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A Review on *Bauhinia variegata* (Kanchnar) - A useful Ayurvedic Herb

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ABSTRACT

Bauhinia variegata Linn. well known as kanchnar/rakta kanchan belongs to the family Caesalpiniaceae. The chemical constituents found in Kanchnar help in treatment of various ailments. A wide variety of phytochemical constituents isolated from this plant are sitosterol, lupeol, kaempferol, tannins, carbohydrates, alkaloids, apigenin, quercetin, reducing sugars. The present review calls for attention on chromatographic methods for standardization. The review further highlights distinct therapeutic potential of kanchnar medicine if standardized with respect to content of active constituents to be listed as anticancer, antioxidant and antidiabetic.

Key Words *Analytical methods, Bauhinia Variegata (Kanchnar), Therapeutic Potential*

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INTRODUCTION

Ayurveda is more than just a form of medicine; it is a science of life or an art of longevity. The stem, bark, and blossoms of kanchnar are utilised in many formulations of the ancient Indian science of life known as ayurveda. Priyavrat Sharma refers to Kanchnar as Gandmalanashak Varga in his book *Dravyagun Vigyana part-2*¹. kanchnar plant and its leaf is shown in Fig 1 & Fig 3.

The Caesalpiniaceae family includes *Bauhinia variegata* Linn., sometimes known as kanchnar or raktakanchan. The word "kanchnar" means "A shining gorgeous lady" in Sanskrit. a medium-sized ephemeral tree that can be found in India's

Himalayan areas. The plant's bark is cream coloured on the inside and greyish brown on the outside when it is first collected. After drying, the bark takes on a curled or channelled appearance. Southeast Asian native kanchnar grows in tropical and subtropical environments. It is found in Sikkim and Punjab state's sub-Himalayan and outer Himalayan regions (India). Other nations like China and Burma as well as tropical nations like South America and Africa also have it.

In certain locations of India, the tree's leaves, flowers, and flower buds have long been used as vegetables. Different varieties of kanchnar plant is shown in Fig 2. Additionally, kanchnar's stem

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yields fibre. Another product made in kanchnar is called as gum².



Figure. 1 Kanchnar plant

Vernacular names³

Hindi name-Kachanar

Bengali name- Kanchana

Marathi name-Koral

Telugu name-Devakanchanamu

Tamil name-Mandare

Gujarati name-Chapmakati

Malayalam name Koral, Kanchan



Figure 2 Varieties of Kanchnar plant

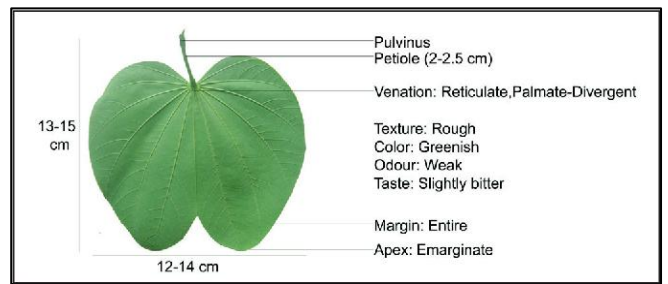


Figure 3 Leaf of Kanchnar plant

Sanskrit synonyms

Kanchanara, Gandari - helpful for thyroid problems and cervical lymphadenitis, Kovidara, Chamarika, Karbudara and Svalpakesari
Yugapatraka - At the apex of the leaf, a split occurs, separating the leaf into two halves.

Classical categorization

CharakaSamhita- Vamanopaga- a collection of plants that are beneficial in Vamana Panchakarma therapy (emesis)

SushrutaSamhita- Herbs used in Vamana therapy include the Kashayavarga and Urdhwabhagahara groups, which have bitter tastes.

Kanchnar - Medicinal qualities

Guna (qualities)

1. Laghu (light to digest), Rooksha, Sheetavirya

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2. Rasa (taste) Kashaya (Astringent)
vipaka-taste conversion after digestion-Katu
(pungent)

Prabhava-Special effect –Gandamala nashana-
Helpful in cervical complications

Effect on Tridosha - Relieves Kapha and Pitta.

