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Review Article

CASE REPORT ON *MOCHARASA* (HAEMOSTYPTIC DRUG)- ACTION AND USES

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ABSTRACT

Medicinal plants are resources of newer drug evolution and form the basis of all alternative medicine system. *Mocharasa*-reddish brown colored secondary metabolite in the form of exudate from Silk - Cotton Tree (*Salmali malabarica)* and is in demand in pharmaceutical industries for preparation of formulations used for bleeding disorders. *Mochrasa* is one of source for the life saving drug and known by synonyms like "*Niryasa*, *Pichha, Pichhalsaar, Salmaliveshtaka, Mochsrava, Mochsaar* denoting its sticky characteristic. Their therapeutic uses are well described in Ayurvedic, Unani and Siddha literature in various bleeding disorders like menorragia, haemptysis, bloody dysentery, diarrhoea mainly. It has good potential of cooling, demulscent, haemostyptic and astringent nature. Due to its binding nature used to heal wounds, ulcers, inflammation and in skin disorders. It is well known for aphrodiasic action in traditional practices as well. It is mild in nature and can be used in pregnant women and children. In *Shodhana* process of *Panchkarma*, it is main content of " *Pichha basti* " which is given per rectal route which proves its mild astringent and styptic action. Main chemical constituents are L-arbanose, gallic acid, tannic acid with other alkaloids. Various formulations containing Mochrasa are *Sunisnaak Changeri Ghrita, Bilwaadi churna, Kutajastak avhleha, Sammangaadi Churna, Changeri Ghrita etc.* Various newer trials for antioxidant, analgesic, hepatoprotective action etc. are going on the basis of properties to revalidate the ancient knowledge. Here is an attempt to through light on collection process, purification and availability of raw drug as well extracts in market by collecting data from various sources on every aspect of *Mocharasa* and their therapeutic and folklore uses.

KEYWORDS: *Salmali malabarica*, Exudate, Astringent, Haemostyptic, Bleeding disorders.

INTRODUCTION

Ayurveda is a plant based health care system used since ancient times worldwide. About 80% of population rely on medicinal plants to cure various ailments. Medicinal plants are important source of evolution of new life saving drugs for the majority of the world's population. Natural products of plant origin are well known for potent pharmacological activities and all plants contain active chemical constituents and combination of secondary plant metabolites such as alkaloids, steroids, glycosides etc. Plants as medicine has been used for traditional healing remedies and the literature of Ayurveda, Siddha and Unani has explained the use of various parts of plants in different dosage forms for the various diseases. [1,2] *Mochrasa* is one among such drugs used as haemostyptic agent in different formulations indicated in bleeding condition and its therapeutic uses are described in various Ayurvedic treatise. It can be used in bleeding disorders like menorragia- bleeding uterine disorder, haemoptysis, influenza, acute dysentery, malena, Ulcers, wound, inflammation etc due to its astringent, haemostyptic, demulscent, cooling and binding properties. *Mocharasa* was also described as a good Aphrodiasic agent since ancient times.[29] Mochrasa is a secondary metabolite in the form of resin a sticky liquid which exudates from natural openings or opening made by insects on the lower part of stem of silk – cotton tree *(Salmali malabaria or Bombax ceiba. Salmali malabarica)* specially in summer season. [3,9] Here is an attempt to have a critical overview on *Mochrasa*, its collection process and traditional uses as well as therapeutic uses in nutshell.

Historical Background: *Salmali / Salmali Malabarica*

In *Rigveda*, *Salmali* wood is use to prepare a chariot during marriage ritual and consider as best among trees*. (R.V-10/85/20)*.[4] In "*Mahabharat*", it is related to that *'Pitamaha'* after creating the world, reposed it under the tree *'Salmali'*. In the *"Yajnavalkya*", it is mentioned. as it is one of the tree of the infernal regions. Also described in *Grhaya sutra, Vishnudharma Sutra* and *Atharva Parisista*.[3,4]

Habitat and Morphological Features of Source of *Mocharasa* [5-6]

Botanical name

Salmali malabarica (D.C) Schott & Endl. / *Bombax ceiba/ Bombax malabaricum* D.C

Family name: Malvaceae/ Bombaceae

English Name: Red Silk Cotton Tree)

Species: *Bombax ceiba* Burm. f.

Habitat: It is a tall lofty deciduous tree up to height of 30mt. With typical woody spines on trunk and branches. It is widely distributed throughout India, in Tropical and Subtropical forest up to an elevation of 1500mt. Tree are

leafless during winter month and flowers (fleshy cup-shaped reddish in color) appear during January- March.

Flowers: Ornithophilus, Crimson colored flowers.

Fruits: Oblong, rounded at base, 5-valved and lined with white silky hairs.

