



## Review Article

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### ROLE OF SHALMALIGHRITA IN THE MANAGEMENT OF ASRIGDARA VIS-À-VIS ABNORMAL UTERINE BLEEDING (AUB): A REVIEW

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#### ABSTRACT

Abnormal Uterine Bleeding (AUB) is variation in normal menstrual flow in terms of amount, frequency, duration and interval in menstrual cycle. The sign and symptom of abnormal excessive vaginal bleeding is given the term *Asrigdara* in Ayurveda treatises. Excessive uncontrolled bleeding is one of the major gynecological complain causing admission in hospital and later surgical intervention due to emergency created because of prolonged continuous bleeding. Conservative management is a need of time. There are many formulations mentioned in traditional practices to improve quality of life and to reduce the percentage of surgical interventions in gynecological disorder. The compound, *Shalmali Ghrita* has four ingredients viz. *Shalmali Pushpa Niryasa* (*Salmalia malabarica*), *Prishnapani Phal* (*Uraria picta*), *Gambhari Phal* (*Gmelina arborea*) and *Chandan Kalka* (*Santalum alba*). It seems to be an effective combination to relieve symptoms and condition of patient.

**Keywords:** *Asrigdara*, Abnormal Uterine Bleeding, *Shalmali*, *Ghrita*.

#### INTRODUCTION

Abnormal bleeding per vaginum is one of the common gynecological problems among female of reproductive age group seeking medical intervention.<sup>1</sup> Abnormal uterine bleeding (AUB) is variation in normal menstrual flow in terms of amount, frequency, duration and interval in menstrual cycle.<sup>2</sup> AUB occurs in 9 to 14 % women between menarche and menopause. Prevalence varies from country to country. It is approximately 17.9 % in India.<sup>3</sup> Among abnormal uterine bleeding (AUB); Heavy menstrual bleed (HMB) affects approximately 30 % of females in their reproductive period.<sup>4</sup> It has been defined as excessive blood loss during menstruation, i.e. more than 80 ml significantly interfering physical, social and emotional status of woman. It can occur alone or in combination with other symptoms.<sup>5,6</sup> In the search of knowledge, beginning from *Veda* to *Samhita* there is a vast collection and description of disease including their etio-pathogenesis, presenting features, methods of prevention and management. An exhaustive description of gynecological diseases is mentioned in *Ayurveda* treatises. The sign and symptom of abnormal excessive vaginal bleeding is given the term *Asrigdara*. *Asrigdara* literally means *Dirana* (excessive release) of *Asrik* (menstrual blood). Another term *Raktapradara* is also used which signifies *Pradirana* (excessive discharge) of *Rakta* or *Rajah* (menstrual blood).<sup>7</sup>

Various etiology of *Asrigdara* has been described in the classics. Excessive intake of *Lavana* (salts), *Amla* (sour or acidic), *Katu* (bitter), *Vidahi* (spicy), *Krisara* (rice gruel), *Payas* (milk), *Dadhi* (curd), *Mastu* (butter milk), *Guru* (heavy), *Snigdha* (oily), *Mithya Ahar* (incompatible diet) can cause *Asrigdara*.<sup>8</sup> *Pittavrita Apana Vayu*<sup>9</sup> increases the amount of blood (*Ativridhi of Rakta*). *Viruddha Bhojana* (incompatible foods), *Madya* (alcohol), *Garbhaprapata* (abortion/miscarriage), *Ati-maitihuna* (excessive indulgence in sexual activity), *Atikarshana* (severe emaciation), *Atimargagamana* (excessive walking or workout), *Abhigata*

(physical trauma), *Diva-shayana* (afternoon snap) and *Shoka* (mental stress) is considered to cause symptoms of *Asrigdara* by *Madhava Nidana*, *Bhava prakash* and *Yoga ratnakar*.

