



## Pharmacognostical Examination & Preliminary Phytochemical Analysis of *Mimusops elengi* L and *Monoon longifolium* Sonn Fruits

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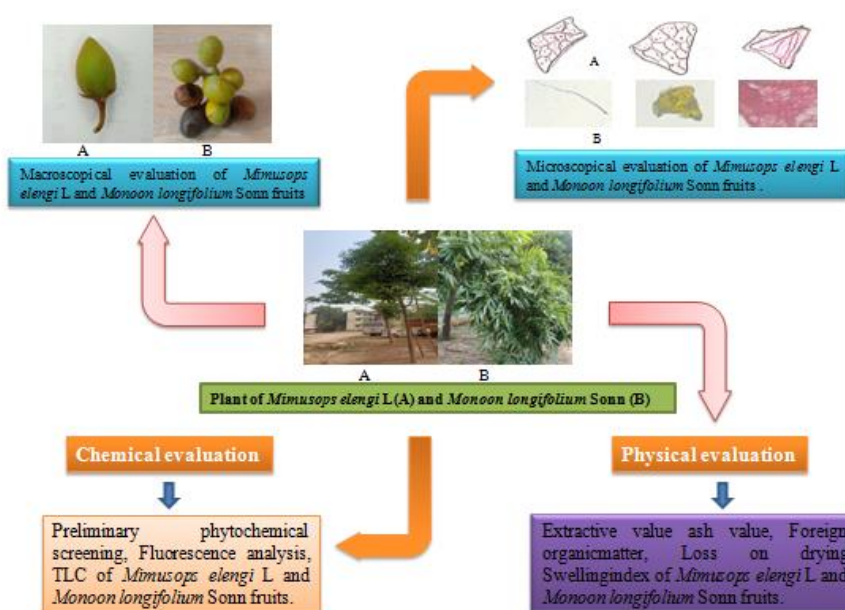
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### KEYWORDS

*Mimusops elengi* L, *Monoon longifolium* Sonn, Herbal remedies, Immunomodulator agent, Phytochemical screening, fluorescence analysis.

### ABSTRACT:

This study investigates the pharmacognostical characteristics and preliminary phytochemical properties of *Mimusops elengi* L. and *Monoon longifolium* Sonn. fruits, both known for their extensive use in traditional medicine. *Mimusops elengi* L, commonly known as Bakul or Bulletwood, is renowned for its astringent, antibacterial, and anti-inflammatory properties, often used in dental care and wound healing. *Monoon longifolium* L, also known as False Ashoka or Mast Tree, is valued for its anti-inflammatory, analgesic, and antipyretic activities. Detailed pharmacognostical examination, including macroscopic and microscopic analysis, was conducted to identify distinguishing anatomical features of these fruits. Physicochemical parameters such as moisture content, ash values, and extractive values were measured to assess quality and purity. Preliminary phytochemical screening revealed the presence of bioactive compounds, including alkaloids, flavonoids, phenolics, tannins, and saponins, which contribute to their therapeutic potential. Thin Layer Chromatography (TLC) profiling provided a comprehensive fingerprint of the phytoconstituents. The findings offer crucial baseline data for the standardization and pharmacological evaluation of *Mimusops elengi* and *Monoon longifolium* fruit, supporting their traditional uses and potential in developing novel therapeutic agents.





## Introduction

Symbiosis is best exemplified by the remarkable relationships found in nature. People in the western world are growing more interested in natural product treatments with a fundamental approach to nature as they gain a deeper understanding of the effectiveness and adverse effects of synthetic drugs <sup>(1)</sup>. Natural medicine is then a stay of healthcare in numerous emerging nations. Historical applications of medicinal herbs signifies extensive historical application, and This is true for many products that are available such as continue with the rest of the sentence as “indigenous medicine”<sup>(2)</sup>. In numerous emerging nations, a significant portion of the community depends on traditional healers and their range of herbal medicine to address their healthcare needs. This belief is largely due to the perception that herbal medicine are free of side effects, in addition to being affordable and readily available locally. According to the United Nations agency, the global use of botanical medicine is two to three times more prevalent than conventional drugs. Using plants as medicine has its roots in ancient times and forms the basis for many aspects of traditional medicine. Several traditional drugs have obtained from plant origins, One example of a plant is *Mimusops elengi* L related to Family Sapotaceae <sup>(3)</sup>.