Seeds: Black or grey in color, smooth in touch and are embedded in long white wool.

Bark: Pale ashy to silvery grey in color colored armed with hard, sharp, conical prickles.

Leaves: Palmate type compound leaves and crowded at the ends of branches. They are abruptly digitate and glabrous. Leaflet 3-7,lanceolate type.

Part used: Resin, Flowers, Fruit, Root, Bark, Thorns

Salmali tree denoted by *Raktapushpa* (red color flowers), *Kanktaadhy* (prickles on bark of younger tree), *Tuulini* (fruits ruture and cotton like fibres resides inside), *Sthiraayu* (hard bark)[7,8]

Varieties: It is planted as an ornamental tree. In Bhavprakash samhita, *Salmali* have two varieties which are described as Salmali (*Salmali malabarica* DC) and other *Kuttasalmali* (*Ceiba pentandra* Linn.).[17]

Mocharsa

Mocharsa is sticky liquid exudate comes from fissure on bark of *Salmali* tree made by insects or due to other reason in summer season and get solidify due to atmospheric temperature.[9] "*Niryasa*" as its synonym indicates this nature of resin. Initially it is sticky in nature and dark reddish brown in color and then turns black when get solidify. Its synonyms "*Pichha"/Pichalsaar* " also suggest its sticky nature. Other synonyms are *Mochaahva, Salmaliveshtaka, Mochsrava, Mochaa, Mochsaar* described in various lexicons of Ayurveda.[7,10,18]

Classification of Mochrasa in Ayurvedic Treatise

Charak: *Acharya Charak* – describes 50 *Mahakashaya* as a group comprising ten drugs basically with same therapeutic action and availability of drugs in different regions. *Mochrasa* was classified under *Purishsangrahniya Mahakashya, Shonit-sthapan Mahakashya, Vedana-sthapan.* On the basis of *rasa* it is kept under *Kashya skanda* representing its astringent and cooling property.[11-12]

Purishsangrahniya Mahakashya: **(Anti-diarrhoeal action)**

The drug which prevents the repeated excretion of stools is known as *Purishsangrahniya*. It is mainly indicated in *Sannipatatisara* and *Grahani.* The anti-diarrhoeal concept according to Ayurveda is based comprised of two terms of *Grahi* and *Sthambhana.*

Grahi* and *Sthambhana: The drugs which acts as appetizer and digestive while absorbing the fluids is known as *Grahi.* The *Grahi* and *Sangrahi dravya* is predominant in *Prithvi* and *Vayu bhutas. Acharya shushruta* pointed out *Vayu bhuta* is responsible factor for *Drava soshana* while *Acharya Sharangdhara* consider *Ushna veerya* responsible for it. [13]

Shonit-sthapan Mahakashya: (Anti-haemorrhagic action)

The drugs which will rectify the vitiated blood and provides normalcy is known as *Sonitasthapana. Sonitasthapana* drugs acts as anti-haemorrhagic. Another term *Rudhira samsthapana* represents those drugs which acts as nourishing and haemetenic.[14]

Vedana-sthapan mahakashya: **(Anodynes)**

The drugs which is used to relieve the pain for particular part of body and which restores normal state is known as *Vedana-sthapan. Acharya Gangadhara* said *Vedana-sthapan* drugs will re-establish the lost sensation in the body. [13]

Sushruta Samhita (Acharya Sushruta)

Mocharasa was described under *Priyangvadi gana* having properties of *Pitta shaman* and causes *sthambhan*. Therefore indicated in condition of *Pakwa-atisara, Vrana* (promotes healing process) and *Raktpitta* like disorders of bleeding and can be useful for *Sandhan karma* in tissue injury cases ((joins the broken one or acts connective tissue binding agent) and acts as *Vrana Ropana drugs.*[15]

Astang Hridya (Acharya Vagbhata), Mocharasa no specific description.[16]

In Bhavprakash Nighantu[17] *Acharya Bhava mishra* grouped the *Mocharasa* under *Vataadi vargh.* Properties of *Mocharasa* are separately described from *Saalmali (Salmali malabarica)* which is source of *Mocharasa* as follows.

