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Hibiscus cannabinus and *Hibiscus sabdariffa* Phyto Phamacognostical review

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Abstract
Hibiscus cannabinus is found throughout Africa and Asia. It is a warm- season annual fiber crop. Its flowers are mainly useful as emollient, demulcent, seeds as aphrodisiac, purgative, etc. *Hibiscus sabdariffa* is found mostly in Africa i.e; Sudan, Asia, Srilanka, Thailand, Malaysia etc. It is used as a vegetable, Herbal medicine, anti-hypertensive, laxative, Vermifuge etc. The present review is focused on the Phamacognostical characters like scientific classification, vernacular names and the plants' potential in biological activity against mosquitoes.

Keywords: *Hibiscus cannabinus*, *Hibiscus sabdariffa*, Africa, Asia, aphrodisiac, anti-hypertensive

Introduction
Hibiscus Cannabinus
Synonyms
Abelmoschus congener Walp, Abelmoschus, verrucosus Walp., Furcaria cannabina Ulbr., Furcaria cavanillesii Kostel., Hibiscus malangensis, Baker f. and Hibiscus vanderystii De Wild

Taxonomic Classification
Kingdom: Plantae
Subkingdom: Viridiplantae
Infrakingdom: Streptophyta
Superdivision: Embryophyta
Division: Tracheophyta
Subdivision: Spermatophytina
Class: Magnoliopsida
Superorder: Rosanae
Family: Malvaceae
Genus: Hibiscus
Species: *Hibiscus cannabinus*

Common Names
Arabic: Jaljal
Chinese: da ma Jin
English: Bastard-jute, bimli-jute, Deccan-hemp, Indian-hemp, Java-jute, Kenaf, Kenaf hibiscus
French: chanvrede Bombay, chanvre de Guinée
German: Ambari, Dekkanhanf, Gambohanf, Jawa-Jute, Kenaf
Hindi: Ambary, Mesta, patsan, pitwa
Italian: Ibisco; Japanese: Kenafu
Korean: yangma
Spanish: apocino
Swedish: kenaf

Distribution
Hibiscus cannabinus was a warm-season annual fiber crop. It was native to Africa [Kenya, Tanzania, Uganda, Chad, Ethiopia, Somalia, Sudan, Angola, Malawi, Zambia, Mozambique, Zimbabwe, Botswana, Namibia, South Africa, Ghana, Mali, Nigeria, Senegal, Burundi, Cameroon, Central African Republic, Rwanda and Zaire], and has been commercially cultivated in Asia, such as Russia, China, India, Malaysia, Thailand, Iran, Iraq and many other countries.

Description

Annual herb, up to 2 - 5 m, stem erect, slender, cylindrical, prickly on wild accessions. Leaves alternate, simple; stipules filiform, 5–8 mm long, pubescent; petiole 3–30 cm long; blade 1–19 cm × 0.1–20 cm, 3–7-lobed in lower part of plant, often unlobed in upper part or even bractlike near the apex, base cuneate to cordate, apex acuminate, margins serrate or dentate, upper surface glabrous but with a prominent, 3 mm long nectary at the base of the midrib, lower surface hairy along the veins. Flowers axillary, solitary or sometimes clustered near the apex of the plant, bisexual, 5-merous, 7.5–10 cm in diameter; pedicel 2–6 mm long, articulated at the base; epicalyx of 7–8 linear segments 7–18 mm long, persistent; calyx campanulate with acuminate to subcaudate lobes 1–2.5 cm long [up to 3.5 cm in cultivars], persistent, green, bristly and with a characteristic white, woolly, arachnoid tomentum especially near the base and margins, with a prominent nectary gland on each midrib; petals free, usually spreading, twisted clockwise or anticlockwise, obovate, 4–6 cm × 3–5 cm, outer side stellate-pubescent, usually cream to yellow with red inner base, sometimes blue or purple; stamens numerous, filaments united into a column surrounding the style, 17–23 mm long, dark red, with yellow or red anthers; ovary superior, ovoid, villose, 5-celled, style branching into 3–5, hairy arms 2–4 mm long, each branch ending in a capitate stigma. Fruit an ovoid, shortly beaked capsule 12–20 mm × 11–15 mm, densely appressed pubescent, 20–25[–35]-seeded. Seeds reniform to triangular with acute angles, 3–4 mm × 2–3 mm, grey to brown-black with pale yellowish spots, hilum brown.