*Mimusops elengi* L commonly known as ‘maulsari’ in Hindi and ‘spanish cherry’ in English. It is a medium size perennial tree reaching to be 20 meters tall. *Mimusops elengi* L. is a species commonly located in Tropical forests in South Asia, Southeast Asia, and Northern Australia <sup>[2,4]</sup>. It is native to regions including India, Sri Lanka & Andaman Islands, Indo-Chin <sup>(4)</sup>. It is utilized as a medicinal drug in both the Ayurvedic & Siddha systems of medicine as the second most famous spice globally, following black pepper. The fruits are rich in volatile oil, it is primarily made up of fatty acids, aldehydes, ketones, esters, monoterpene hydrocarbons, and oxygenated mono- and sesquiterpenes <sup>(5)</sup>. The plant has spiral or alternating, distichous leaves that are sometimes ± opposed and occasionally grouped at the base of the branchlets. The fruit is either a berry or drupe, containing one or more seeds <sup>(6)</sup>. The miniature, star-shaped, creamy-white flowers occur in tiny clusters in the leaf axils and are only 1.2 cm diameter. The covering of the seed is tough, glossy, brown (light yellow in *Pouteria annamensis*), and contains a lot of

tannins. The seed scar might be basal and spherical or lateral and linear to oblong <sup>(7)</sup>. The endosperm is usually greasy. It has long been utilised in Ayurvedic medicine, where its stringent in nature, cooling, anthelmintic, tonic and febrifuge qualities are thought to exist. Dental caries, pyorrhoea, and bleeding gums are the main problems it is used to treat. It is a great supplement to any formula intended for a patient with impaired digestive function and aids therapeutic digestion. It has a lengthy history of usage in reputable conventional medical systems like Siddha along with Ayurveda.

*Monoon longifolium*, commonly known as the False Ashoka or Mast Tree, belongs to the Annonaceae family and is native to the Indian subcontinent, including India and Sri Lanka <sup>(8)</sup>. This evergreen tree is well-known for its tall, slender, and symmetrical shape, often grown as an ornamental plant in urban landscapes for its aesthetic appeal and ability to provide shade<sup>(9)</sup>. The tree can reach up to 30 meters in height and is characterized by its glossy, lance-shaped leaves and fragrant, greenish-yellow flowers, which bloom in clusters. Traditionally, various parts of *Monoon longifolium* have been used in folk medicine due to their therapeutic properties <sup>(10)</sup>. The bark and leaves are rich in alkaloids, flavonoids, and tannins, which contribute to their anti-inflammatory, analgesic, and antipyretic effects <sup>(11)</sup>. It is frequently employed in traditional remedies for conditions such as fever, skin diseases, and dysentery <sup>(12)</sup>. The essential oil extracted from the plant is also used in aromatherapy for its calming and stress-relieving properties. Scientific studies have begun to validate its traditional uses, highlighting its potential as a source of bioactive compounds for developing new pharmacological agents. The plant's broad spectrum of medicinal applications underscores its importance in traditional medicine and its potential for future therapeutic exploration. The rationale for conducting pharmacognostical examination and preliminary phytochemical analysis of *Mimusops elengi* L. and *Monoon longifolium* Sonn. fruit lies in their traditional medicinal uses and the potential discovery of bioactive compounds. Provide a basis for further pharmacological and toxicological investigations. Support the development of plant-based medicines or nutraceuticals. *Mimusops elengi* L. Traditionally used for its antibacterial, anti-inflammatory, antioxidant, and



astringent properties. It has applications in treating dental issues, diarrhea, and skin conditions. *Monoon longifolium* Sonn. Known for its therapeutic potential in managing inflammation, fever, menstrual disorders, and wound healing. Identifying and validating their phytochemicals can lead to the development of new drugs or herbal formulations. The pharmacognostical and phytochemical study of these fruits bridges the gap between traditional knowledge and modern science. It ensures the proper identification, authentication, and analysis of active compounds, paving the way for safer, effective, and standardized herbal products