निर्यासः शाल्मलेः पिच्छा शाल्मलीवेष्टकोऽपि च |

मोचास्रावो मोचरसो मोचनिर्यास इत्यपि ||

मोचास्रावो हिमो ग्राही स्निग्धो वृष्यः कषायकः |

प्रवाहिकाऽतिसारामकफपित्तास्रदाहनुत् ||

In other lexicons of Ayurveda[18], *Mocharasa* was described among various groups (*Varga*) like

Nighantu/Lexicons of Ayurveda	***Mochrasa***
Saushrut Nighantu	*Priyangvadi Gana*
Astangh Nighantu	*Priyangvadi Gana*
Madanaadi Nighantu	*37 th. Gana*
Dhanwantari Nighantu	*Aamradi Varga*
Sodhal Nighantu	*Aamradi varga*
Madanpala Nighantu	*Vaatadi varga*
Kaiyadev Nighantu	*Aousadha varga*
Bhavprakash Nighantu	*Vaatadi varga*
Raaj Nighantu	*Saalmaliyadi varga*
Nighantushesh	*Vriksha kanda*
Nighantu Adarsh	*Saalmalyadi varga*
Priya Nighantu	*Dravyadi varga (Sthambhan)*
Raaj Vallabha Nighantu.	*Vrikshadi varga*

Properties And Action[19]

Rasa : Kashya

Guna : Laghu, Snigdha, Picchila

Virya : Sita

Vipika : Katu

Karma : Sothahara, Dhaprasamana, Pittahara, Vatahara, Kaphavardhaka, Shtambhan

***Salmalica Malabarica* (*Mocharasa*)[17,20]**

Literature	*Rasa*	*Guna*	*Veeya*	*Vipaka*	*Karma*
Guna ratan mala	*Kashya*	*Snigdha*	*Sheet*	*Madhur*	*Grahi*
Bhavprakash Nighantu	*Kashya*	*Snigdha*	*Hima*	-	*Grahi, Vrishya*

Chemical Constituents: Hydrolysis of gum yields arabinose, galactose, galacturonic acid, rhamnose and partial hydrolysis yields 6-o-(*β*-D-galactopyranosyl-uronic acid)- D-galacto Pyranose; 2,3,4,6-tetra-,2.6-di and 2,4-di-o-methy-L-arabinose. Methylated S. malabaricum gum on hydrolysis has been found to yield 2,3,4,6-tetra-,2,6-di-,and 2,4-di-o-methyl-D-galactose and 2,3,5-tri- and 2,5-di-o-methyl-L-arabinose.[21] Resin contains 2-9% mineral matters, gallic and tannic acids, yields L-Arbinose, D-Galactose, D-Galaturonic Acid, D-Galatopyranose. [22,29] The alcoholic and water extracts have alkaloids, flavonoids, glycosides and tannins.[23].

All parts of *Salmali malabarica* have active constituents like Betasistosterol and its Glucosides. Flowers-hentriacontane, hentriacontanol. Seeds, bark and root bark- lupeol, root bark in addition gave 7-hydroxycadalene. Younger root contain more sugars and peptic substances. They contain mucilage, starch, mineral matter, tannins and non tannin.[24,29]

Folklore uses: there is traditional use of oral intake of Mochrasa to treat worms and diarrhea in Nawalparasi district of central Nepal recorded by Anti-diarrheal Field observations on the use of medicinal plants in traditional health care systems.[25]

Various parts of *Salmali* like juices of leaves, root, flowers, seeds, bark or thorns are used as traditional healing remedies as mentioned below.[26]

Abortifacient: Seed powder of *B. ceiba* and *Hing* (*Ferula foeitida*) are used.

Aphrodisiac agent: Fresh stem bark of *B. ceiba,* to cure gonorrhoea, impotency, spermatorrhea, sterility, nocturnal emission and leucorrhoea. It is also prescribed for increasing sperm in semen and to act as aphrodisiac.

Impotency, asthma and small-pox boils: Powder of stem prickles was used to treat asthma and taken with a glass of cow's milk/fresh water. Seed paste prepared in water was applied on small-pox boils.

Leprosy: Seeds and roots were used in the treatment of leprosy.

Anti-inflammatory agent in Muscular Injury: barks and roots were used to treat muscular injury

Wound healer: bark is used externally for cattle wound in Mysore and Coorg of Karnataka.

Anti-diarrheal agent: Decoction of the leaves of *B. ceiba* and the bark of *Mangifera indica* was taken orally to treat diarrhea.

Antihelminthic drug: Flowers were fed to the animal as anthelminthic agent.

Pimples and skin disease: Concentrated bark decoction for applications in the treatment of skin diseases and in folk cosmetics. Fresh bark of B. ceiba was crushed and applied topically on pimples, carbuncles and boils.

Leucorrhoea: Bark powder was boiled with water and given orally to treat leucorrhoea. birth control, sexual diseases and tonic, Impotency, asthma and small-pox boils.

Therapeutic Uses: In Ayurvedic Literature[27]

1.Intrinsic haemorrhage

Mocharasa is used in combination with *Chandan* (*santalum album)* in various forms.

In haemorrhage from rectum, milk with boiled *Mochrasa* is efficacious.

