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Research

Atrabotrys hexapetalus: Integrating Numerical taxonomy with Pharmacognostical, Phytochemical and Pharmacological insights

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Abstract

The plant *Artabotrys hexapetalus*, which belongs to the Annonaceae family, has a long history of use in traditional medicine. Investigating published reports on numerical taxonomy, taxonomical classification and geographic distribution, ethanomeditional applications, and pharmacological and phytochemical reviews was the aim of this review. A plant of great importance, widely found all over the world. Native to South India, *A. hexapetalus* is also referred to as Ylang Ylang Vine.To cure a variety of illnesses, traditional medicine uses plant parts such as flowers, fruits, and roots. Analysing different quantifiable leaf properties may be part of a numerical taxonomic research of *Artabotrys* species based on leaf characteristics. The classification and comprehension of the relationships between the different artabotry species could therefore be aided by the generation of similarity and dissimilarity using this data.The goal of the current study was to analyse phytochemicals both qualitatively and quantitatively. Amino acids, carbohydrates, phenols, tannins, proteins, and flavonoids were all detected and estimated in the study. Antimicrobial, anti-inflammatory, anti-cancer, antihelminitics, antifertility, anti-leishmanial, mosquito repellent, anti-diabetic, hepatoprotective, and antipyretic activities are just a few of the pharmacological characteristics of *A. hexaptalus.*

Keywords: *Artabotrys hexapetalus*, pharmacological, phytochemical, numerical taxonomy, pharmacognostical.

INTRODUCTION

The plant *Artabotrys hexapetals* is tiny and climping [1]. The folk remedy *Artabotrys hexapetalus (L. f.)* (*A. hexapetalus*) Bhandari, which has several therapeutic applications, belongs to the Annonaceae family. It

has glabrous, lanceolate, oblong leaves. Peduncles are woody, hooked, recurved branches bearing solitary or paired, frequently fragrant blooms [2]. There are 2000 species and 128 genera in the class *Artabotrys.* One hundred of the 2000 species are found in the Paleotropics, while the majority of the species are found in tropical and subtropical regions of the planet, especially in tropical Africa and Eastern Asia.From India, seven species have been discovered [3]. These seven species include *Artabotrys hexapetalus, Burmanicus, Caudatus, Nicobarianus, Speciosus, Zylanicus, and Sahyadricus* [4]. It is probably native to South India and is grown mostly in India. Large amounts of it are found in southern China and southern Asia. *Artabotry* species have long been utilized in traditional medicine to treat a wide range of ailments. Bitter and caustic, the flower helps with vomiting, blood and heart problems, headaches, and leucoderma. A leaf decoction is used to treat cholera. Its phytochemical components include terpenoids, alkaloids, flavonoids, volatile oil, and phenolic content. Pharmacological effects include cardiovascular protection, anticancer, antitumor, anti-ulcer, antiviral, anti-inflammatory activity, antidiabetic, antimutagenic, antioxidant, gastroprotective effects, antihypertensive, immunomodulatory, and anti-infective.[2,3] Quantitative analysis identified the following: lavonoids (28.3±0.91 mg/gextract), tannins (24.53±1.02 mg/gextract), phenols (7.63±0.85 mg/gextract), proteins (60.4±0.88 mg/gextract), amino acids (19.33±1.30 mg/gextract), and carbohydrates (43.16±1.0 mg/gextract).[5] morphological, microscopical, physicochemical constants, foreign matter, ash values, extractive values, pharmacognostical study, and first phytochemical screening. Microbial studies involve TS of leaves, stems, roots, and seeds [1].

Taxonomical classification

Artabotrys hexapetalus toxonomical classification are given as follow,

Taxonomical classification of Artabotrys hexapetalus (L.f)Bhandari.[6,2,7].