Morphology

Fig 1: *Hibiscus cannabinus*

- **Stalks**

Kenaf is a dicotyledonous herbaceous annual plant with a high fiber yield. This plant contains three types of fibers: bast, core, and pith. The “bast” refers to the outer part of the fiber that represents about 30% of the dry weight of the stalk. Meanwhile, core is the whiter, inner part of the fiber which contributes around 70% of dry weight of the stalk. The pith consists exclusively of parenchymatous cells, which are not typically prismatic but polygonal in shape.

- **Leaves**

Two general leaf types are produced: entire (simple) and divided. These leaves are alternate from side to side on the stalk and branches. The young leaves on all kenaf seedlings are simple, entire, and cordate. Divided leaf cultivars can produce 3 to 10 entire juvenile leaves prior to producing the first divided leaf.

- **Flowers and Pollination**

Kenaf plants produce large showy, light yellow, creamy colored flowers that are bell-shaped and widely open. The flowers of many cultivars have a deep red or maroon colored center. The flowers are solitary, short-stalked and auxiliary which are 8 to 13 cm in diameter with 5 petals, 5 sepals, and numerous stamens.

- **Fruit and Seed**

The seed capsule (fruit) that is about 1.9–2.5 cm long and 1.3–1.9 cm in diameter, is hairy and contains five segments which are many-seeded (20–26 seeds). The seeds are brown, glabrous, wedge-shaped, 6 mm long, 4 mm wide, their weight is about 35,000 to 40,000 seeds/kg corresponding to 25–29 g thousand grain weight.

- **Roots**

Kenaf has a prolific root system with a long taproot and extensive lateral roots allowing it to be more sensitive to changes in soil moisture and the absorption of deep soil water.

Uses

The flowers were considered emollient, and an infusion of the petals was used as a demulcent. Its decoction was given in bronchial catarrh in India. Seeds were considered aphrodisiac, fattening, aphrodisiac, purgative, for stomachic, bilious conditions, bruises, fever, and puerperium. Powdered leaves were applied to Guinea worms in Africa. Africans use peelings from the stems for anemia, fatigue, lassitude, etc. In Gambia, the leaf infusion was used for coughs. In local medicine in Kenya, pounded roots were administered to spider bites, and leaves were used to treat stomach disorders. In West Africa, powdered leaves were applied to sores and boils, and a leaf infusion was administered fortreatment of cough. In India, juice from the flowers was taken against biliousness. Seeds were applied externally to aches and bruises, juice of the flowers with sugar and black pepper was used in biliousness with acidity.It was also used as antidote to poisoning with chemicals [acid, alkali, pesticides] and venomous mushrooms.

Chemical Constituents

1. moisture -11.82 ± 0.45 %
2. ash content 5.11 ± 0.15 %
3. crude fibre 29.61 ± 0.22 %
4. lipids 2.33 ± 0.34%
5. crude protein 13.78 ± 1.17 %
6. carbohydrate 37.67 ±1.03 %
7. phytic acid 19.78 ±1.80 mg/100g
8. tannins 2.74 ± 0.47 mg/100g
9. oxalates 158.5 ± 0.07 mg/100

Pharmacological Effect

1. Cytotoxic effect
2. Anthelmintic effect
3. Antibacterial effect
4. Antiulcer effect
5. Antidiabetic effect
6. Hypolipidemic effect
7. Immunological effect

8. Haematinic effect
9. Antioxidant effect
10. Hepatoprotective effect

Hibiscus Sabdariffa

Synonyms

Abelmoschus cruentus, Furcaria sabdariffa, Hibiscus acetosus, Hibiscus cruentus, Hibiscus fraternus, Hibiscus gossypifolius, Hibiscus palmatilobus, Hibiscus sanguineus, Sabdariffa rubra.

Taxonomic Classification

Domain: Eukaryota
Kingdom: Plantae
Phylum: Spermatophyta
Subphylum: Angiospermae
Class: Dicotyledonae
Order: Malvales
Family: Malvaceae
Genus: Hibiscus
Species: *Hibiscus sabdariffa*

Common Names

English: Indian sorrel; Jamaica sorrel; red sorrel
Spanish: canamo de Guinea; rosella; sereni
Chinese: Luo shenhua, Mei guijia, Shan jiazi.
German: Afrikanischer Eibisch, Hibiscus-Tee, Karkade-Tee, Roselle, Rote Malve.
Ghana: Sobolo.
French: Oseille de Guinée, Thé rose d'Abyssinie.
Japanese: Roozera, Roozeru, Rozerusou.
Polish: Hibiskus szczawiowy, Ketmia szczawiowa.
Portuguese: Caruru De Guine (Brazil), Quiabo Da Angola (Brazil), Rosela, Vinagreira.
Thai: Krachiap, Krachiapdaeng.