In epistaxis, *Mocharasa* with other drugs to snuff.

2. Bleeding Piles

Mochrasa with *Samanga, Lodhra, tila, Chandan* and *Niloptpala* with goat's milk followed by diet of *Sali* rice with milk is advised.

Mochrasa is main content in *Sunisnaak changeri ghrita* as *Kwath dravya* and *Kutajadi rasakriya.*

3. In Diarrhoea

Along with *Lodhra, Samanga, Kamala* and *Utapala* mixed with honey and taken with rice water.

Atisara: *Chakra dutta* indicated internal use of *Mocharasa* in all type of *Atisara* as content of *Bilvadi churna, Kutajastak Avleha.* etc

In *Raktaatisara* in *Samanagaadi churna, Changeri ghrita.*

In *Sarsha Pichha basti*, *Mocharasa* is used.

4. *Praameha*: Along with *Priyangavadi gana* drugs is advised

5. Sinus: It is one ingredient in *Kumbhikady Taila.*

6. *Garbhasrava, Gabhashool, Pradar roga*: *Mocharasa* as content in *Hriberadi kwatha* in *Garbhani roga adhikar in Bhaishajaya Ratanawali* indicated[28]. In *Pushyanaga churna Mocharasa* as a content used. Also in various formulations for *Pichhu* it can be used.[28]

***Pichha Basti*:** In *Charak chikitsa sthana* versus -14/228, as content of *Pichha basti* used in *Pravahika, Gudabhransha, Raktashrava, Jwara nashak, Rakta arsa.* As a content of " *Pichha basti* " given by rectal route proves its mild nature and astringent with styptic action*. Picha basti* also indicated for *Parikartika* treatment in *Vamanvirechana vyapada* of *Sidhi sthana.*

In Unani Medicine, due to hot and dry temperament of gummy exudates of *Salmali* known as *Mochrasa* is employed in disorders occurring due to cold and moist

temperament. It is used in phlegmatic cough due to respiratory disorders. Tooth powder containing *Mochrasa* is beneficial for loosen teeth and bleeding gums. *Mocharasa* powder along with sugar is given to cure diarrhoea in children. It also cures dysentery and other gastro intestinal track disorders with loose motion. It has astringent action on uterus if kept in vagina as a pessary, thus used in leucorrhoea. To reduce or stop puerperal discharge and menorrhagea. *Mochrasa* is used with *rasot* orally. Nocturnal enuresis of children can be treated by this drug. *Mochrasa* alone or mixed with other drugs is used to treat spermatorrhoea and urinary incontinence. It cures the stomatitis if applied locally. It improves the skin complexion when used as face wash. Bark purifies the blood and diminishes the burning sensation. For this purpose its decoction is taken internally and paste is applied as plaster.[30]

Material and Methods

In order to collect original sample of raw *Mocharasa* small study performed to observe the process and collect authentic sample from relevant sources. Data is collected on basis of observation and available literature from various journals and web resources.

Collection Of Original sample of *Mochrasa*

Mochrasa is dried form of exudate which oozes out from the opening on lower part of stem and branches of *Salmali malabarica* (Silk Cotton Tree).

Procedure

Liquid exudates or Resin of *Salmali malabarica* oozes out after 2-3months period of time by making deep vertical or slightly tilt incisions made to form artificial opening on bark of *Salamali* tree during summer season and which later on get dried up to obtained reddish brown colored nodular solid mass of *Mochrasa*. Dried sample collected from the bark after 2-3 months by removing it from stem bark**.** (Fig. No.1, 4.A, 4.B)

Site for Observation and Collection: (Fig. No.2)

Location: Bank of the River Ganga in Hardwar region.

Tress are mostly located at the Bank of River Ganga of Hardwar region (mostly trees are planted by Forest Department of Hardwar) but found throughout India up to the altitude of 1300 A.S.I and associated with foot hills and valleys. It is Deciduous tree with buttress at base of trunk and leaves are digitate with 5-7 leaflets and becomes leafless during winter month, flowers (fleshy cup- shaped reddish in color) appear during January-March.

Time of incision: Blunt incision penetrating to inner bark (cortex) with help of axe was done in the Month of April - May (Fig No.2.A).

Time of collection : Two month apart from incision time

Required Time period for collection : 3 to 4 Months

Precaution : Continuity of transportation of Nutrition via vascular bundles should not be hampered in order to prevent damage to trees.

Quantity of resin

Tiny droplets to solid mass of 5- 6gms depends on availability of water for Photosynthesis, Age of tree, Sunlight exposed area and Climatic condition of the area.