## MATERIALS AND METHODS

### Acquiring and validating the plant material

The fruits of *Mimusops elengi* L. was collected from bakshi ka talab, Lucknow (Uttar Pradesh) in August, and morphology Recognized and validated by Dr. Lal Babu Chaudhary Senior Principal Scientist & Curator of Herbarium and the fruits of *Monoon longifolium* sonn. was collected from the Gulab Vatika, Sector G, Aliganj, Lucknow (Uttar Pradesh) in August, and morphology Recognized and validated by Dr. K.M. Prabhukumar, Senior Scientist and botanical garden, CSIR – National Botanical Research Institute (NBRI) Lucknow, Uttar Pradesh. The specimen has been preserved in the herbarium of the Department of Botany at the CSIR – NBRI, located in Lucknow, Uttar Pradesh. (110278 and 117466€).

### Extraction of plant material

100g of coarsely powdered fruits of *Mimusops elengi* L. and *Monoon longifolium* sonn were packed in tissue-paper and hot extraction technique using distilled water ethanol chloroform & petroleum ether in a Soxhlet extractor, with each solvent used separately for 8 hours. While the extracts were filtered, the filtrates were dried by evaporating them. The % yields of the P. ether, chloroform, ethane, and water-soluble extracts were then calculated <sup>(13)</sup>

### Microscopy

A thin transverse section (TS) and longitudinal section (LS) of the fruit were slice by free-hand sections and stained with various colouring agents(aniline blue & safranin).The various histological part soft he fruit were examined and drawn with the help of camera Lucida.

<sup>(14)</sup>Using Ruthenium red for mucilage, Millon's reagent for protein, weak iodine solution for starch, and Dragendorff's reagent for alkaloids, histochemical colourful reactions of powdered fruit were conducted. The suggested methods used aqueous NaOH to detect flavonoids and aqueous ferric chloride to detect phenolic chemicals <sup>(15)</sup>.

### Physico-chemical and fluorescence analyses

The procedures for measuring total ash value, sulphate ash value acid-insoluble & water-soluble ash value, loss on drying, and crude fiber content followed the guidelines outlined in the Indian Pharmacopoeia. The powdered fruit was extracted using various polar & non-polar solvents to assess the sequential extractive values <sup>(14)</sup>. The powdered material was analysed for fluorescence using several chemical reagents under the daytime and ultraviolet (UV) light (as 254 and 365 nm, respectively). The powdered form was viewed on a glass slide, and the different extracts were analysed using Whatman filter paper to absorb the extracts <sup>(16)</sup>.

### Preliminary phytochemical screening

For the initial phytochemical investigation, 100 g of powered sample were sequentially extracted using a Soxhlet apparatus with solvents such as examples P. ether (30°C-40°C), chloroform, ethanol & water. The extracted substances were then evaporated on a water bath, weighed, and their color and consistency were noted. These extracts were subsequently screened for the availability of several phytochemicals to identify potential phytoconstituents <sup>(14)</sup>.

### TLC identity test

For the TLC fingerprinting, ethanolic extracts of the fruits were analyzed. The solvent system was used toluene: acetone: formic acid in a 10:1:0.1 ratio. Anisaldehyde-sulfuric acid reagent served as the detecting agent, and the values of R<sub>f</sub> were evaluated. against the standard drug lupeol, which was dissolved in methanol <sup>(17)</sup>.