Formation of *Raja* (menstrual blood) is said to be from *Prasadbhag* (main/worth product) of *Rasa*.<sup>10</sup> *Acharya Kashyap* has described the physiology of menstruation. *Raja* (blood) reaches *Garbhakoshtha* (uterine cavity) during the reproductive cycle via *Rajovaha Shiras* (uterine blood vessels) and get expelled out at end of each menstrual cycle i.e. after completion of one month.<sup>11</sup> *Vata* is responsible for expulsion of menstrual blood out of uterine cavity down to *Yonimukha* (vaginal orifice) each month. Amount of *Artava* is mentioned as four *Anjali*<sup>12</sup> whereas *Artavakala* (duration of menstrual blood flow during each cycle) is of three days according to *Vagbhata*<sup>13</sup> and *Bhavamishra*<sup>14</sup>, five days as per *Acharya Charaka*<sup>15</sup> and seven days according to *Harita*<sup>16</sup> and *Bhela*.<sup>17</sup>

*Asrigdara* can lead to various conditions including *Daurbalya* (weakness), *Bhrama* (giddiness), *Murchchha* (mental confusion), *Tama* (syncope), *Trisha* (thirst), *Daha* (burning sensation), *Pralapa* (delirium), *Pandu* (anemia), *Tandra* (drowsiness), *Vata Vyadhi* (convulsion and other neurological disorders due to vitiation of *Vata*) as a result of excessive bleeding per vaginum.<sup>18</sup>

First and foremost management involves avoidance of etiological factors which can either prevent the morbidity or can be the best treatment in mild form. Different formulations as therapeutic measures have been mentioned for the management of manifested symptoms. In the present study pharmacological evaluation and relevance of probable mode of action of *Shalmali Ghrita*<sup>19</sup> will be discussed along with evidence based scientific validation.

The compound, *Shalmali Ghrita* have four ingredients viz. *Shalmali Pushpa Niryasa* (resinous exudates of *Salmalia malabarica*), *Prishnaparni Phala* (fruit of *Uraria picta*), *Gambhari Phala* (fruit of *Gmelina arborea*) and *Chandana Kalka* (*Santalum alba*).

### Details of Individual Drugs

#### *Shalmali Pushpa Niryasa (Salmalia malabarica)*

*Salmalia malabarica* is *Bombax malabaricum* Linn. is a lofty, deciduous tree buttressed at the base. The tree grows 25-35 meters in height with old tree up to 60 meters. It is known as King of the forest due to their massive size and showy flowers. It is widely distributed throughout India, including the Andamans, up to 1500 m or even higher. In peninsular India, the tree is very common in the dry as well as moist, mixed deciduous forests.

#### Taxonomic Rank

Kingdom: Plantae; Division: Magnoliophyta; Class: Magnoliopsida; Order: Malvales; Family: Malvaceae (Bombacaceae); Genus: *Bombax*; Species: *ceiba*

#### Binomial Name

*Bombax ceiba* Linn., *Bombax malabaricum* D.C., *Salmalia malabarica* (D.C.) Schott and Endl.

#### Vernacular Names

*Semal, Semar, Semul, Shembal and Pagun* (in Hindi), *Shimul* (in Bengali), Silk cotton tree and Red silk cotton tree (in English), *Simble* (in Punjabi), *Shemalo* and *Sawar* (in Gujarati), *Sanvar* and *Simalo* (in Marathi), *Buruga* (in Telugu), *Mullilavu* (in Malayalam), *Elavam* (in Tamil).

#### Sanskrit Synonyms

*Shalmali, Mocha, Picchila, Raktapushpa*

#### Description of Flower

*Shalmalia* have cup-shaped flowers. They vary in arrangements; may be solitary or clustered; axillary or sub-terminal, fascicles at or near the ends of the branches; when the tree is bare of and without leaves, petals of an average length up to 12 centimetres, 7-11 centimetres broad, and width up to 14 centimetres and cup-shaped calyx usually 3 lobed, diameter in an average of 3-5 centimetres cover the tree. Staminal tube in number of more than 60 is short and arranged in 5 sets. Stigma is light red in colour, up to nine centimetres in length. Ovary is pink in colour; its skin is covered with white silky hair of length approximately 1 mm. Its length is 1.5-2 centimetres.

#### Pharmacological Properties of Drug (*Rasa Panchak*)

*Rasa* of *Shalmali* is *Madhura* and *Kashaya*. It has *Laghu, Snigdha* and *Pichchhila Guna* and *Sheeta Virya* and *Madhura Vipaka*.

