CHAPTER 2.  
BOMBAX CEIBA LINN.

*Bombax ceiba* Linn.

2.1. Synonyms

*Bombax malabaricum* DC., *Salmalia malabarica* (D.C.) Schott & Endl [1].

2.2. Introduction

*Bombax ceiba* of the family Bombacaceae is an important medicinal plant of tropical and subtropical India commonly known as Silk Cotton Tree. It is the tall deciduous tree, with straight buttressed trunk and broad spreading branches. Almost every part of this plant is used as medicine, and its roots and flowers are used for curing the maximum number of ailments [2].

2.3. Botanical classification [3]

Kingdom : Plantae
Division : Magnoliophyta
Class : Magnoliopsida
Order : Malvales
Family : Bombacaceae
Genus : Bombax
Species : ceiba
2.4. Vernacular names [4]

Hindi : Semal, Semar

English : Silk-cotton tree

Sanskrit : Moca

Urdu : Sembhal

Gujarati : Shemalo

Telugu : Buruga

Assam : Simalu

Bengali : Shimool

2.5. Habitat and distribution

*Bombax ceiba* is widely found in temperate Asia, tropical Asia, Africa and Australia. In India, it can be found at altitudes up to 1500 m. In peninsular India, the tree is very commonly seen in the dry and moist deciduous forests and also near rivers. This tree is a great light-demander and fast-growing tree. *Bombax ceiba* grows best on deep sandy loams or other well-drained soils, especially in valleys, in the regions that are receiving 50 to 460 cm. annual rainfall well distributed throughout the year [5].

2.6. General Description

The different part of *B. ceiba* like leaves, roots, stem bark, seed, flower, gum and fruit are reported to possess various medicinal qualities in ethnobotanical surveys conducted by ethnobotanist and in traditional
system of medicine such as Ayurvedic. Semal is a lofty, deciduous tree up to 40 m tall with horizontally spreading branches and young stems covered with hard prickles.

2.6.1. **Bark** - grey brown or silver grey colored with hard sharp conicles prickles

2.6.2. **Leaves** - are large, spreading, glabrous, leaflets lanceolate, 3-7, and margin entire

2.6.3. **Flowers** - are red numerous, appearing when the tree is bare of leaves, stamens many arranged in five bundles of 9-12 each and an inner bundle of 15.

2.6.4. **Fruits** - The fruits are brown capsule-like upto 15 mm long, filled with numerous black seeds.

2.6.5. **Seeds** - are smooth, black or grey embedded in long white wool, which are irregular obovoid in shape, smooth and oily with dense silky hair.

2.6.6. **Gum** - Light brown to opaque or dark brown called as semul gum [4].

In February, *B. ceiba* begins dropping all of its leaves. It is time for flowering and follows a sensational display of large silky red flowers at the tips of bare branches. In May, white cottony strands, from opened fruits, float downward, settling on the ground, houses and whatever else is in their way. The tree does not begin to relief until almost all the flowers have fallen. Even without its flowers, *B. ceiba* is still an impressive tree. It displays prickly branches arranged in horizontal tiers. Trunk is rough, straight and spiny with buttress roots. The trunks of the
oldest specimens lose much of their spines. *B. ceiba* is rare in cultivation and always impresses tourists and first-time viewers [6].

Fig 2.1 Exomorphic features of the plant-a-*B.ceiba* in full bloom, b-flower, c- stem, d- buds with cotton and seed
2.7. Ethnoherbological Properties

Tribal people throughout all over India are well knownedged with the plant’s usage. *B.ceiba* was used as aphrodisiac, in sexual diseases and as a tonic, half a cup of ethanol extract of bark and flower was given for 3 days to men and women with sexual diseases like leucorrhoea, gonorrhea as well as also used to regulate menstrual abnormalities in women [7]. About 30g of seed powder of *B. ceiba* and about 10 g Hing are used as an abortifacient by the Oraon tribe in West Bengal [8]. Another study showed that *B. ceiba* is utilized in the hydrocele, leucorrhoea, gonorrhoea and to regularize menstruation, urinary problems and as a tonic [9]. It is also prescribed for increasing sperm in semen and to act as an aphrodisiac. Studies on the ethnomedicobotany of the Kandha tribe of Orissa showed that fresh stem bark of *B. ceiba*, with some other herbs taken orally to cure gonorrhoea, impotency, spermatorrhea, sterility, nocturnal emission and leucorrhoea [10]. *B. ceiba* mixed with cow dung was applied over back muscle of leg at night to treat hotness and inflammation [11, 12]. The plant is among five trees of ‘Panchwati’ and hence, has spiritual importance. It is the large and long-living tree that provides strength to body, mind and heart [13].

2.8. Phytoconstituents reported in *Bombax ceiba*

Bark contains lupeol, saponins, tannins, gums and 4,5,7- trihydroxy-flavone-3-O-β-D-glucopyranosyl(1-4)-α-L-rhamnopyranoside, n-hexacosanol and palmitic acid isolated from seeds, lactone isolated from root bark, polysaccharide isolated from flowers-had a continuous backbone of 4(1-4)- β-linked D-galactopyranose and 2 (1-3)- β-linked L-arabinopyranose units with β-linked D- galactose and α-linked L-
rhamnose and L-arabinose units as end groups [14]. Leaves contain a flavonol C-glycoside shamimin [15]. Hemigossypol-6-methyl ether was isolated from the root bark of *B. malabaricum* along with isohemigossypol-1-methyl ether [16]. From *Bombax ceiba* stem bark Shamimicin,(3, 4- dihydroxyphenyl)-3, 4-dihydro-3, 7- dihydroxy-5-O -xylopyranosyloxy- 2H-1-benzopyran along with lupeol were isolated [17]. From the dried leaves of *B. malabaricum* in the same year, mangiferin, a xanthone was separated by repeated column chromatography of the n- BuOH fraction [18]. From the root bark of *B. malabaricum*, new sesquiterpene lactone, 5-isopropyl-3-methyl-2, 4, 7-trimethoxy-8, 1- naphthalene carbolactone together with naphthoquinone, 8-formyl-7-hydroxy- 5-isopropyl-2-methoxy 3methyl 1, 4naphthoquinone were isolated [19].