Domain : Eukaryota
Kingdom: Plantae
Subkingdom: Tracheobionta
Division : Magnoliophyta
Phylum: Tracheophyta
Subphylum: Spermatophytina
Class: Magnoliopsida (Dicotyledans)
Subcalss: Magnoliidae
Order: Magnoliales
Family : Annonaceae
SubFamily: Annonodeae
Genus : Artabotrys
Species : Hexapetalus

Synonyms

List of synonyms for Artabotyrs hexapetalus (L.f) Bhandari. [8,9]

Synonyms that plays a in accurately recognizing and classification for medicinal use.In the context of pants synonyms for purpose could include function, role, utility, or objective. The synonyms of *Artabotyrs hexapetalus* includes;

- *Annona hexapetalus .L.f*
- *Annona uncinata Lam.*
- *Artabotrys hamatus (Dunal) Blume.*
- *Artabotrys intermedius Hassk.*
- *Artabotrys odoratussimus R.Br.*
- *Artabotrys uncata (Lour) Baill.*
- *Artabotrys* uncinatus (Lam) Merr.
- Unona esculenta Dunal.
- Unona hamata Blume
- Unona uncata (Lour) Dunal.
- Uvaria hamata Roxb.
- Uvaria odoratissima Roxb.
- Uvaria uncata Lour.

Common names[8,10]

Common name are important for plant because they provide widely understood and accessible way to refer to plant ,especially within a specific region or cuitural cotext.The scientific names are crucial for precise

identification and global communication ,common names play a vital role in cultural heritage ,traditional knowledge.

Common Name: Ylang Ylang Vine
Climbing lang lang
Tail grape

Vernacular names :
Hindi - Hari champa , Madanmast, Manoranjini.
Tamil - Manoranjitham .
Telugu - Manoranjidamu ,Aku sampenga.
Kannada - Madana masthi hoo
Sanskrit - Harachampaka.
Manipuri - chini champra , Chini champa.
Oriya – Kalomuro.
Bengali – Kanthalichampa, kandala, Madanamajari.
Marathi - Hirva chapha.
Nepali - Kanak champa.
Gujarati - Chibhad champo.

Geographical distribution

South India and tropical Asia are the native habitats of the *Artabotrys heapetalus* species. Usually grown as an ornamental plant, this species is found in tropical and subtropical regions.It grows well in regions with harsh climates, and it is frequently found in gardens. It is also widely grown in South China, Taiwan, India, Sri Lanka, and Burma [2]. The geographical range of *Artabotyrs hexapetalus* includes southern India (Tamil Nadu, Salem), and southwest India (Karnataka, Bangalore), and Andhra Pradesh (Sikakulam district, West Godavari district).Bangladesh, Bhutan, Borneo, Burma, Uttar Pradesh, Punjab, Lakshadweep (Kavaratt Island), Northeastern India (Tripura), and North India Shanghai, in southeast China Southern China: Guangdong, Guangxi, Guizhou, Hainan, Hong Kong, Jiangxi, Indonesia: Java, Moluccas, Sulawesi, Sumatra, Eastern Africa: Korogwe, Tanzania, Malaysia, the Philippines, Taiwan, and Vietnam; South-western China: Yunnan; and Eastern China: Zhejiang.[11,12]

Ethnomedicinal uses

The traditional knowledge and practice of using plants and other substances for therapeutic ressons within a particular culture or ethnic group is referred to as ethnomedical usage. Ethanomedicinal uses refers to a variety of medical practices that are not grounded in contemporary scientific medicine.

Flower: *Artabotrys hexapetalus* flowers are used in aromatherapy for their relaxing and potentially aphrodisiac qualities, as well as their pleasant, enticing scent.It includes volatile and essential oils that are used to make perfume.Blood diseases, bladder diseases, biliousness, thirst, leucoderma, and respiratory ailments can all be treated using *Artabotrys hexapetalus* flowers. The flowers of *A. hexapetalus* are employed as a stimulant and tonic in the Siddha and Ayurvedic medical systems.[7,12,13]

Leaves: Because of their antibacterial and anti-inflammatory qualities, *Artabotrys hexaputalus* leaves are used topically to treat wounds, inflammation, and skin infections, among other ethanomedicinal purposes. utilized to treat malaria and chlorea.Leaf decoction is used as an antioxidant, antifungal, heart stimulant, muscle relaxant, and antifertility agent.[7, 2, 13]

