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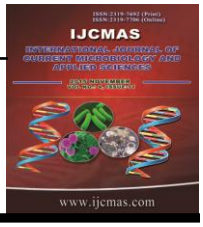


Original Research Article

Pharmacognosy Phytochemistry and Antibacterial Study of *Mimusops elengi* L.bark.

S. D. Salve and A. S. Bhuktar*

Department of Botany, Vivekanand Art, S.D.Commerce & Science College, Aurangabad.(M.S) India
**Corresponding author*

Keywords

Mimusops elengi, Pharma-cognosy, Sapotaceae

A B S T R A C T

The genus *Mimusops elengi* L. belongs to family sapotaceae found in India. Commonly known bakula, Mukula, Sindhugandha as in Sanskrit. Bark and fruits are used as medicine, bark extract is given orally to cure diseases of gums and teeth. The present study was carried out to investigate morphological, microscopical and phytochemical, antibacterial screening of bark revealed that the presence of Clindamycin, D-Alanine, N-propargyloxycarbonyl, isohexyl ester, 4HPyran- 4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl, Hexadecanoic acid,methyl ester, 2 Furancarboxaldehyde, 5-(hydroxymethyl), n Hexadecanoic acid, 6-Octadecenoic acid, cis-13-Octadecenoic acid,1,4,5,8-Dimethanonaphthalene-2,3diol The result study was useful for drawing pharmacognostic parameters also detected phytoconstituent may proceed to find a novel drug for this species.

Introduction

The genus *Mimusops elengi* L. belongs to family sapotaceae found in in tropical forests in South Asia, Southeast Asia and northern Australia it is an evergreen tree reaching a height of about 16 m (52 ft). *Mimusops elengi* is considered as a sacred plant among Hindus and has obtained important place in religious texts as well as in ancient Sanskrit literature. in literature review Bark extracts is used as a gargle for odontopathy (Chunekar *et al*,. 2002). It is valuable aid in dental ailments like bleeding gums, pyorrhoea, dental caries and loose teeth. In such conditions, the tender stems are used as tooth brushes or the powder of bark is used for cleansing the teeth. Bark works well as an antidiuretic (Koti and Ashok, 2010; Katedeshmukh *et al.*, 2010) The fruits are believed to be effective in preventing chronic dysentery and constipations. The aqueous concoctions of the fruits are believed to promote delivery during child birth. It prevents premature ejaculations The ripe fruit is supposed to be a general tonic and are used to decrease the pitta dosha (Nadkarni, 1976; Mitra,1981). Due to its diverse medicinal uses the present investigation of pharmacognsy standards,

phytochemical and antibacterial study was carried out

Morphology

Family Sapotaceae

Mimusops elengi L. Sp. Pl. 349. 1753; Cl. in Hook. f. Fl. Brit.India 3: 548. 1882; Cooke, Fl. Pres. Bombay 2: 155. 1958 (Repr.); Naik,Fl. Marathwada 1: 518.1998; Pradhan in Singh et al.,Fl. Maharashtra St.Dicot. 2: 294. 2001.

Vernacular Name

English : *Bullet-wood tree, Indian Medlar* Hindi: *Maulsari,* Urdu: *Kirakuli* Tamil: *Magizhamboo* Malayalam: *Ilanni* Bengali:

Bakul Marathi : *Bakuli* Kannada: *Ranjal* Gujarati : *Barsoli*

Description

Tree, much branched 5-8 m tall; bark dark gray fissured, scaly; branches compact, glabrous. Leaves arranged spirally alternate, ovate elliptic or oblong-elliptical, 4-12 x 2-5 cm, acute or rounded at base, margin entire and undulate, shortly acuminate; petioles 1-2 cm long with minute caducous stipules. Flowers axillary, solitary, fragrant, 1.5- 2 cm across; pedicels 7-18 mm long, pubescent. Sepals 7-10 mm long, brown-pubescent outside; 2 whorles of 4 outer ones ovate-lanceolate, inner ones lanceolate; Corolla creamy white, with a short tube and 8 lobes, each deeply divided into 3; lobes linear oblong, 8-10 mm long, about 24, in 2 series. Stamens 8, alternating with 8 staminodes. Ovary superior pubescent. Berries ovoid, 2 - 3 cm long, orange color when ripe. Seeds solitary, ovoid, compressed, brown.

Soil type: Black soil

Flowers and fuirts January to July.

Locality In all districts.

Materials and Method

Microscopy

Transverse section obtained by hand sectioning with help of blades. The permanent slides of these sections were made by using different grades of alcohol and xylol. While stains were used as saffranin and light green. Observations were under taken with light microscope and photographe using image processing software.