## Results

### Macroscopical characteristics

Fruits colour is reddish brown in colour. It has an unforgettable smell and a fragrant taste.. The fruit measures approximately 1-2 cm in length and about 1



cm in width. It has an elongated shape, tapering at both ends, and the cremocarp typically separates into individual mericarps. Each mericarp features fine longitudinal ridges, including five yellowish, straight

major ridges., interspersed with Minor ridges. that are flat & have prominent emergences. Both the entire cremocarp and isolated mericarps are connected to short pedicels. (Fig.1)



**Figure 1.1 a. Healthy plant b. Stem with flower c Fresh fruit d. Ripe fruits, e. Seed of *Mimusops elengi* L**

The fruits of the *Monoon longifolium* tree are berries that are smooth, ovoid to ellipsoid in shape, and have fleshy pulp. Small to medium-sized, evergreen tree with narrow, columnar crown and weeping branches. It typically grows up to 8 - 12 m in cultivation, but can reach 20 m in the wild. When immature, the fruits are yellowish green, but ripen to a purplish black color. The

fruits are about 2–2.5 cm long and 1.5 cm wide. The fruits grow in clusters of 10–20. Each fruit contains a single, large, light brown seed that is ovoid to ellipsoid in shape. The seed has a curved, longitudinal groove along its surface. The fruits are eaten by birds and fruit bats, which help to disperse the seed (Fig. 2)



**Figure 1.2 a. Healthy plant b. Stem with flower c Fresh fruit d. Ripe fruits, e. Seed of *Monoon longifolium* Sonn.**

### Microscopic characters

A transverse section of the fruit displays a pericarp made up of the exocarp, mesocarp, and soft endocarp. Notably, secretory tubes bordered with 5-7 epithelial cells exist. The mesocarp has a large parenchymatous zone, with most cells carrying masses of rubber-like

material.

The testa measures 1-1.5 mm thick and is divided into five circles. The mesocarp has many vascular bundles. The walls of the endocarp cells are thick, and the seed is encased within them. A thin perisperm splits the testa from the endosperm. The walls of cotyledonous cells and endosperm are thin.(Fig. 2 abc)

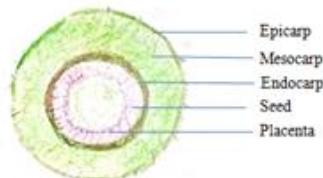


Figure 2 a. T.S of *Mimusops elengi* fruit (Cotyledons)

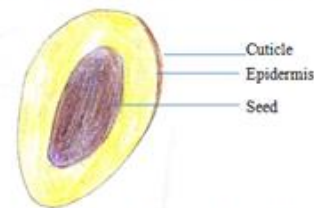


Figure 2 b. L.S of *Mimusops elengi* fruit

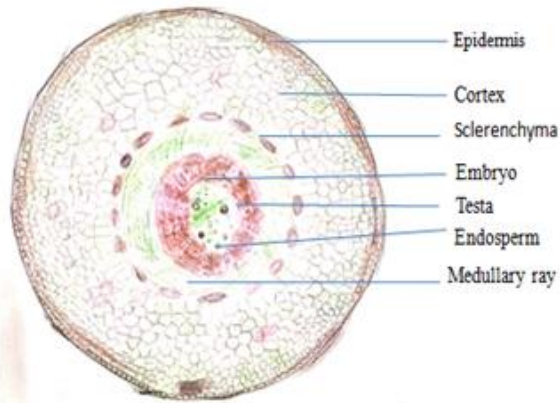


Figure 2 c. T.S of *Mimusops elengi* fruit

The transverse section of *Monoon longifolium* Sonn the pedicel shows a single layered epidermis covered with a large number of branched and unbranched trichomes, followed by cortex constituting 6–7 layers of collenchymatous cells. The pericycle shows the presence of pericyclic fibers with intervening parenchymatous cells, whereas the central region represents a continuous narrow band of phloem encircling the xylem beneath which is a ring of intraxylary phloem. The centre most region is consist of

hollow pith surrounded by parenchymatous cells with a few thick walled lignified fibers towards the intraxylary phloem.