*Doshaghnata: Vata-Pitta shamaka*

*Rogaghnata: Vranashotha, Daha, Raktastrava, Mukhapaka, Vrana, Vyanga, Nyachchha, Atisara, Pravahika, Grahani, Arsha, Raktaipitta, Raktavikara, Pleehavridhi, Kasa, Ashmari, Mootrakrichchhara, Vrikkashoola, Shukradosha, Shwetapradara, Raktapradara, Dourbalya, Karshya, Snayukaroga*

*Karma: Shothahara, Dahaprashtamana, Vedanasthapana, Raktarodhaka, Stambhana, Vranaropana, Lekhana, Varnya, Raktastambhana, Kasahara, Mootrala, Vrishya, Shukrastambhana, Purishavirajneeya, Shonitasthapana, Artavarodhi, Balya, Brinhaba, Rasayana, Vajikarana.*<sup>20</sup>

### Phytochemical Constituents of *Shalmali*

#### Flowers

Flowers contain  $\beta$ -D-glucoside of  $\beta$ -sitosterol, free  $\beta$ -sitosterol, hetricontane, hetricontanol, kaempferol, quercetin and traces of essential oil<sup>21</sup>

#### Action and Uses of Flowers

Laxative, diuretic, astringent and are good for skin troubles, intrinsic haemorrhage, conjunctivitis, splenomegaly and haemorrhoids.<sup>22</sup>

#### *Prishnaparni (Uraria picta)*

*Prishnaparni* consists of dried whole plant of *Uraria picta* Desv. (Fam. Fabaceae), anerect under shrub up to 90 cm high, distributed throughout the country

#### Taxonomic Rank

Kingdom: Plantae; Division: Magnoliophyta; Class: Magnoliopsida; Order: Fabales; Family: Fabaceae; Genus: *Uraria*; Species: *Picta*.

#### Vernacular Names

*Pithavan and Dabra* (in Hindi), *Salpani, Chhalani* and *Chakule* (in Bengali), *Pithavan* (in Gujarati), *Murele Honne, Ondelehone* and *Prushniparni* (in Kannada), *Pithvan* and *Prushnipamee* (in Marathi), *Orila* (in Malayalam), *Prushnipamee, Shankarjata* (in Oriya), *Detedarnee* (in Punjabi), *Oripai* (in Tamil), *Kolakuponna* (in Telugu).

#### Sanskrit Synonyms

*Citraparni, Kalasi, Dhavani, Prithakparni, Shrigalavonna.*

#### Botanical Description

#### Macroscopic

Root of *Uraria picta* has thickness of 1 to 2 cm, gradually tapering at end, cylindrical in shape, light yellow to buff externally whereas pale yellow internally. Its surface bears fine longitudinal striations. Stem is about 8.0 to 16.0 cm long, 0.2 to 0.4 cm in diameter, cylindrical, branched, pubescent, external surface light yellow to brown. Leaves are variable, imparipinnate, up to 20 cm or longer, up to 2 cm wide.

#### Microscopic

Root has 5 to 6 layers of thin-walled, tabular, regularly arranged cork cells; secondary cortex is composed of 4 to 6 layers of oval, tangentially arranged, thin-walled, parenchymatous cells; secondary phloem is composed of sieve elements, parenchyma and fibres traversed by phloem rays. Secondary xylem is composed of vessels, tracheids, fibres, crystal fibres and parenchyma traversed by xylem rays; vessels are very few, mostly confined to inner and outer part of xylem; fibres similar to those of phloem fibres are arranged in close set concentric bands. Stem has single layered epidermis covered with cuticle, a few epidermal cells elongated outwards forming papillae; cortex 8 to 10 cells wide, consisting of oval to circular, thin walled, parenchymatous cell; phloem consisting of usual elements except phloem fibres. Midrib of Leaf consists of single layered epidermis on either surfaces covered with striated cuticle having a few unicellular or bicellular, hooked or straight and pointed tipped hairs present on both surfaces but more on lower surface; collenchyma and parenchyma is 2 to 3 layered. Lamina has single layered epidermis on either surfaces, mesophyll is differentiated into single layered palisade and spongy parenchyma which has numerous paracytic stomata present on lower surface. Vascular bundle is present centrally.