Maceratrion

The bark were studied by maceration techniques. The pieces of bark were boiled in Jeffery fluid (chromic acid 10% and nitric acid 10% in (1:1 proportion).The photographs were taken by Sony digital camera model Cybershot DSCH70.The dimensions of the cells were measured with the help of microscope and by micrometry.

Phytochemical Study

For phytochemical study plant extracts were prepared by Soxhlet extraction .

Preparation of Extract

25 gram of powder drug was extracted with methanol solvent using soxhlet extractor for 18 hours at 65 ºC. The extracts were filtered through a Whatman filter paper no. 42 (125 mm) and concentrated at 40 ºC by using an evaporator and stored in amber color bottle at 4 ºC. These extracts were send to *Sophisticated Analytical Instrumentation Facility, Indian Institute of Technology Bombay, Powai Mumbai, India.*

For GC-MS (Gas chromatography mass spectroscopy) for detection of phytochemicals and same extracts were used for antibacterial screening.

GC-MS Analysis

For each sample the analytical method is same while the oven temperature is variable, Injection port temperature is 250, Carrier gas is Helium 1ml /sec. Inter face temperature is 250, Ion source is at 200, Analysis was done by using E+ ionization with 70ev, The MS is AccuTOF GCV, Column through the sample passes is HP-5. The MS detection was completed in 36 minutes. The detection employed the NIST Ver. 2.0-year 2005 library.

Antibacterial Screening

Microorganisms

The three different species of bacteria used in the screening process were gram positive *Staphylococcus aereus* and gram negative *Pseudomonas aeruginosa* and *Escherichia coli*. a pure bacteria strains were supplied by the Government Medical college Aurangabad, Maharashtra.

Disc Diffusion Method

The bacterial activity was performed by Disc Diffusion method (Baur *et. al.*, 1996). The sterilized (autoclaved at 120 ºC for 30 min) Nutrient agar medium pour into sterile petriplates. Paper discs made using whatman filter paper no. 1 (6 mm diameter). Discs were sterilized and impregnated with 50 Micro liter plant extract and placed on seeded plate. Blank disc impregnate methanol used as a control these plate were incubated at 37 ºC for 24 hours to allow maximum growth of bacteria antibacterial activity of plant extract determined by measuring the diameter of zone of inhibition. It is expressed in millimeter the experiment carried out three times.

Results and Discusion

T.S of Bark

Transverse section of bark dark brown in color. Cork 5-6 layered composed of rectangular compactly arranged cell. Phellogen 2 - 3 layered. Cortex composed of phloem parenchyma irregular cells ca 18 - 20 × 20 -24 µm alternating lignified group of fibres ca 10 - 12 × 12 - 15 µm traverld by medullary rays composed of squarish cell ca 20 - 50 × 20 - 22 µm. Secondary phloem is a wide zone composed of sieve tubes, companion cells, phloem parenchyma alternating strands of phloem fibers by phloem rays. (fig-1)

Maceration

Parenchyma Cells

Cells are thick walled, squarish, rhomboid, reactangular, pits few-many,distribution all over the cell, cell wall continuous ranges 60-159 x 30-50 µm and average 140 x 50 µm (fig 2, Table no. 1).

Fibres Pitted

Fibre long, slender, tapering sharply pointed at both ends rarely forked at one or both ends, outline entire ranges 700 - 900 x 30 - 40 µm and average 864 x 32 µm (Table no. 2)

Tracheids

Long, slender, ends blunt or pointed at one or both fork at one end, pits few-many, elongate in one-many rows, alternate,

outline irregular ranges 700 - 1200 x 30 - 40 µm and average 964 x 34 µm (Table no. 3)

Sieve Element

Sieve element are short. Tapering horizontal at both ends,with few pits, pits are alternate, elongate ranges 300 - 500 x 40 -45 µm and average 360 x35 µm (Table no. 2) (fig-3).