Varieties

White-Bauhinia variegata

Red-Bauhinia purpurea

Yellow-Bauhinia tomentosa

Ayurvedic uses

Grahi- absorbent

Krumighna- worm infection is relieved

Kushtaghna - used in skin diseases

Gudabhramsha- used in the treatment of rectal
prolapsed

Gandamala- used in cervical lymphadenitis,
Thyroid problems

Pittasra- used in bleeding disorders

Pradara - used in menorrhagia heavy menstrual
bleeding

Kasanut-Used in cough and cold

Formulations with Kanchnar as one of the ingredient:

1. Kanchnar Guggul- A very famous
Ayurveda tablet (e.g Divya Kanchnar guggul
20gm with 40 tabs of 500 mg each)

2. Chandanasava- used as cardiac and
digestive tonic.

3. Chitrakadi Taila- An herbal oil used to
promote rapid healing of the fistula tract

4. Ushirasava-A syrup used in treating heavy
menstrual bleeding skin diseases etc.

5. Mutra Sangrahaniya Kwatha-Used in UTI

6. Gandamala Kandana Rasa- Used in goitre,
cervical lymphadenitis.

Morphology

This tree has a dark brownish bark that is practically smooth, a deciduous trunk that can reach a height of 15 metres, and branches that are initially puberulent grey before becoming glabrous. Leaf blade, suborbicular or broadly oval, 5-9*7-11 cm; petiole, 2.5-3.5 cm. lobes rounded at apex; apex bifid to 1/3. Fusiform, smooth, subsessile flower buds. Petals are 4-5 cm long, clawed, and white or have pink or purple markings.

Chemical Constituents

β-Sitosterol, lupeol, kaempferol, tannins, carbohydrates, amides, reducing sugars, vitamin C, crude protein, fibres, calcium, phosphorus, quercetin, rutin, quercitrin, apigenin, and apigenin are the chemical components of the plant that have been identified thus far.

The primary goal of this study is to draw attention to the chromatographic techniques used and their unique therapeutic potential ⁴.

A significant portion of the population in developing nations is heavily dependent on natural and herbal sources. The need for these natural medicines drives scientists to create standardised herbal formulations.

The medicinal efficacy of herbal plant extracts is ensured by the standardisation of the active components found in those extracts ⁵⁻⁶.

Ayurvedic ingredient Kanchnar guggul comes in the shape of a spherical pill or vati, is black or brownish-black in colour, and has a pleasant

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unique odour and a bitter taste. Both the Indian Ayurvedic Pharmacopoeia and the Ayurvedic Formulary contain a listing for it. Approximately 12 different ingredients make up the formula, including *Bauhinia variegata* stem bark (*Kanchnar*, 480 g), *Terminalia chebula* pericarp (*Haritaki*, 96 g), *Terminalia bellerica* pericarp (*Bibhitaka*, 96 g), *Phyllanthus emblica* pericarp (*Amalaki*, 96 g), *Zingiber officinale* rhizome (*Sunthi*, 48 g), *Piper nigrum* fruits (*Marica*, 48 g), *Piper longum* fruits (*Pippali* 48 g), *Crataeva nurvala* stem bark (*Varuna*, 48 g), *Elettaria cardamomum* seeds (*Ela* or *Sukshmaila*, 12 g), *Cinnamomum zeylanicum* stem bark (*Tvak*, 12 g), *Cinnamomum tamala* leaves (*Tejpatra*, 12 g), and *Commiphora awightii* oleo-resins purified (*Guggulu-Shuddha*, 996 g). Among these, *Kanchnar* and *Guggulu* are chief and major ingredients. *Kanchnar* and *Guggulu* possess properties like *Deepan*, *Pachan*, *Vatta-Kaphashamak*, *Shoth-har*, *Lekhan* and *Bhedi*, which help to get rid of the cardinal symptoms (heat, pain, redness, swelling, etc.) of minor tumors. *Guggulu* contains oleo-resins which have a potent anti-inflammatory (*shothhara*) effect. It is therapeutically used to treat *Gulma* (abdominal lump), *Gandamala* (cervical lymphadenitis), *Apachi* (chronic lymphadenopathy/ scrofula), *Granthi* (cyst), *Vrana* (ulcer), *Kustha* (diseaseskin), *Bhagandara* (fistula-in-ano) and *Slipada* (filariasis). Both benign and malignant tumours are treated with the formulation in clinical

practise⁷⁻¹¹. Most of the significant plants that go into making this mixture, or their phytochemicals, have shown to be effective anticarcinogens¹²⁻¹⁸.

Analytical Methods

Herbal products though available in their pure forms or marketed in plant extracts opens a number of opportunities towards the development of new drug leads. This is because of their unmatched chemical heterogeneity. Prior to formulation of the herbal drugs, the standardization of these drugs is necessary. Plants are the most abundant sources of the number of active components. These can be quantified & analyzed using validated methods. Thus, standardization of herbal crude drugs gives the assurance of chemical compounds present in them¹⁹. Analytical methods play an evident role in identifying the active chemical constituents, the content of the chemical constituents and their therapeutic potentials.

THERAPEUTIC POTENTIAL**1) Antidiabetic:**

B. variegata's aqueous and ethanolic extract demonstrated notable anti-diabetic efficacy in streptozotocin-induced (type I and type II)²⁵⁻²⁷.

In streptozotocin (STZ) and alloxan-induced diabetic rats, oral administration of ethanolic, fluid, and hydro-alcoholic concentrate of the leaves and stem bark of *B. variegata* at different dosages, i.e. 200 and 400 mg/kg, reduced the elevated blood glucose level via enhancing glucose metabolism²⁸.