### Pharmacological Properties of Drug (*Rasa Panchak*)

*Rasa* of *Prishnparni* is *Madhura*, *Amla*, *Katu* and *Tikta*. Its *Guna* is *Laghu* and *Sara*, *Virya* is *Usna* whereas *Vipaka* is *Madhura*.

*Karma*: *Deepana*, *Sangrahi*, *Tridoshahara*, *Vatahara*, *Vrisya*, *Sothahara*, *Angamardaprashtamana*, *Sandhaneeya*, *Jeevaneeya*, *Balavardhaka*.<sup>23</sup>

### Phytochemical Constituents of *Prishnparni*

Two isoflavanones, 5,7-dihydroxy-2'-methoxy-3', 4'-methylenedioxyisoflavanones (2) and 4', 5-dihydroxy-2', 3'-dimethoxy-7-(5-hydroxyoxychromen-7yl)-isoflavanone(4) along with six known compounds including isoflavanone, triterpenes and steroids were isolated from roots of *Uraria picta*.<sup>24</sup>

### *Gambhari* (*Gmelina arborea*)

*Gambhari* consists of dried fruit of *Gmelina arborea* Roxb. (Fam. Verbenaceae), an unarmed tree, found scattered in deciduous forests throughout the greater part of the country up to an altitude of 500 m, planted in gardens and also as an avenue tree.

### Taxonomic Rank

Kingdom: Plantae; Division: Magnoliophyta; Class: Angiosperms; Order: Lamiales; Family: Verbenaceae; Genus: *Gmelina*; Species: *G. arborea*

### Vernacular Names

*Gambhari* (in Hindi) *Gomari* (in Assamese) *Gamargachha* and *Gambar* (in Bengali), *Seevan* (in Gujrati), *Seevani*, *Shivani* and *Hannu* (in Kannada), *Kumbil* and *Kumizhu* (in Malayalam), *Sivan* (in Marathi), *Gambhari* and *Bhodroparni* (in Oriya), *Khambhari* (in Punjabi), *Perunkurmizh* and *Komizhpazham* (in Tamil), *Gumaditeku* (in Telugu), *Gambhari* (in Urdu).

### Synonyms in Sanskrit

*Kashmari*, *Kashmarya*, *Peetarohini*, *Sriparni*, *Bhadraparni*, *Madhuparnika*, *Krishnavrinta*, *Madhurasa*, *Mahakusumika*, *Tuvara*

### Botanical Description

#### Macroscopic

Fruit is drupe, ovoid, crinkled 1.5-2.0 cm long black in color, sometimes with portion of attached pedicel, one or two seeded, taste is sweetish sour. Seed is ovate, 0.5-1 cm long, 0.4-0.6 cm wide; light yellow in color with smooth, thin and papery surface.

#### Microscopic

Fruit has pericarp which is differentiated into single layered epicarp, multilayered, fleshy mesocarp and hard and stony endocarp. Epicarp consists of single layered, thin-walled cells whereas mesocarp has a wide zone of isodiametric, thin-walled, parenchymatous cells and endocarp consists of multilayered sclerenchymatous cells.

Seed has an outer integument consisting of 3-5 rows of crushed, parenchymatous cells followed by inner integument consisting of 2-3 rows of thin-walled, tangentially elongated, parenchymatous cells; cotyledons consisting of single layered, radially elongated epidermal cells. Mesophyll has thin-walled cells, filled with oilglobules and aleurone grains.

### Pharmacological Properties of Drug (*Rasa Panchak*)

*Rasa* of *Gambhari* is *Madhura*, *Amla*, *Kashya*; *Guna* is *Guru*, *Sara*, *Snigdha*. It has *Madhura Vipaka* and *Sheeta Virya*. *Karma* of *Gambhari* is *shukrala*, *Hridya*, *Kesha*, *Medhya*, *Pittahara*, *Rasayana*, *Vatahara* and *Balya*.<sup>25</sup>

### Phytochemical Constituents of *Gambhari*

Butyric acid, Tartaric acid, Alkaloid, Resin and Saccharine.<sup>26</sup>

### *Swetachandana* (*Santalum album*)

*Swetachandana* consists of dried heart wood of *Santalum album* Linn. of Family Santalaceae, an evergreen, semi parasitic tree, 8 to 18 m in height and 2 to 4 m in girth, widely distributed in the country, commonly found in the dry regions of peninsular India from Vindhya mountains outwards, especially in Karnataka and Tamil Nadu where it is cultivated for its aromatic wood and oil.