The transverse section of fruit shows the presence of exocarp which represents a single layer while mesocarp shows a wide zone of parenchymatous cells with strong cellulose thickening. Figure 3.c Microscopical characters of pedicel and calyx of fruit of *Monoon longifolium* Sonn. cellulose thickening. The endocarp is similar to that of exocarp but at some places the cells are flattened and collapsed.

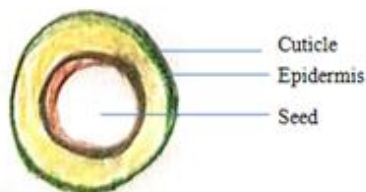


Figure 3 a. T.S of *Monoon longifolium* Sonn fruit (Cotyledons)

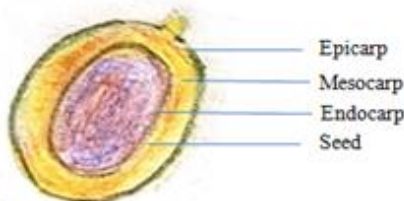


Figure 3 b. L.S of *Monoon longifolium* Sonn fruit

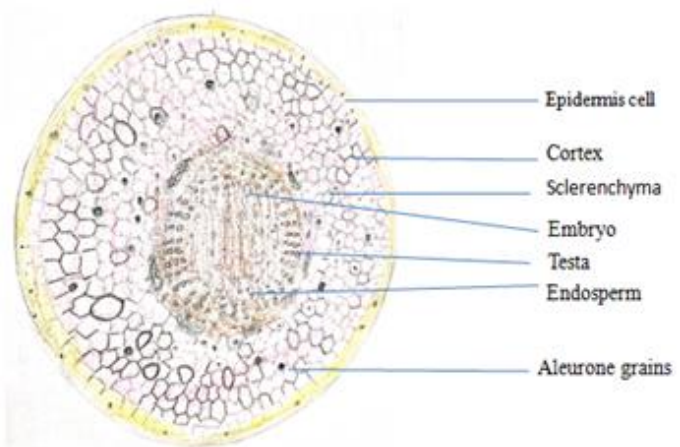


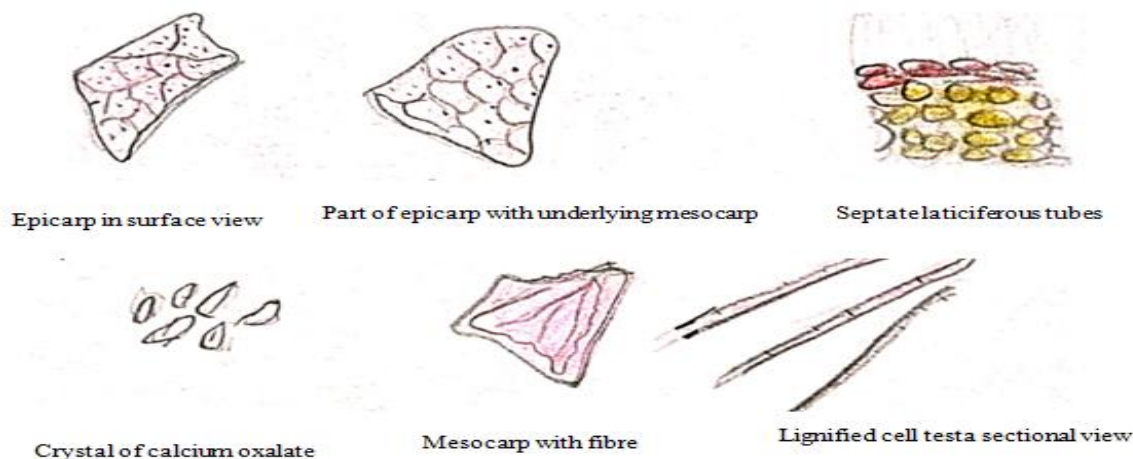
Figure 3 c. T.S of *Monoon longifolium* Sonn fruit



**Powder characteristics**

Microscopic study of *Mimusops elengi* L fruits the powder reveals the appearance of epicarp, part of