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Table 1 Analytical methods

Analytical Methods	Key objectives	Principle conclusion	Ref
TLC & HPTLC	Estimation of lupeol using normal TLC & densitometric HPTLC method.	The presence of violet-colored bands showed presence of lupeol at an Rf. of 0.65 using TLC. The quantitative estimation was reported using HPTLC.	20
UHPLC–UV–MS based fingerprinting approach, coupled with multivariate data analysis.	Identification of eight species for their antidiabetic and other activities. The analysis was carried with an aim to identify compositional differences in the species.	The extensive study was provided with the polyphenol composition in <i>Bauhinia</i> L. This preliminary analysis can be further studied for single chemical compounds of <i>Bauhinia</i> L.	21
HPTLC Fingerprint Analysis.	Optimizing of the HPTLC fingerprint method involved in standardization of the herb <i>Bauhinia variegata</i> .	The detection of 11 peaks after HPTLC analysis was identified. Thus, the study can be employed for identification of reference compounds and standardization of <i>Bauhinia variegata</i> Linn. Leaves	22
GC-MS and HPTLC Fingerprinting	Quantitative Phytochemical analysis of <i>Bauhinia variegata</i> species using CC, GC-MS & HPTLC for Active compounds quantification	The cytotoxic assays were reported for the anticancer activities in ethanolic extract of <i>Bauhinia variegata</i> leaves. The biologically active chemical constituents were fractionated using spectroscopic as well as by GCMS, HPTLC methods	23
Determination of Quercetin using HPTLC in polyherbal formulation.	The estimation of quercetin using HPTLC in bioactive fractions of plant extracts & hepatoprotective polyherbal formulations.	The method validation and quantification of quercetin in <i>Ocimumgratissimum</i> , <i>Buteamonosperma</i> , <i>Bauhinia variegata</i> and polyherbal hepatoprotective formulation was performed using HPTLC	24

THERAPEUTIC POTENTIAL

1) Antidiabetic:

B. variegata's aqueous and ethanolic extract demonstrated notable anti-diabetic efficacy in streptozotocin-induced (type I and type II) ²⁵⁻²⁷.

In streptozotocin (STZ) and alloxan-induced diabetic rats, oral administration of ethanolic, fluid, and hydro-alcoholic concentrate of the leaves and stem bark of *B. variegata* at different dosages, i.e. 200 and 400 mg/kg, reduced the elevated blood glucose level via enhancing glucose metabolism ²⁸.

2) Anticarcinogenic & Antimutagenic:

Using a skin cancer and melanoma tumour model, *B. variegata* extract was tested for its anticarcinogenic and antimutagenic potential in Swiss albino mice. Results of the 30-day micronucleus and chromosomal aberration tests revealed an increase in life span and significantly smaller tumours compared to controls ²⁹.

In a different investigation, Swiss albino mice were used to test the effectiveness of an ethanol extract of *B. variegata* (EBV) against Dalton's ascitic lymphoma (DAL). It was shown that EBV therapy increased the number of peritoneal cells. This effect is likely due to macrophage activation

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and augmentation or some type of cytokine production inside the peritoneal cavity. The changes in the haematological parameters brought on by tumour injection might be reversed in the EBV treated groups. This impact could be explained by lectins, which are known to alter the structure of the cell envelope, and flavonoids, which have been demonstrated to have antimutagenic and anticarcinogenic activity³⁰.

B. variegata's shade-dried leaves were used to make an ethanol extraction, which was then exposed to column chromatography. By evaluating the anticancer activity on COLO 320 cell lines, active fractions were discovered²³.

3) Antiarthritic:

This study demonstrates that giving this to rats with arthritis greatly lowered their levels of Paw Edema and changed their biochemical parameters as well as the levels of several antioxidant enzymes. According to the results of this investigation, the ethanolic extracts of this plant significantly reduced arthritic symptoms in rats³¹.

4) Nephroprotective effect:

The ethanolic concentration of *B. variegata* (Linn.) whole stem extract's nephroprotective effects against cisplatin-induced nephropathy in rats were studied in in-vivo. When compared to the toxic group, 14 days of treatment with the ethanol concentrate of *Bauhinia variegata* at a dose level of 400 mg/kg body weight resulted in significant decreases in serum creatinine and urea levels, decreases in urine creatinine and albumin with a significant weight gain, and increases in urine output. In contrast to the poisonous rats, the

group that received BV extract had minimal histological damage³².