Nature of resin

Reddish brown, jelly like liquid (secondary metabolite) secreted from broken inner bark (secondary xylem-phloem) which get solidify due to oxidation process into blackish brown in color. Impurities may be present like bark of tree, insects infestation, soil particles etc. (Fig.No.3)

Market Survey

Raw drug bought from the market of Hardwar at rate of Rs.350/- per Kg and was sold openly. These samples are genuine, similar to original drugs but there is slight variation in color and it have some adulterants which are physically recognizable.(Fig No.4)

In Phytochemical Industries - (Extracts) (Fig No.6)

Mochrasa with assurity of 10-20% other contents, light brownish in color available at rate of Rs.2500/- per kg Extract of drug containing active principles are available for the drug preparation in industrial use but they lack counter balancing active principles of the whole drug and may produce side effects which is reason behind its drawback from market. Limitation : Spoiled if exposed to air by absorbing water so should be used instantly.

Identification Features[31]: (Organoleptic study- Fig.3)

Physical Appearance: Nodular mass of agglutinated, round or irregularly shaped tears up to 4cm across.

Color : Outer surface of tear is opaque, brick red to reddish brown in color resembling shellac.

Nature: Resin swell to large size on soaking in water and get soften and sticky in nature but no completely dissolve in water.

Odor: Faint or no smell

Taste: Astringent and Mucilaginous.

Purification Method: Solid resin before using for drug preparation dissolved into water and filter it out through filter paper. (Fig No.5)

Production, Availibility and Trade[31]: Commercial supply was coming from Bihar and West Bengal. The drug market handling bulk supply from region of Kolkatta, Patna, Mumbai and Delhi.

Adulterant –substitute[31,32]

Moringa oleifera, Butea monosperma and Pistacia lentiscus.

B. malabaricum gum can be substituted for gum tragacanth

Evidences from Ayurvedic Literature

Some Formulations: Main Formulations containing Mochrasa are *Sunisnaak Changeri Ghrita, Bilwaadi churna, Kutajastak avhleha, Sammangaadi Churna, Changeri Ghrita, Salmali ghrit, Kamadenurasa, Suadarialpa, Chandanaasava, Abhayarista* etc. in different Ayurvedic treatise which are widely used.

Formulations and Therapeutic Use in Ayurveda.

Table 1: In Charak Samhita - Chikitsa Sthana

Indication	Use/Formulation	Use –Internal /external	Literature Reference
Jwara, Daaha	*Chandanadi tail*	Ext.	Ch.Ci-3/258
Raktpitta	*Kiratiktadi churna*	Int.	Ch. Ci-4/76
Nasagata Raktpitta	*Avapida Nasya*	Int.	Ch. Ci -4/99
Arsa	*Kutajadiraasa kriya*	Int.	Ch. Ci -14/188
Rakta Arsa	*Churna paan*	Int.	Ch. Ci-14/192
Rakta Arsa	*Churna paan*	Int.	Ch. Ci-14/202
Jwara/Raktasrawa	*Pichha Basti*	Int.	Ch. Ci -14/225
Arsa, Raktasrava, Maandagni	*Sunnisnaka Changeri Ghrita*	Int.	Ch. Ci-14/237
Grahni	*Grahninasak Yavagu*	Int.	Ch. Ci-15/113
Vrana	*Avapidaan*	Ext.	Ch. Ci-25/62
Urusthambha	*Urusthambha nasak yoga*	Int.	Ch. Ci-27/29
Yoni dosha, Raaju dosha, Yoni srava	*Pushyanaag churna*	Int.	Ch. Ci-30/91
Yoni picchilta	*Paalashadi varti*	Int.	Ch. Ci-30/122

Table 2: *Sushruta samhita -Purvardha*

Indication	Use/Formulation	Use-Internal/External	Literature Reference
Picchila dravya	*Prapeedan*	Ext.	S. Su-37/11
Pramehanasak yoga	*Prameh*	Int.	S.Ci-11/10
Salyaj Naadi	*Vrana taila paak*	Int.	S.Ci-17/28

Table 3: Ashtanghridya

Indication	Use/Formulation	Use-Internal /External	Literature reference
Rakta-atisaradi roga	*Leha*	Internal	A.H-8
Pitta- atisara	*Paana*	Internal	A.H.-9/63
Yoni dosha, Raajo dosha	*Pushyanaga churna*	Internal	A.H-34/46

Pharmacological Activities Revalidating

Traditional Uses:[22,26]

Analgesic activity

Mangiferin obtained directly from methanolic extracts of *B. ceiba* leaves demonstrated strong antioxidant activity using DPPH assay. Mangiferin showed hepatoprotective activity against carbon tetrachloride induced liver injury further supporting the free radical scavenging property in the in vivo system. Extracts displayed significant analgesic effect in acetic acid-induced writhing and hot plate tests in mice. Using naloxone, it was revealed that plant extract induced analgesia was independent of the opioid receptor. Mangiferin demonstrated significant interaction with the receptor at a peripheral site, with a slight contribution at the neuronal level.