Distribution

Hibiscus sabdariffa probably originates from Africa, where it may have been domesticated in Sudan about 6000 years ago, first for its seed and later for leaf and calyx production. In the 17th century vegetable types were introduced to India and the Americas. Selection for fibre production took place in Asia, where cultivation is reported from the beginning of the 20th century, e.g. in India, Sri Lanka, Thailand, Malaysia and Java. Roselle is now found throughout the tropics. In tropical Africa it is especially common in the savanna region of West and Central Africa. It is often found as an escape from cultivation. However, apparently truly wild plants of *Hibiscus sabdariffa* have been collected in Ghana, Niger, Nigeria and Angola.

Description

Large annual herb up to 4.5 m tall; stem glabrous to sparsely pubescent, sometimes sparsely prickly, green or reddish. Leaves alternate, simple; stipules narrowly lanceolate to linear, up to 1.5 cm long; petiole 0.5–12 cm long; blade shallowly to deeply palmately 3–5(–7)-lobed, sometimes undivided, up to 15 cm × 15 cm, margin toothed, glabrous or sparsely pubescent, sometimes with a few prickles on midrib, palmately veined, with a distinct nectary at base of midrib. Flowers solitary in leaf axils, bisexual, regular, 5-merous; pedicel up to 2 cm long, articulate; epicalyx segments 8–12, united at base, subulate to triangular, free part 0.5–2 cm long; calyx campanulate, up to 5.5 cm long, becoming fleshy in fruit, lobes nearly glabrous to hispid hairy, with a nectary outside; petals free, obovate, up to 5 cm × 3.5 cm, pale yellow or pale pink, often with dark red-purple centre; stamens numerous, united into a column up to 2 cm long, pink; ovary superior, 5-celled, style with 5 branches. Fruit an ovoid capsule up to 2.5 cm long, almost glabrous to appressed-pubescent, enclosed by the calyx, many-seeded. Seeds reniform, up to 7 mm long, dark brown. Seedling with epigeal germination; cotyledons rounded, up to 2.5 cm × 3 cm, leafy.

Morphology

Fig 2: *Hibiscus sabdariffa*

Hibiscus sabdariffa ruber is an annual, erect, bushy, herbaceous subshrub that can grow up to 8 ft (2.4 m) tall, with smooth or nearly smooth, cylindrical, typically red stems.

- **Leaves**

The leaves are alternate, 3to 5 in (7.5–12.5 cm) long, green with reddish veins and long or short petioles. The leaves of young seedlings and upper leaves of older plants are simple; lower leaves are deeply 3 to 5 or even 7 lobed; the margins are serrate.

- **Stems**

Stems are woody, cyclindrical and typically red to purple. The calyx, stems and leaves are acid and closely resemble the cranberry.

- **Flowers**

Flowers, borne singly in the leaf axils, are up to 5 in (12.5 cm) wide, yellow buff with a rose or maroon eye, and turn pink as they wither at the end of the day. At this time, the typically red calyx, consisting of 5 large sepals with a collar (epicalyx) of 8 to 12 slim, pointed bracts (or bracteoles) around the base. White to yellowish white flowers (8 cm wide) have a red spot in center, bright red, fleshy calyx enclosing the base of cranberry.

- **Fruits**

Fruits are velvet capsules and turn brown when mature. They split open and dry. Dehiscent, dry fruit is classified as capsule.

- **Seeds**

Seeds are brown in color, kidney shaped and wrinkled.

- **Roots**

Roselle has a prolific root system with a long taproot and extensive lateral roots allowing it to be more sensitive to changes in soil moisture and the absorption of deep soil water.

Uses

1) Vegetable
2) Bevarage
3) Herbal medicine
4) Traditional/Ethnobotanical Uses

The hibiscus has had a lengthy history of use in Africa and neighboring tropical countries. Its fragrant flowers have been used in sachets and perfumes. In areas of northern Nigeria, this plant has been used to treat constipation. Fiber from H. sabdariffa has been used to fashion rope as a jute substitute. The fleshy red calyx is used in the preparation of jams, jellies, and cold and warm teas and drinks. The leaves have been used like spinach. The plant is used widely for the treatment of cardiac and nerve diseases and has been described as a diuretic. Drinking sour tea for the treatment of It has been used in the treatment of cancers. Research reveals little or no evidence of these medicinal uses of hibiscus. The mucilaginous leaves are used as a topical emollient in Africa. In Western countries, hibiscus flowers often are found as components of herbal tea mixtures. In Thailand, people consume roselle juice to quench thirst. Karkade seed products (ie, karkade defatted flour, protein concentrate, protein isolate) have been studied for their nutritional and functional value.