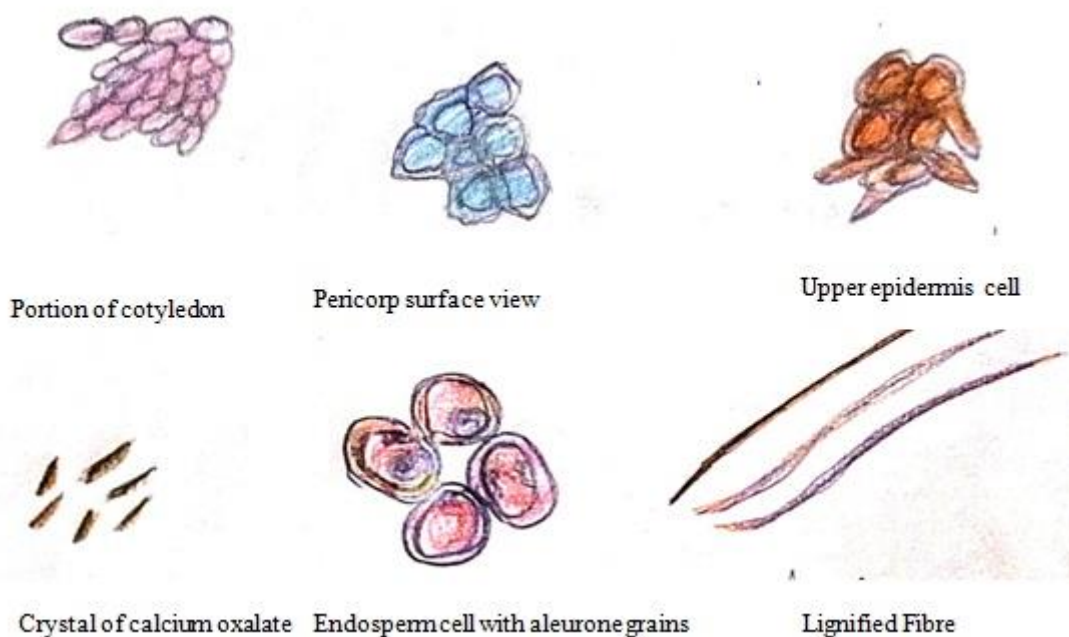
epicarp with underlying mesocarp, crystal of co-oxalate, fragments of fibers, sclerides, lignified cell testa. Additionally, it contains parenchymatous cells, as well as spiral and scalariform vessels.



**Figure 4 Diagnostic characters of powdered fruit of *Mimusops elengi* L**

The powder characteristic of the fruits of *Monoon longifolium* Sonn is demonstrated in Figure 5, which shows a large number of parenchymatous cells of

cotyledons, fragments of pericarp showing parenchymatous cells, thick walled endosperm cells showing aleurone grains, epidermal cells with unicellular covering trichomes. Crystal of co-oxalate and few xylem vessels with spiral thickening



**Figure 5. Diagnostic characters of powdered fruit of *Monoon longifolium sonn***



### Physico-chemical parameters

The physicochemical properties of dried *Mimusops elengi* L fruits, including extractive values for petroleum ether, chloroform, alcohol, and water. Ash value, acid-insoluble ash, water-soluble ash, loss on drying and foreign matter, are reported in Table 1.

Table.1 Quantitative standards of powdered fruit of *Mimusops elengi* L and *Monoon longifolium* Sonn.

Parameter	Limits (% w/w)	
	<i>Mimusops elengi</i> L	<i>Monoon longifolium</i> Sonn.
Foreign organic matter	1.4%	1.6%
Loss on drying	13.02%	12.6%
Swelling index	7.1%	7.3%
Total ash value	4.25%	4.45%
Acid insoluble	0.86%	0.96%

Water soluble ash value	1.7%	1.8%		
Sulphated ash value	0.96%	0.93%		
Extractive value				
	Cold extraction	Hot extraction	Cold extraction	Hot extraction
Petroleum ether extractive value A	1.5%	2.2%	2.1%	2.5%
Chloroform extractive value B	1.8%	2.4%	2.2%	2.6%
Ethanol extractive value C	4.8%	5.5%	4.8%	8.5%
Water extractive value D	4.5%	3.5%	5.5%	6.5%