Antioxidant activity

The antioxidant activity of a methanolic extract of *B. ceiba* was evaluated using several antioxidant assays, in terms of its: (i) ability to scavenge DPPH (1, 1-diphenyl-2-picrylhydrazyl) and hydroxyl free radicals; (ii) action against lipid peroxidation (in rat liver microsomes and soy bean phosphatidylcholine liposomes), induced by ascorbyl radicals and peroxynitrite; and (iii) effect on myeloperoxidase activity. Caffeine and gallic acid were quantified by high performance liquids chromatography (HPLC). Total free radical scavenging activity of each ingredient was investigated by 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging method and the values were compared with phenolic and gallic acid present in each plant

Antimicrobial and antibacterial activity

Plant extracts (methanol and aqueous) were assayed for their activity against multi-drug resistant Salmonella typhii. Strong antibacterial activity was shown by the methanol extracts of *Salmalia malabarica*. Plant or plant parts were collected, dried, homogenized and extracted in two organic solvents viz. methanol and acetone. The antibacterial activity against Klebsiella pneumoniae was done by agar disc diffusion method. The activity was compared with standard antimicrobials Amikacin and Piperacillin.

Antipyretic

The methanol extract of *Bombax malabaricum* leaves was investigated for the antipyretic activity in rats. MEBM possessed significant antipyretic activity in Baker's yeast-induced pyrexia. Phytochemical tests showed the presence of steroids, carbohydrates, tannins, triterpenoids, deoxy-sugars, flavonoids and coumarin glycosides.

Aphrodiasic

The aphrodisiac activity of *B. ceiba* root extract was investigated. The extract was administered orally by gavage for 28 days. Mount latency (ML), intromission latency (IL), ejaculation latency (EL), mounting frequency (MF), intromission frequency (IF), ejaculation frequency (EF) and post-ejaculatory interval (PEI) were the

parameters observed before and during the sexual behavior study at day 0, 7, 14, 21, and 28 days. The extract reduced significantly ML, IL, EL and PEI ($p < 0.05$). The extract also increased significantly MF, IF and EF ($p < 0.05$). These effects were observed in sexually active and inactive male mice.

RESULT

Mochrasa is therapeutically important drug used in various important formulations like *Sunisnaak Changeri Ghrita, Bilwaadi churna, Kutajastak avhleha, Sammangaadi Churna, Changeri Ghrita, Salmali ghrit* used in bleeding disorders to treat bleeding haemorrhoid, menorrhagia due to antihemolytic activity by phenolic compounds like flavonoids which neutralize the free radicals causing haemolysis. Other bioactive components like flavanoids, phenols and tannin protect the erythrocytes membrane from destruction and lysis. Classical manual method of collection are used. In Market it is available with adulterants but resembles with genuine sample in organoleptic characters. There is no need of specialized methods of purification for therapeutic use. Collection of original sample of *Mochrasa* shows it is mucilagineous liquid exudate which get solidify into irregular nodular agglutinisied reddish color mass and quantity depends on nutrition and water supply to Salmali tree, source of *Mochrasa*. There is need of further research on other bioactive components for more pharmacological activities and uses.

DISCUSSION

An extensive literature survey has revealed that it has a long history of traditional use for a wide range of diseases. Much of the traditional uses have been validated by scientific research on pharmacological actions like antioxidant, analgesic, antibacterial- antimicrobial, antipyretic activity and aphrodiasic nature. The traditional manual method for collection is used basically to obtain from natural opening or artifically induced opening for secretion of exudate (secondary metabolite -*Mocharasa*) from vascular tissues specially in summer season when transportation of nutrition occurs at most. Fresh exudates is red color in liquid form which solidified and turned to reddish brown color. There is difference in market sample and original sample on the basis of organoleptic characters like nodular agglutinised irregular shape, reddish-brown color, no preculiar odour and astringent in taste. Purification is required to remove soil particles, bark pieces and insect infestation by dissolving in water to obtain sticky mucilaginous liquid form of *Mochrasa* for formulation preparation. For pharmaceutical and industrial use extracts in form of fine powder are available. Therapeutically used internally in various bleeding disorders with other haemostatic drugs in pregnant ladies and children. "*Pichha Basti"* given per rectal route as styptic agent proves their mild nature and astringent property. In bleeding disorders, all types of diarrhea and *Rakta –Arsha mocharasa* have significant haemostatic action due to astringent. The effective antihemolytic activity is due to ability of phenolic compounds like flavonoids, to neutralize the free radicals causing haemolysis. Other bioactive components like flavanoids, phenols and tannin protect the erythrocytes membrane from destruction and lysis. Therefore it is used widely to treat dysentery, menorrhagia, skin disorders, haemorrhoids, boils, leucorrhoea, internal bleeding, chronic inflammation, ulceration of bladder and kidney, gonorrhea, haemoptysis, influenza, and catarrahal affections bleeding piles. The pharmacological activities are reported in the present review confirm the therapeutic value of *Mochrasa* and data from Ayurvedic literature supports well the medicinal use of *Mocharasa.* Various formulations containing *Mochrasa* are *Sunisnaak Changeri Ghrita, Bilwaadi churna, Kutajastak avhleha, Sammangaadi Churna, Changeri Ghrita, Salmali ghrit, Kamadenurasa, Suadarialpa, Chandanaasava, Abhayarista* etc. are widely used.