### Taxonomic Rank

Kingdom: Plantae; Division: Magnoliophyta; Class: Magnoliopsida; Order: Santalales; Family: Santalaceae; Genus: *Santalum*; Species: *album*

### Vernacular Names

Sandal Wood (in English), *Chandan* and *Safed Chandan* (in Hindi), *Sandale Avyaj* (in Assame), *Chandan* (in Bengali), *Sukhad* (in Gujrati), *Shrigandhamara*, *Shrigandha* and *Chand* (in Kannada), *Chandanam* (in Mallyalam), *Chandan* (in Marathi), *Chandana maram*, *SandanamandIngam* (in Tamil), *Gandhap*, *Chekka*, *Manchi Gandham*, *Tella Chandanamand Sriga* (in Telgu), *Sandal Safed* (in Urdu).

### Synonyms in Sanskrit

*Shrikhanda*, *Channraduti*, *Chadan*, *Bhadrashree*, *Tailparnika*, *Gandhasara*, *Malayaj*

### Botanical Description

#### Macroscopic

Yellowish-brown to pale-reddish orange, heavy, dense, hard but split easily; transversely smooth surface shows alternating light and dark concentric zones with numerous pores, traversed by very fine medullary rays; odour, persistently aromatic; taste, slightly bitter.

#### Microscopic

Wood consists of tracheids, vessels, fibres, xylem parenchyma and traversed by medullary rays; vessels numerous scattered singly throughout the region, rarely two together, barrel-shaped, pitted and with transverse to oblique pen oration with tail-like projections, at one or both ends; a few tracheids elongated with tapering ends and possess bordered pits on their walls; fibres many, lignified with pointed tips; xylem parenchyma mostly rectangular, a few of them contain prismatic crystals of calcium oxalate; xylem rays numerous, run straight, uniseriate to triseriate, mostly biseriate, thick walled, radially elongated having golden yellow to brownish contents and contain a few prismatic crystals of calcium oxalate.

### Phytochemical Constituents of *Swetachandana*

Volatile oil ( $\alpha$ - and  $\beta$ - Santalol) composed of  $C_{15}H_{24}O$ , hydrocarbons like santene, nortricyclo-ekasantalene; Aldehydes like nortricyclo-ekasantalol 3, 7, 8 and acids alpha and beta santalic acids and alcohols like santenol, alpha santalol, beta santalol, teresantalol. Its leaf wax has hydropalmitone and palmitone.

### Pharmacological Properties of Drug (*Rasa Panchak*)

*Rasa* of *Chandan* is *Madhura, Tikta*. It has *Laghu, Ruksha Guna; sheeta Virya* and *Katu Vipaka*.

*Karma*: *Hridya, Krimighna, Kaphahara, Pittahara, Vrishya, Varnya, Vishaghna, Durgandhahara, Dahaprashtama, Trishnanigrahana*<sup>27</sup>.