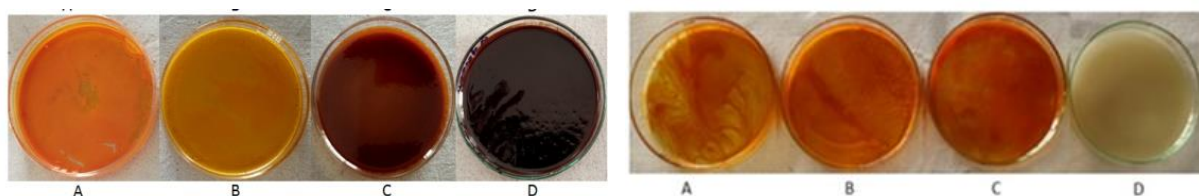


Figure 6 a. Cold and Hot Extraction of *Mimusops elengi* L



Figure 6 b Cold and Hot Extraction of *Monoon longifolium* sonn. fruit

### Fluorescence Analysis

Fluorescence analysis was carried out in a variety of solvents under both normal and UV light (at 254 & 366 nm). It was discovered that the pH values of the 1% and

10% water solutions were, respectively, 5.90 and 5.45. are reported in Table 2.



**Table 2 Fluorescence analysis of powdered fruit of *Mimusops elengi* L**

Treatment of powdered <i>Mimusops elengi</i> L fruit	Florescence observed		
	Day Light	UV 254nm	UV366nm
Drug p/w as such	Reddish brown	Light Green	Dark Green
Acetone	Dark Reddish brown	Dark Green	Greenish Black
NaOH in Methanol	Reddish brown	Green	Black
Ethanol	Reddish brown	Light Green	Dark Black
Toluene	Reddish brown	Green	Black
Conc. Sulfuric acid	Dark Brown	Black	Black
Nitrobenzene	Green	Black	Black
Ferric chloride	Green	Black	Black
Methanol	Reddish brown	Green	Greenish Black
Ethyl Acetate	Reddish brown	Green	Greenish Black
Distilled Water	Reddish brown	Green	Greenish Black
HCl	Dark Reddish brown	Greenish Black	Black
Picric Acid	Light Reddish brown	Dark Green	Black

**Table3. Fluorescence analysis of powdered fruit of *Monoon longifolium* Sonn. fruit**

Treatment of powdered <i>Monoon longifolium</i> sonn. fruit	Florescence observed		
	Day Light	UV 254nm	UV366nm
Drug p/w as	brown	Light	Dark Green

such		Green	
Acetone	Dark brown	Dark Green	Greenish Black
NaOH in Methanol	Dark brown	Green	Black
Ethanol	Reddish brown	Light Green	Dark Black
Toluene	Reddish brown	Green	Black
Conc. Sulfuric acid	Dark Brown	Black	Black
Nitrobenzene	Green	Black	Black
Ferric chloride	Green	Black	Black
Methanol	Reddish light brown	Light Green	Greenish Black
Ethyl Acetate	Reddish brown	Light Green	Greenish Black
Distilled Water	Light brown	Light Green	Greenish Black
HCl	Dark brown	Greenish Black	Black
Picric Acid	Light Reddish brown	Dark Green	Black

#### Preliminary phyto-chemical screening

An initial phytochemical analysis of the petroleum ether, chloroform, ethane, and water-based extracts disclosed the presence of tannins, flavonoids, glycosides, proteins, Carbohydrate, amino acids (Table 4).