5) Hypertension

A randomized clinical trial evaluated the effect of sour tea available commercially in Iran on essential hypertension in otherwise healthy volunteers. A decrease in blood pressure was seen. However, after cessation of drinking the sour tea, a rise in blood pressure occurred. Although no adverse effects were seen in this study, the use of sour tea for treating hypertension requires further study.

6) Antibacterial/Vermifuge

Aqueous extracts of hibiscus appear to exert a slight antibacterial effect. In laboratory and animal studies, worms were killed by hibiscus extracts. Research reveals little or no clinical data regarding the use of hibiscus as an antibacterial or vermifuge (kill worms).

7) Chemo preventive effects

Components of hibiscus have shown potential as a chemopreventative agent against tumor promotion in laboratory and animal studies. These components also possess anti-inflammatory properties. Research reveals little or no clinical data regarding the use of hibiscus as a chemopreventive agent.

8) Laxative effects

The plant has been used as a mild laxative. While animal studies show a mild cathartic effect, research reveals little or no human clinical data regarding the use of hibiscus as a laxative.

9) Other uses

Hibiscus has been studied for its use in preventing renal stone formation, as well as its respiratory and sedative effects. To date there is no clinical evidence to prove any of these beneficial medical effects. Additionally, hibiscus anthocyanins have shown antioxidant activity in protecting against hepatotoxicity in rats. Application and action in humans has yet to be investigated.

Chemical Constituents

Table 1: Physicochemical constituents of the fresh calyces and leaves of H. sabdariffa.

S. No	Constituents	Calyces(fresh)	Leaves (fresh)
1	Moisture	9.2g	86.2%
2	Protein	1.145g	1.7-3.2%
3	Fat	2.61g	1.1%
4	Fibre	12.0 g	10%
5	Ash	6.90 g	1%
6	Calcium	12.63 mg	0.18%
7	Phosphorus	273.2 mg	0.04%
8	Iron	8.98 mg	0.0054%

Pharmacological Effect

1. Antihypertensive,
2. hepatoprotective,
3. Antihyperlipidemic,
4. antioxidant activity,
5. anticancer activity,
6. antipyretic activity,
7. antinociceptive activity,
8. antiinflammatory activity,
9. anticholesterol effects,
10. antibacterial activity,
11. antifungal activity,
12. Antiparasitic Activity and
13. Anticholestrol activity.

Larvicidal and Ovicidal activity

Mosquitoes are the vectors for the dreadful diseases of mankind. Mosquitoes are the most dangerous insect pests affecting humans and animals worldwide, transmitting a number of epidemic and fatal diseases. WHO has declared the mosquito "public enemy number one". They also cause allergic responses in humans that include local skin and systemic reactions such as angioedema. Major dreadful diseases caused by mosquitoes are Malaria, Dengue fever, Yellow fever, Filariasis, Japanese encephalitis, Chikungunya. So, by performing Larvicidal and Ovicidal activity mosquito population can be reduced by determining the mortality rate of it's larva and ova. Excessive use of synthetic pesticides causes resistance to them and harmful effects on non-target organisms. So, development and improvement of mosquito control methods that are economical and effective as well as safe for non- target organisms and environment, therefore taking this into consideration herbal insecticides were selected.

Literature Review

Rajansingh Raveen *et al.* (2017) [13] performed a laboratory evaluation of few plant extracts for their ovicidal, larvicidal and Pupicidal activity against medically important human dengue, Chikungunya and zika virus vector, Aedesaegypti by exposing their eggs, larvae and pupae to different concentrations 62.5,125,250 mg/L and their LC_{50} and LC_{90}values of larvae and pupae were calculated after 24hours. The mortality rate of eggs was calculated after 72 hours of exposure. They concluded that the mosquitocidal potential of these plant extracts were very efficient to kill the mosquitoes in early stages.

V.H. Shruthi *et al.* (2016) [14] performed a study on Roselle as a source of natural color. It is reported to be antihypertensive, antiseptic, sedative, diuretic, digestive, purgative, emollient, demulscent and astringent. They reported the plant can be

used as flavoring agent or colorant for foods. They concluded that *Hibiscus sabdariffa* is used as source of natural color.