### DISCUSSION

The probable mode of action of *Shalmali* in the management of bleeding disorders can be explained by its action; done in previous clinical and experimental studies. Flowers of *Bombax ceiba* have shown anti proliferative and antioxidant activity against Cancer cell lines, COR-L23, C32, A375, ACHN, and LNCaP cells. Here its effect on cell growth inhibition is studied.<sup>28</sup> The inhibitory effect of *Bombax* over cell growth may have regulatory effect in abnormal formation of layer of endometrium. *Bombax malabaricum* stem's bark methanolic extract was found to exhibit a significant anti angiogenic activity on tube formation of Human Umbilical Venous Endothelial Cells (HUVEC). Lupeol a component of fractionated product of the extract showed a marked inhibitory activity on HUVEC tube formation while it did not affect the growth of tumor cell lines such as SK-MEL-2, A549 and B16-F10 melanoma.<sup>29</sup> Sheding of endometrial wall following each menstrual cycle require angiogenesis for endometrial repair and regeneration. Any disruption in above mentioned process leads to menorrhagia which is manifested as excessive bleeding. Excess uterine bleeding is evidenced to be caused by abnormal excessive angiogenesis.<sup>30</sup> *Bombax*, thus by anti angiogenic effect helps to check excessive uterine bleeding. The *Mocha Rasa* (*Shalmali Niryas*) contains tannic and gallic acids. They act as astringents and helps in restoring the damaged epithelial mucosal lining of the ulcerated mucosa.<sup>31,32</sup> Fatty acid synthesis (FAS) had been found to be over expressive and hyperactive in most of proliferative diseases (like cancer). Pharmacological inhibitors of fatty acid synthesis activity preferentially repress cancer cell proliferation and induce cancer cell apoptosis without affecting non-malignant fibroblasts. These made Fatty acid synthesis an excellent drug target for cancer therapy. To test the inhibitory effort of flavonoid extracts of *Shalmalia malabarica* on FAS, cancer cell A549 was used as a cell model and was found effective.<sup>33</sup> Thus, *Shalmali* show inhibitory effect on fatty acid synthesis which in turn limits proliferation of effected tissues of endometrium in abnormal uterine bleeding disorder.<sup>34</sup>

Similar effects are found in constituents of *Santalum* which shows action against any type of abnormal proliferation. The hydrolyzed exhausted sandalwood powder (HESP) has different properties including anti-remorogenic, anti-inflammatory, anti-mitotic, antiviral, anti-cancerous, anti-hypertensive, anti-pyretic, sedative, ganglionic blocking and insecticidal.<sup>35,36</sup>

For assessment of antitumor promoting activity about six novel sesquiterpenoids, two aromatic glycosides and several neolignans were identified from sandalwood heartwood chips, which were further evaluated for *in-vitro* Epstein-Barr virus early antigen (EBV-EA) activation in Raji cells. Later *in vivo* two-stage carcinogenesis assays were known to demonstrate its potent inhibitory effect on EBV-EA activation strong suppressive effect on two-stage carcinogenesis on mouse skin.<sup>37</sup> Not only this, derivatives of  $\alpha$ -santalol had shown tumor-selective cytotoxicity in HL-60 human promyelocytic leukemia cells and TIG-3 normal human diploid fibroblasts.<sup>38</sup> Two lignans obtained from the heartwood samples, demonstrated apoptosis induced tumor cell cytotoxicity against HL-60 human promyelocytic leukemia cells and A549 human lung

adenocarcinoma cells.<sup>39</sup> Alpha-Santalol, an active component of sandalwood essential oil has been studied for skin cancer preventive efficacy in murine models of skin carcinogenesis.<sup>40</sup> *Santalum album* possess anti-inflammatory and antiulcer activities evidence by significant inhibition in the carrageenan induced paw edema, cotton pellet induced granuloma, as well as pylorus ligation induced ulcer. The *in-vitro* antioxidant and *in-vivo* analgesic and anti-inflammatory activities in mice were established for methanolic extracts of heartwood.<sup>41</sup>

The above activity of individual drug when work in combination in a compound along with fortification of *Ghrita* and change in properties of compound during its processing can be assumed to be helpful in healing the eruptions caused by the inflammatory causes of excessive bleeding and checking new growth and proliferation.

### CONCLUSION

Heavy menstrual bleeding poses undue mental stress and is sufficient enough to hamper physical activity of the woman. It can cause disruption in daily routine activities. Long term course of excessive heavy and prolong menstrual cycle can lead to life threatening condition. Untreated patients of HMB often suffer from severe anemia and its consequences. Abnormal Uterine Bleeding directly affects quality of life of suffering women and has a significant impact on physical and mental health.

Thus, the above-mentioned findings under the discussion of the individual drugs could substantiate the inclusion of this formulation in the effective management of *Asrigdara* (Abnormal uterine bleeding) in Ayurveda system of medicine.

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