**Table4 Preliminary phyto-chemical screening of various extracts fruit of *Mimusops elengi* L and *Monoon longifolium* sonn. Fruits**

S. No	Tests	<i>Mimusops elengi</i> L (A) and <i>Monoon longifolium</i> sonn. Fruits (B)							
		Pet ether extract		Chlorof orm extract		Metha nol extract		Aqueo us extrac t	
		A	B	A	B	A	B	A	B
1.	Alkaloid s Test	-	-	+	+	+	+	-	-
	Dragandr off	-	-	+	+	+	+	-	-



	Hagers Wagners Mayers	-	-	+	+	+	+	-	-
2.	<b>Carbohy drate test</b> Fehling test Benedict test Molish test	-	-	-	-	+	+	+	+
3.	<b>Glycosid es test</b> Legal test Baljet test Killer killani Bontrage r's test	-	-	-	-	+	+	+	+
4.	<b>Tannins test</b> Gelatin solution Catechin	-	-	+	+	+	+	-	-
5.	<b>Test for Sterols</b> Salkowas ki test Liberma n buchards test	-	-	-	-	-	-	-	-
6.	<b>Flavonoi ds</b> Shinoda test	-	-	+	+	+	+	+	+
7.	<b>Test Protein and amino acid</b> Ninhydi n test Biuret test Xanthopr otic test	-	-	+	+	+	+	+	+

	Millons test								
8.	<b>Phenolic test</b> Lead acetate Gelatin Ferric chloride	-	-	-	-	+	+	+	+
9.	<b>Saponin test</b> Foam test	-	-	-	-	-	-	-	-

### TLC

TLC fingerprint of different solvents like ethanolic extracts of fruits were showing (Figure3).The lots of spots, colour and Rf values of TLC finger prints were recorded (Table 4)

**Table 5. TLC fingerprints of different extractives of *Mimusops elengi* L fruits**

Extracts with various solvent	No. of spots	Colour of spot	R <sub>f</sub> values
Ethanol	2	i) Light Blue ii) Light green	i) 0.64 ii) 0.52
Lupeol (standard)	1	Light blue	0.64

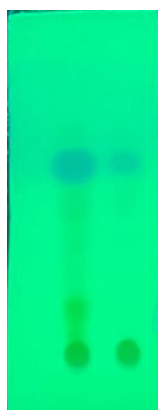


**Figure 7a. TLC fingerprints of different extractives of *Mimusops elengi* L fruits**



**Table 6. TLC fingerprints of different extractives of *Monoon longifolium* Sonn. fruit**

Extracts with various solvent	No. of spots	Colour of spot	R <sub>f</sub> values
Ethanol	2	i blue	i 0.64
		ii light green	ii 33
Lupeol (standard)	1	Blue	0.64



**Figure 7 b. TLC fingerprints of different extractives of *Monoon longifolium* Sonn. Fruit**

### Discussion

The fruits of *Mimusops elengi* L and *Monoon longifolium* Sonn. were analyzed using a range of techniques. A macroscopic examination was conducted to assess the morphological and organoleptic properties, providing qualitative insights into the fruit. Microscopic examination was used to identify the histological profile, serving as diagnostic parameters. Analytical methods such as extractive value determination, ash content measurement, loss on drying, fluorescence analysis of the fruit extract was also performed. The values of extractive analysis were calculated using on air-dried powdered fruits, indicating the quantity & nature of soluble phytochemicals in the extracts. Fluorescence analysis was carried out on powdered

fruits in different solvents under both normal & UV light to detect fluorescent compounds. Additionally, TLC was employed for the preliminary division and identification of plant phytochemical.

### Conclusion

Phytochemical standardisation of plant materials is essential for investigating their pharmacological properties. The current study focusses on the pharmacological and phytochemical properties of *Mimusops elengi* L. and *Monoon longifolium* Sonn. fruits. Before proceeding with toxicological and pharmacological studies, it is critical to assess these factors to ensure that customers obtain medication that is pure, safe, potent, and effective. The results show that standardisation and preliminary phytochemical screening of *Mimusops elengi* L and *Monoon longifolium* Sonn. fruits resulted in a set of standards that can be used to validate the identity, quality & purity of plant material in future investigations. This study represents a significant step, but further long-term research is needed to assess the therapeutic efficacy and toxicity of the fruits to establish them as a drug.

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