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Phyto pharmacognostical and isolation of chemical constituents from bauhinia variegata leaf extract

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Abstract

The pharmaceutical sector is focused on development of new drugs and plant based drugs through investigation of leads from traditional system of medicine Ayurveda which is being practiced for thousands of years. *Bauhinia variegata* is a species of flowering plant in the family *fabaceae*. The major chemical constituents of the plant was found to be flavone, 5,7-dimethoxy-30, 40-methylenedioxy flavone and a new dihydrodibenzoxepin, 5,6-dihydro-1,7-dihydroxy-3,4-dimethoxy-methyl dibenzoxepin, flavono glycoside, triterpene saponin, phenanthraquinone, flavonoids. *Bauhinia variegata* is found as chemoprotective antitumor activity, anti-inflammatory, anti-diabetic, antioxidant and etc., in our present investigation we propose to isolate the major phytochemical constituents from *Bauhinia variegata*.

Keywords: *Bauhinia variegata*, Flavone, Ayurveda, Chemoprotective.

Introduction

Herbal Medicine is the use of whole plant preparations and is the oldest known form of medicine. It has been used for over 2,000 years and is still the major form of medicine for over 75% of the world's population. Our ancestors used trial and error to discover the most effective local plants for the treatment of illnesses. Advances in science have enabled a better understanding of the physiological effects of herbs on the human body and therefore their role in restoring health. Herbal medicines support the body's natural healing process and aim to treat the person as well as the disease.

Bauhinia variegata is native to southeastern Asia, from southern China west to Pakistan and India. The major chemical constituents of the plant were found to be flavones, flavonol glycoside, triterpene, phenanthraquinone. *Bauhinia variegata* shows anti-inflammatory^[1], chemoprotective^[2] and hepatoprotectivity^[3].

The traditional approach on herbal drug research consists of the following steps.

- Identification of the plant reportedly in use.
- Collection of the plant.
- Transport of the plant to the research laboratory.
- Storage of the plant.
- Preparation of the extracts.
- Toxicity studies of the plant extracts in animals.
- Evaluation of therapeutic efficacy of the extract in animal models.
- Identification of the extracts which is having more activities.
- Further fractionation of the active molecule.
- Structural elucidation of the bio-active molecule.
- Synthesis of bio-active molecule.

Plant Description [4]

Plant Material

The leaves of *Bauhinia variegata* plant were collected from the Jeypore College of pharmacy herbal garden in the month of August-September and leaves were dried under shade for 15 days, coarsely powdered and stored in air tight container for the further study.

Plant Profile

Botanical Description

Botanically Raktakanchara is identified as *Bauhinia variegata* and is a member of *caesalpinaceae* family. *Bauhinia* which is a large genus belongs to *caesalpiniceous*

subfamily under which 250 species have been described. In India the family is represented by 16 genera. In *Bauhinia* about 15 species occur in India.

Morphology

Distribution: Distributed throughout India in areas about 1800 meters in elevation. It is also distributed throughout tropical regions of the world.

Habitat: Distributed in Punjab, central and south India & China. It occurs in tropical regions and found throughout India. It is found wild in sub-Himalayan tract and outer Himalaya's up to 1300 meters.

Habit: A medium sized deciduous tree ascending to an altitude of 1300 meters in the Himalayas found in deciduous forests. Also grown as an ornamental tree for its beautiful appearance in flowers.

Bark: Gray with longitudinal cracks, pale pink inside. Wood moderately hard. Grayish brown with irregular darker patches.

Leaves: Leaves are 10-15 cm long, petiolate, divide into 2 lobes. Base is usually deeply cordate, 11-15 nerved. Leaflets 11-13 cm, adnate to about 2/3rds up, ovate-oblong or rounded, nerves 11 from base, transverse nervules, prominent, connate for about 2/3rds up, leaflets ovate, rounded apex, upper side glabrous.

Flowers

Flowers are white or pink, large and fragrant. The uppermost petal darker and variegated usually appears before the leaves in short axillary or terminal racemes. Pedicels short or sessile. Calyx pulses cent outside. Petals 5-6.3 cm long, ovate with white or pale purple petals. Stamens are less, staminodes absent.

Fruit: 15-20 / 1.2 cm flat, hard dehiscent, dark brown pod glabrous. 10-15 seeded.