Sivasankaran Kuppusamy *et al.* (2015) [15] studied the ovicidal and larvicidal activities of hexane, chloroform and methanol extracts of Gymnema sylvestre, *Scilla peruviana*, *Rubia cordifolia* (R. cordifolia) and *Elytraria acaulis* roots against the eggs and larvae of *Aedes aegypti* L. (A. *aegypti*) and Culex quinquefasciatus at various concentrations of 62.5, 125, 250, 500mg/L. The larvicidal and ovicidal activities were recorded by taking LC_{50} and LC_{90}values. Hence he found outmethanol extract can be used effectively for biological control of mosquitoes.

Anupam Gosh *et al.* (2014) [16] performed mosquito larvicidal potential of the crude extracts of four plants *viz. Alternanthera sessilis* L. (Amaranthaceae), *Trema orientalis* L. (Cannabaceae), Gardenia carinat*a* Smith. (Rubiaceae) and *Ruelliatu berosa* L. (Acanthaceae) against Culex quinquefasciatus. Selective concentrations (0.5, 1 and 1.5%) of crude extracts of all four plants were tested against C. quinquefasciatus. In 72 hours, the highest mortality was recorded. They concluded that the crude extracts showed larvicidal activity against Culex quinquefasciatus Roger Paul *et al.* (2013) [17] studied the potential of kenaf (*Hibiscus cannabinus*) and Cora (*Zea mays*. L.) for phytoremediation of dredging sludge contaminated by trace metals. By comparing cadmium and zinc concentrations in stem and leaves of kenaf separately one can find out that about 70 % of zinc extracted was accumulated in stem. So they concluded that kenaf has high tolerance to low soil fertility and doesn't requires mud field management system.

Anitha Rajasekaran *et al.* (2012) [18] performed larvicidal activity on Aedesaegypti by using aqueous extracts from plants of Datura stramonium, Tridax procumbens, Gomphernaspcs, Euphoria hirta at 1000µg/ml of concentration and moitrtality rate was calculated after 24 and 48 hrs. Either the crude drugs or their phytochemicals can be used as effective vector control agents individually or in combinations.

M. Govindarajan *et al.* (2011) [19] performed an activity on mosquito larvicidal, ovicidal and repellant properties of botanical extracts against anopheles stephensi, Aedesaegypti and Culex quinquefasciatus. The larvicidal, ovicidal and repellent activity of crude benzene and ethylacetate extracts of leaf of Ervatamia coronaria and Caesalpinia pulcherrima were assayed for their toxicity against the mosquitoes. The larva mortality was observed after 24hrs of exposure by taking LC_{50} and LC_{90} values under consideration and mean percent hatchability of the ovicidal activity was observed at 48 hrs of post treatment. They have concluded that leaf solvent plant extracts have a potency to control mosquitoes M. Govindarajan *et al.* (2011) [20] performed mosquito larvicidal and ovicidal properties of *Eclipta alba* (L.) against chikungunya vector, Aedesaegypti (Linn) (Dipteria Culcidae). They studied the larvicidal activities of benzene, hexane, ethyl acetate and chloroform extracts of *Eclipta alba*. TheLC_{50} values of benzene, hexane, ethyl acetate, methanol and chloroform were calculated. Maximum larvicidal activity was observed. Methanol extract excreted 100% mortality at 300ppm (zero hatchability). Therefore crude extract was an excellent potential for controlling A. *aegypti* M. Govindarajan *et al.* (2011) [21] performed mosquito larvicidal and ovicidal activity of different solvent extracts of Cardiospermum halicacabum and tested it against C. *quinquefasciatus* and A. aegypti. The different solvents like benzene, hexane, ethylacetate, methanol and chloroform were used in larvicidal and ovicidal activity was determined at various concentrations ranging from 100-600 ppm under laboratory conditions. The plant extracts showed efficacy against the larva and ova and the LC_{50} values were calculated. Therefore they concluded that the crude extracts were a potential for controlling the larva and ova.

Conclusion

Hibiscus cannabinus and *Hibiscus sabdariffa* has reviewed for this Pharmacognostical and phytochemical constituents. In this review it is a Potencial for research doing scholars. In this review various pharmacological activities also discussed both plants. Both the plants once isolate the active molecules if it's more beneficial for this society. India is a developing country, here available herbs more valuable for various ailments without side effects, once complete this research it will promote our health of civilization.

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