CONCLUSION

By analyzing the folklore uses in traditional health care system and literature of Ayurveda and Unani, it can be said that – *Mochrasa* is a secondary metabolite in the form of resin - a sticky liquid which exudates from natural openings or artificial opening made by insects on more sun exposed area on the lower part of stem of *Salmali malabaria or Bombax ceiba* specially in summer season. *Mocharasa* is a drug having therapeutic value in bleeding disorders (menorragia- bleeding uterine disorder, haemoptysis etc), in treatment of gastrointestinal disorders (acute dysentery, malena etc) and in urogenital disorders due to their astringent, haemostyptic, demulscent, cooling and binding properties. *Mocharasa* was used as a good Aphrodiasic agent in traditional practices. "*Pichha Basti"* via rectal route used as styptic agent and internal use in pregnant ladies and children due to significant haemostatic action (astringent and binding nature) in various bleeding disorder with other haemostatic drugs proves its mild nature. The effective antihemolytic activity is due to ability of phenolic compounds like flavanoids to neutralize the free radicals causing haemolysis. New researches on pharmacological activities revalidate the potency of drug in diseases which are used since ancient times and supports evidences of therapeutic use in Ayurveda. The presence of other interesting chemical compounds indicates that the plant could serve as "lead" for development of novel agents in disorders in the coming years. In this regard, further experiments are need to be carried out to develop new scientific collection methods, purification and to explore *Mochrasa* for its potential in preventing and treating disease.

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Fig No. 1-Original Sample of Mocharasa