Organoleptic study

In organoleptic evaluation, various sensory parameters of the plant material, such as color, odour, taste, shape and texture of the powder were studied.

1	Color	Greyish-Brown
2	Odor	Characteristic
3	Taste	Astringent
4	Shape	Curved
5	Texture	Rough

Taxonomical Classification

Kingdom	<i>plantae-plants</i>
Sub-kingdom	tracheobionta - vascular plants
Super division	<i>spermatophyte</i> - flowering plants
Division	<i>magnoliophyta</i> - dicotyledons
Class	<i>Magnoliopsida</i> .
Sub class	<i>rosidae</i> .
Order	<i>roseales</i>
Family	<i>fabaceae</i>
Sub family	<i>caesalpinaceae</i>
Genus	<i>bauhinia</i>
Species	<i>variegata</i> .L.
Botanical name	<i>Bauhinia variegata</i> Linn

Vernacular Names

Sanskrit	phalgu
Hindi	Kachnar.
Telugu	adavimandaramu, devakanchanamamu
Tamil	Kattaki, kanjani.
Odia	kachan, borada, kosonara,
Malayalam	chuvannamandaram, mandaramu
Punjabi	Kanchanal, kovidara, kolar
Kannada	kanchavala, bilimandar



Plant image

Leaf

Experimental Work ^[5]

Plant was identified and authenticated then leaves were collected. The collected plant material was after removal of soil and adhering material dried at room temperature for 5-6 days. Powdered to 60 # and were used for the powder study. Chemical constituents by applying standard phytochemical screening methods.

Extraction with Methanol

200 gm of *Bauhinia variegata* leaves were dried and powdered and that powder was extracted with 30 ml of Methanol of 100% chloroform for 2 hrs at 65-75°C for three times and filter the extract by using Buchner funnel and filtrate was concentrated by using rota vapour and got the 3 gm of powder.

200gm of *bauhinia variegata* leaves



Dried and powdered



Powder was extracted with 30ml of Methanol of 100% chloroform for 2hrs at 65-75°C for three times



Filter the extract by using Buchner funnel



Filtrate was concentrated by using rota vapour



3gms of powder

Results and Discussion ^[6]

In the present study *Bauhinia variegata* belonging to family *fabaceae* were collected and authenticated. The authenticated leaves were subjected to physicochemical evaluation. Leaves

were subjected to size reduction to get a coarse powder and subjected to quality control tests with various parameters such as physical tests, extractive value, ash value, identification of major chemical constituents and its estimation was carried out as per pharmacopoeia/literature.

Table 1: leaf constants of *Bauhinia variegata* Linn.

Leaf	Stomatal index	Palisade ratio	Vein-islet No	Vein-termination No
<i>Bauhinia variegata</i>	5.28	7	8.7	6.4

Table 2: Physical constants of *Bauhinia variegata* Linn

sl.no	physical constants	results
1	Ash values	
	a) Total Ash	9.50% w/w
	b) Acid insoluble Ash	6.95% w/w
	c) Water Soluble Ash	4.75% w/w
2	Extractive values	
	a) water soluble extractive	7.65% w/w
	b) Chloroform soluble extractive value	8.95% w/w
	c) Acetone-water soluble extractive	2.25% w/w
	d) Petroleum ether soluble extractive	0.30% w/w
3	Loss on drying	0.60% w/w

Table 3: Phytoconstituents of different extracts of *Bauhinia variegata*

S.no	Phyto-constituent	Petroleum ether Extract	Chloroform Extract	Acetone-Water Extract	Aqueous Extract
1	carbohydrates	-	+	+	+
2	Tannins, phenols	-	+	+	+
3	Amino acids	-	+	+	+
4	Vit C	-	+	-	-
5	Phytosterol	+	-	-	-
6	Triterpenoids	+	-	-	-
7	Saponins	-	+	-	-
8	Alkaloids	-	-	+	+
9	Fats&oils	+	-	-	-
10	Flavonoids	-	+	+	+

Conclusion

The study concludes that the selected plant preliminary phytochemical studies were performed it was found that methanolic extract contains flavones, flavanol glycosides and tannin with various extracts. Presence of above constituents and based on literature *Bauhinia variegata* shows pharmacological actions like chemoprotective antitumor activity, anti-inflammatory, anti-diabetic, antioxidant and etc.,

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