5) Anti-helmintic:

The anti-helmintic activity of the bark of *B. variegata* against *Pheretimaposthuma* and *Ascardiagalli* was investigated using aqueous and chloroform extracts. For the worms, both extracts (25, 50, and 100 mg/ml) have demonstrated a dose-dependent effect on the duration of paralysis and death. In an aqueous extract, both worms paralysed and died at the same time, however in a chloroform extract, *Ascardiagalli* took longer to paralyse and die. The experiment using piperazine citrate at a concentration of 20 mg/ml demonstrated exceptional anthelmintic potential against both worms. Both concentrates displayed their most potent vermicide effect at a concentration of 100 mg/ml. According to the results of the test, the aqueous and chloroform concentrate of *B. variegata* bark exhibits potential anthelmintic activity³³.

6) Anti-oxidant:

When examined by BHA, BHT, quercetin, ascorbic acid, and propyl gallate, the acetone, aqueous, and ethanolic extracts of *B. variegata* L. shown much greater antioxidant activity than other extracts (petroleum ether, chloroform, benzene)³⁴.

7) Anti-tumor:

The phytochemical analysis revealed that EBV contained flavonoids, lectin, and albumin (Ethanolic extract of *Bauhinia variegata*). The authors came to the conclusion that the EBV's

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flavonoid and lectin may be responsible for its anticancer effects¹⁴.

8) Anti-inflammatory:

According to Mohamed M., a novel tri-terpene saponin extracted from the leaves was discovered to be nontoxic and to exhibit strong anti-inflammatory properties³⁵.

When examined using the carrageenan-induced hind paw oedema technique, a new flavonol glycoside isolated from the ethyl acetate soluble fraction of the 90 percent ethanolic extract of the roots of *B. variegata* shown significant anti-inflammatory activity³⁶.

9) Hepatoprotective:

Rats with liver tumours caused by N-nitrosodiethylamine showed chemoprevention when given an ethanolic concentration of *B. variegata*'s stem. In rats exposed to carbon tetrachloride, which causes hepatotoxicity, the ethanolic concentrate of the stem bark of *B. variegata* displayed hepatoprotective effect by lowering the levels of AST, ALT, ALP, and GGTP³⁷.

10) Effect on wound healing:

The injury-healing effects of the ethanolic and fluid concentrates of *Bauhinia variegata* at the doses of 200 and 400 mg/kg body weight were examined using extraction and entry point twisting models in pale skinned Wistar rats. At both doses, the ethanolic extract of *B. variegata* produced notable injury recovery in the extraction and cut injury models, which was comparable to the standard (framycetin) in the model for extraction wounds²⁸.

11) Antimicrobial activity:

B. variegata from Nepal was discovered to show antibacterial action against *Vibrio cholerae*, *Shigella dysenteriae*, *Shigella typhi*, *Salmonella typhi*, and *Pseudomonas aeruginosa*. The same plant, which was harvested in India, shown outstanding effectiveness against both gram-positive and gram-negative bacteria, with gramme positive bacteria showing greater efficacy³⁸. *B. subtilis* was determined to have the biggest zone of inhibition. Several solvent extracts of *B. variegata* suppressed *Staphylococcus aureus* growth in diffusion assays³⁹.

12) Antihyperlipidemic:

One of the most vulnerable substances to free radical damage is lipids. Lipid peroxidation is the term for this oxidative damage, which can lead to numerous clinical occurrences. The aqueous and ethanolic extracts of *B. variegata* Linn. were discovered to have promising anti-hyperlipidemic activity in the early research⁴⁰. Its antioxidant activity may contribute to some of its anti-hyperlipidemic effects. When tested on rats with Triton WR-1339-induced hyperlipidemia, the butanolic fraction of total methanol extract of leaves significantly reduced cholesterol, triglyceride, LDL, and VDL levels while also raising HDL levels⁴¹.

CONCLUSION

From the studies reported by many scientists as mentioned above, it is seen that *Bauhinia*

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Variegata bark and leaves extracted using various solvents have shown remarkable pharmacological effects. There is a scope for further research by determining the chemical constituents quantitatively in these extracts and correlation is established with the pharmacological effects observed. This is pave way for chemical standardization of raw bark as well as the final dosage form.

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REFERENCES

1. Singh, P., Tiwari, R. C., Bhutiani, R., & Singh, V. (2021). Kanchnar (Bauhinia Variegata Linn.) as a thyroid gland protecting drug. *Ayushadhara*, 8(3), 3349-3353.
2. Kansal, M., Shukla, P., & Shukla, P. (2020). a Boon To Human Health-Bauhinia Variegata. *Int J Pharmacogn*, 7, 155-61.
3. https://www.easyayurveda.com/2012/12/26/kanchanara-bauhinia-variegata-uses-dosage-ayurveda-details/vernacular_names_sanskrit_synonyms
4. VikasNariyal, Priyanka Sharma, kanchnar (bauhinia variegata) as a medicinal herb: a systematic review, *International Journal of Advanced Research*, ISSN: 2320-5407, 5(9), 587-591.