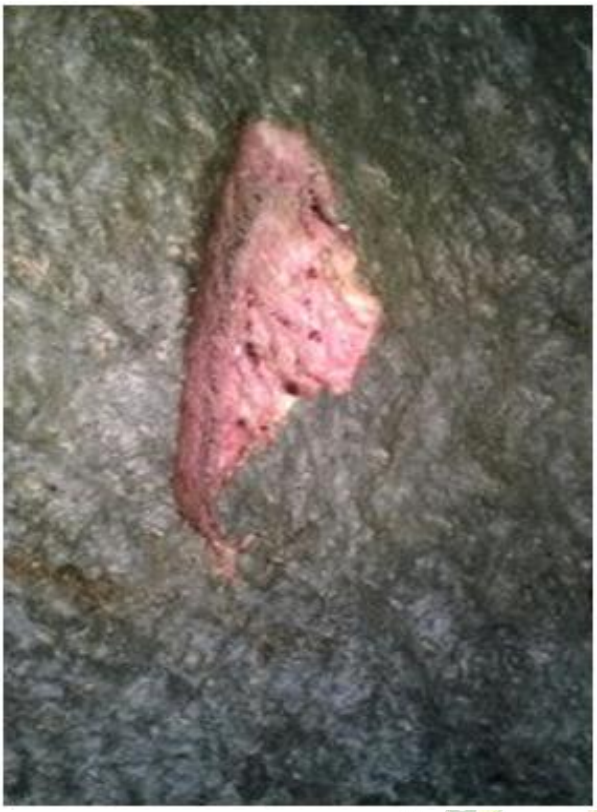

Fig No.2.A-Blunt incision on Bark

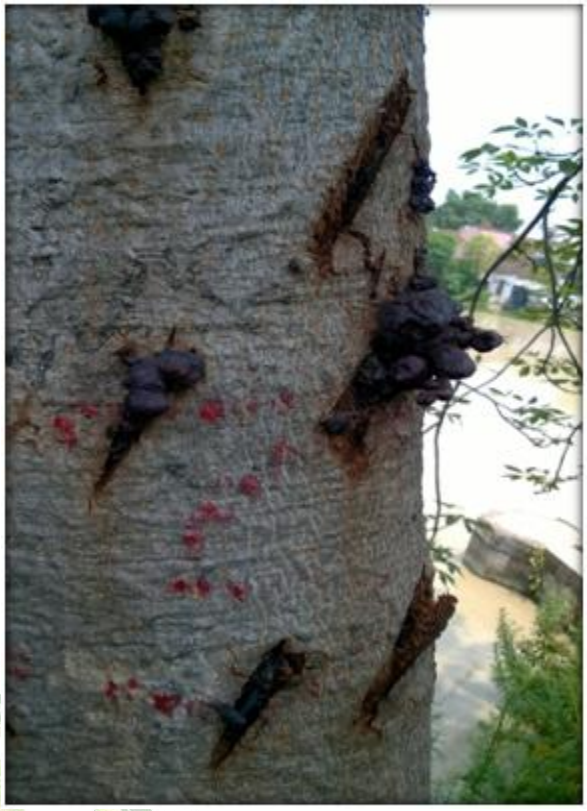

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Fig No. 3 - Fresh Collected Sample of *Mocharasa*

Fig No 4.a .-Dried original sample of *Mochrasa*

FIG NO. 4.b Dried Sample of *Mocharasa*

Fig No.5 Purification of *Mocharasa* –Mucilaganeous Liquid

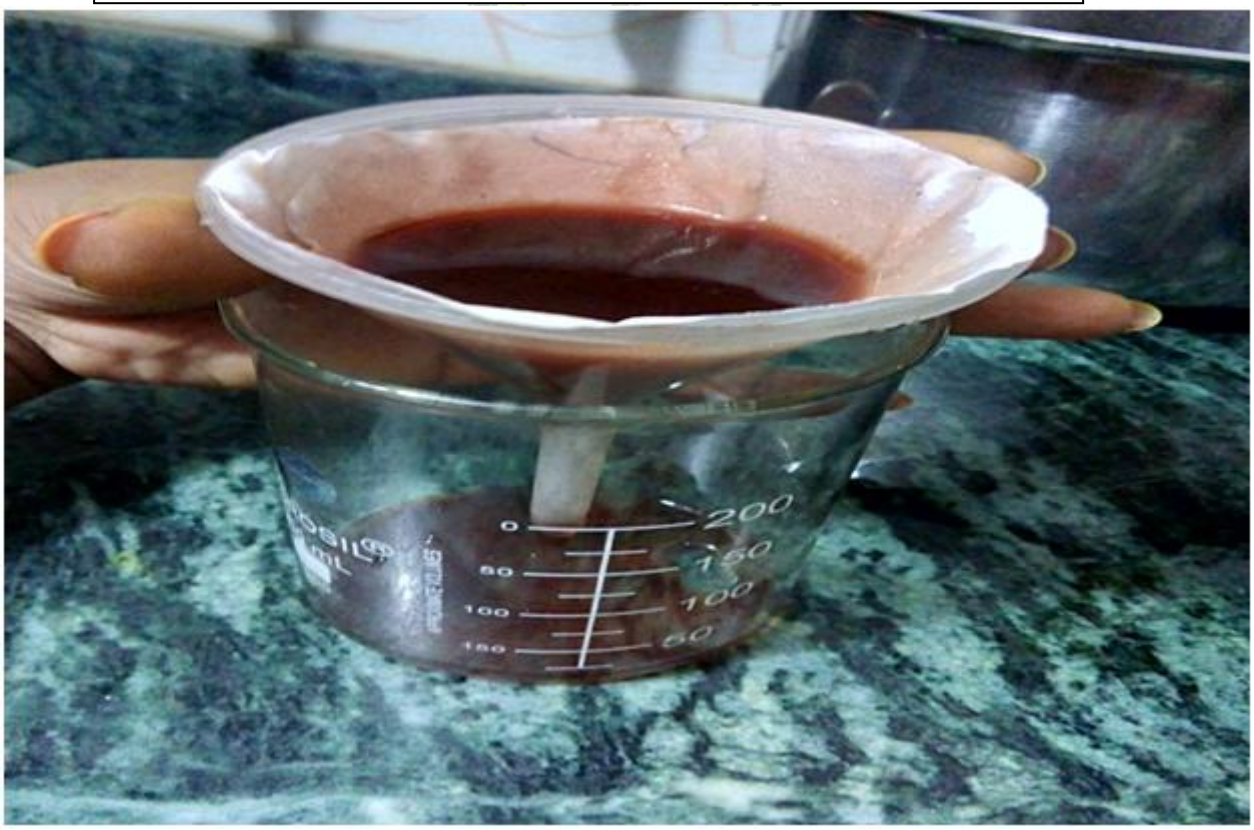

Fig No.- 6 – *Mocharasa* in Extract form

Fig No. -4 *Mocharasa* in Market Sample