Phytochemical investigation of *Bombax malabaricum* shows five new compounds (bombamalones A-D, 1-4; bombamaloside, 5), and four known compounds (isohemigossypol-1-methyl ester, 6; 2-O- methylisohemigossylic acid lactone, 7; bombaxquinone B, 8; and lacinilene C, 9) [20]. A new naphthoquinone together with 7-hydroxycadalene and 8-formyl-7-hydroxy- 5-isopropyl-2-methoxy-3-methyl-1, 4-naphthoquinone was isolated from the heartwood of *Bombax malabaricum*. The new naphthoquinone was characterized as 7-hydroxy-5-isopropyl-2-methoxy-3-methyl-1, 4-naphthoquinone based on spectral and chemical studies [21].

### 2.9. Traditional medicinal uses

The roots of *B.ceiba* are cooling, sweet, stimulant, tonic and demulcent and are used in dysentery. The gum has the property of cooling,
aphrodisiac, astringent, and demulcent. The bark has the property of demulcent and emetic, and it also has the power of healing. Leaves are used for skin eruptions. Flowers are used as an astringent and are good for skin troubles, splenomegaly and haemorrhoids. Seeds are said to be useful in treating gonorrhea and chronic cystitis [1, 4].

2.10. Literature Review

2.10.1. Antioxidant activity

The antioxidant activity of a root extract of *B. ceiba* was evaluated using several antioxidant assays, in terms of its: ability to scavenge DPPH and reducing power assay. Methanolic extract of the roots showed high amount of phenolics (30.95% w/w) and tannins (15.45% w/w) and a very good DPPH radical scavenging activity in a dose dependent manner [22].

A study was undertaken to evaluate the *in vitro* antioxidant potential of bark of *Bombax ceiba* (Bombacaceae). Aqueous and ethanolic extracts of the bark were subjected to *in vitro* antioxidant activity screening models [23].

2.10.2. Hypotensive activity

Shamimin along with lupeol [lup-20 (29) en-3b-ol], which possesses potent hypotensive activity, have been isolated from *B. ceiba* stem bark. filtrate from BCBM (Methanolic extract of defatted stem bark)] one of the most active fractions has revealed its adverse effects on heart, liver and kidneys of mice at the dose of 1000 mg/ kg/d [24].
2.10.3. Antiangiogenic activity

Methanol extract of the stem barks of *B. ceiba* was reported to have a significant antiangiogenic activity on *in vitro* tube formation of human umbilical venous endothelial cells. Result showed bioactivity-guided fractionation and isolation were also carried out on this extract [25].

2.10.4. Hypotensive, hypoglycaemic activity

In this study it has been reported that shamimin, a C-flavonol glucoside from *Bombax ceiba* leaves showed potency as a hypotensive agent at the doses of 15 mg/kg, 3 mg/kg, 1 mg/kg and significant hypoglycaemic activity at 500 mg/kg in Sprague-Dawley rats [26].

2.10.5. Analgesic activity

Dar et.al. obtained Mangiferin, 2-beta-D-glucopyranosyl-1, 3, 6, 7-tetrahydroxy- 9H-xanthen-9-one, directly from methanolic extracts of *B. ceiba* leaves demonstrated strong antioxidant activity using DPPH assay. Additionally, crude plant extracts and purified mangiferin failed to exhibit acute anti-inflammatory activity whereas, extracts displayed significant analgesic effect in acetic acid–induced writhing and hot plate tests in mice [27].

2.10.6. Hepatoprotective activity

Researcher reported that methanol extract of flowers of *B. ceiba* (MEBC) was investigated and it was found that MEBC significantly decreased the level of TBARS and elevated the level of GSH at all doses as compared to control. Biochemical parameters and histopathological studies concluded that the MEBC were not able to completely revert the hepatic
injury induced by INH and RIF, but it could limit the effect of INH and RIF to the extent of necrosis [28].

2.10.7. Aphrodisiac

In this study the aphrodisiac activity of *B. ceiba* root extract was evaluated. The extract (400 mg/kg body wt/day) was administered orally by gavage for 28 days. Intromission latency (IL), ejaculation latency (EL), Mount latency (ML), intromission frequency (IF), mounting frequency (MF), ejaculation frequency (EF) and post-ejaculatory interval (PEI) was the parameter observed. These effects were observed in sexually active and inactive male mice [29].

2.10.8. Antipyretic activity

A group of workers reported that the methanol extract of *Bombax malabaricum* leaves (MEBM) was evaluated for the antipyretic activity in rats. MEBM possessed significant antipyretic activity in Baker’s yeast-induced pyrexia [30].

2.10.9. 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* [31].

2.10.10. Diuretic activity

The study reported the diuretic effects of aqueous and crude ethanol extracts of *Bombax ceiba* L. fruits using acute model in rats. The aqueous and ethanol extracts of *B. ceiba* fruit (200 mg/kg and 400 mg/kg, p.o.),
significantly increased the urine output in higher doses. These effects demonstrate possible diuretic actions of *B. ceiba* fruit extracts and support its folklore use in various urinary ailments [32].
2.11. References


6. STEPHEN H. Brown Lee, (2009), *Bombax ceiba County Extension*, University of Florida, IFAS (The Institute of Food and Agricultural Sciences)