GC-MS Analysis

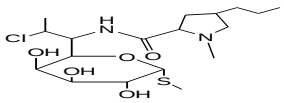
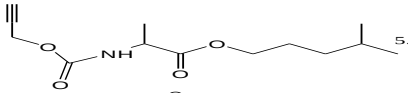
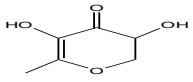
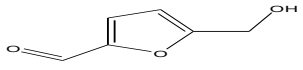
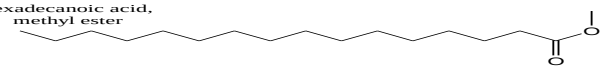
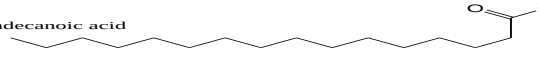
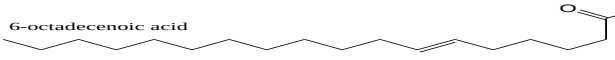
The results pertaining to GC-MS analysis led to the identification of number of compounds from the GC fractions of the methanolic extract of *Mimusops elengi* L. These compounds were identified through mass spectrometry attached with GC. The results of the present study were tabulated in Table 17. The compound prediction is based on Dr. Duke's Phytochemical and Ethnobotanical Databases. The results revealed that the presence of Clindamycin, D-Alanine, N-propargyloxycarbonyl, isohexyl ester, 4HPyran- 4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl, Hexadecanoic acid, methyl ester, 2 Furancarboxaldehyde, 5-(hydroxymethyl), n Hexadecanoic acid, 6-Octadecenoic acid, cis-13-Octadecenoic acid, Octadecanoicacid, Tungsten, dicarbonyl, tetramethyl ethanediamine 1,4,5,8- Dimethanonaphthalene-2, 3 diol (table-2)

Antibacterial Screening

Mimusops elengi L. showed 14 mm zone of inhibition against *Pseudomonas aeruginosa* and significant activity against *Staphylococcus aereus, Escherichia coli* (table-3)

In conclusion, the present investigation various standardization parameters such as morphology, anatomy, maceration, phytochemical study could be help in authentication of bark drug of *Mimusops elengi* L. the result of present study will also serve as reference material in preparation of monograph. However, isolation of individual phytochemical constituents may proceed to find a novel drug.

Table.1 Phytochemicals Present in Bark of *Mimusops elengi* L.

Name of compound	Structure of compound	Retention time	Molecular formula	Molecular weight
Clindamycin		5.9	$C_{18}H_{33}ClO_5N_2S$	424.18
Alanine, N-propargyloxycarbonyl, isohexyl ester		5.9	$C_{13}H_{21}O_4N$	255.15
4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl		7.2	$C_6H_8O_4$	144.04
2-furancarboxaldehyde, 5-(hydroxymethyl)		8.9	$C_6H_6O_3$	126.03
Hexadecanoic acid, methyl ester		19.4	$C_{17}H_{34}O_2$	270.45
n-hexadecanoic acid		19.6	$C_{16}H_{32}O_2$	256.42
6-octadecenoic acid		22.2	$C_{18}H_{34}O_2$	282.26

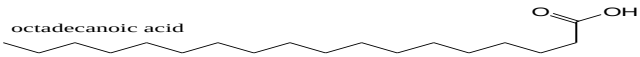
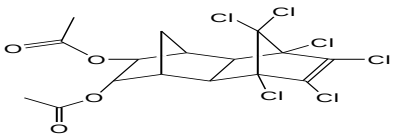
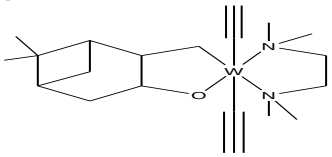
Name of compound	Structure of compound	Retention time	Molecular formula	Molecular weight
cis-13-octadecenoic acid		22.2	$C_{18}H_{34}O_2$	282.26
octadecanoic acid		22.5	$C_{18}H_{36}O_2$	284.27
1,4,5,8-dimethanonaphthalene-2,3-diol		31.7	$C_{16}H_{14}Cl_6O_4$	480.00
Tungsten, dicarbonyl, tetranethyl ethanediamine		31.7	$C_{18}H_{30}O_3N_2W$	472.27

Table.2 Dimensions of Parenchyma and fibres of bark of plant species

Mimusops elengi L. fruit methanol extract (**Zone of inhibition (mm)**)	*Pseudomonas aeruginosa*	*Staphylococcus aereus*	*Escherichia coli*	control
	14	7	8	-

Table.3 Antibacterial screening of selected plant part

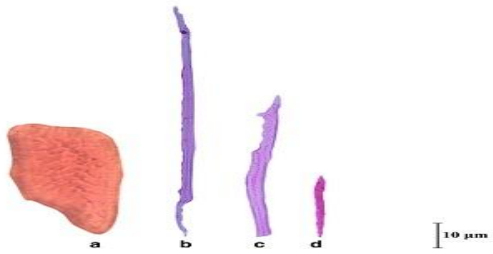
Sr no	Name of plant species	Plant part		Length (µm)		Width (µm)	
				range	average	range	average
1.	*Mimusops elengi* L.	Bark	Thick walled parenchyma cells	60-159	140	30-50	50
			Pitted fibre	700-900	864	30-40	32

Figure.1

Figure.2

fig–3

***Mimusops elengi* L.**



a) Parenchyma cells, b) Fibre, c) Tracheids, d) Sieve element.

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