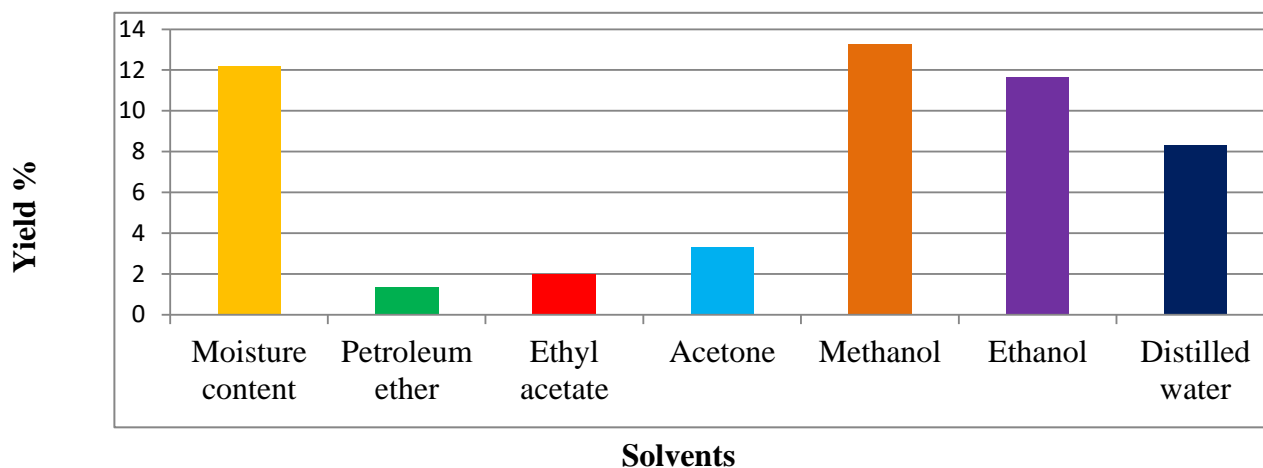


Figure 17. The percentage of moisture content and soluble matter contents of *Mimusops elengi* L.

DISCUSSION AND CONCLUSION

The selected plants are very commonly found as cultivated ornamentals of roadside trees. The plants are medium-sized evergreen trees with white milky juice. The leaves are alternate, simple, exstipulate, and petiolate. The leaf blades are oblong. The flowers are light brown, fragrant and pedicellate. The calyx is in two series, the outer 4 valvate and the inner 4 imbricate. The corollas are white turning brown. The flowers have 8 stamens which are fertile, opposite to the corolla lobes, petalostemonous. The filaments are short, dilated at the base. The anthers are sagittate and brown. There 8 staminodes, alternating with fertile stamens, and petaloid. The ovaries are ovoid; the fruits are berry, ovoid, yellow or orange. The seeds are brown. These characters are in agreement with Hooker, 1882; Kirtikar and Basu, 1935; Backer, 1965; Dassanayake, 1995.

Physicochemical properties such as moisture contents and different solubility of various solvents were determined. The moisture content was about 12.2 %. The solubility of methanol was found to be the highest. It was about 13.0%. The second highest soluble matter was found in ethanol. It was about 11.67%. The least soluble matter was observed from petroleum ether. It was about 1.33% respectively. These characters are in agreement with British Pharmacopoeia, 1968 and WHO, 1998.

Based on the findings of the present research, isolation of medical usefulness of physicochemical compounds methanol and ethanol soluble matters should be used to isolate the pure compounds. This research is basically effective for further pharmacognostic studies on usefulness of medicinal application in Myanmar. The observed morphological characters and physicochemical properties are of great value in its proper and effective utilization of traditional medicine in the near future and in carrying out further research.

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