Fruits: The fruits of *Artabotrys hexapetalus* are used to heal wounds, ulcers, fever, and diarrhea. Some places use the pulp of ripe fruits to treat fungal infections in animals. [2]

Bark: Traditional uses of *Artabotrys hexaprtalus* bark include the treatment of fever, diarrhea, skin conditions, ulcers, inflammation, cough, asthma, and bronchitis.Additionally, it is utilized to treat conditions including amenorrhea and dysmenorrhea as well as gas, colic, and constipation.[2]

Roots: In particular, gastrointestinal issues are treated by *Artabotrys hexaetalus* roots. The decoction made from *A. hexapetalus* roots is used to treat dysentery, diarrhea, and stomach pain.The roots of this plant are used to treat malaria in the Chinese medical system. Additionally, these roots have diuretic qualities and are used to treat kidney stones and urinary tract infections.[2,13]

Numerical taxonomy

The *Artabotrys* genus from the family of Annonaceae, includes about 2000 species are founed in allover India. Among those 6 different species are found in India. The following six species of *Artabotrys* was selected for numerical taxonomy.

- *Artabotrys hexapetalus*
- *Artabotrys burmanicus*
- *Artabotrys caudatus*

- *Artabotrys nicobarianus*
- *Artabotrys speciosus*
- *Artabotrys zylanicus*

Table 1: Table of similar Artabotrys hexapetalus charecters with other six species of Artabotrys.

Special Characters	***ArtabSotrys Hexapetalus***	***Artabotrys BurmanTheicus***	***Artabotrys Caudatus***	***Artabotrys Nicobarianus***	***Artabotrys Speciosus***	***Artabotrys Zeylanicus***
Length of petiole	4-8mm	3-8mm	0.4-0.8mm	0.5cm	0.5-1cm	4.5-8mm (or) 6-10mm
Length of leaflet	10-24cm	6.5-11cm	10-17cm	10-14cm	10-22cm	13-18cm
Width of leaflet	3-7cm	2.2-3.8cm	4-6cm	4-5.5cm	4-6.5cm	3.5-7cm
Number of leaflet	Unifoliated	Unifoliated	Unifoliated	Unifoliated	Unifoiated	Unifoliated
Leaf shape	Oblong-lanceolate to oblong – elliptic	Oblong-lanceolate to oblong-eliptic	Lanceolate-eliptic to oblong-eliptic	Oblong-eliptic	Oblong-lanceolate to lanceolate-oblong	Oblong (or) oblong-lanceolate
Leaf margin	Entire	Entire	Entire and slightly recurved	Entire	Entire	Entire
Leaf tip	Acuminate to acute(sharpe)	Acuminate to acutes(harpe)	Acuminate to acute(sharpe)	Acuminate to acute(sharpe)	Acuminate to acute(sharpe)	Acuminate to acute(sharpe)
Leaf arrangement	Arranged in spiral & distichous pattern	Arranged in spiral & distichous pattern	Arranged in spiral & alternate	Arranged in spiral & alternate	Arranged in spiral & aiternate	Arranged in alternative pattern
Leaf texture	Thinly coriaceous texture	Thinly coriaceous texture	Sub-coriaceous texture	Thinly coriaceous texture	Sub-coriaceous texture	Coriaceous texture
Leaf venation pattern	Reticular venation	Reticular venation	Reticular venation	Reticular venation	Reticular venation	Reticular venation
Leaf type	Simple leave have an undivided lamina	Simple leave have an undivided lamina	Simple leave have a undivided lamna	Simple leave have a undivided lamina	Simple leave have a undivided lamina	Simple leave have a undivided lamina

Table 2: Similarity of different species of *Atrabotrys*

Special Characters	***Artabotrys Hexapetalus***	***Artabotrys Burmanicus***	***Artabotrys Caudatus***	***Artabotrys Nicobarianus***	***Artabotrys Speciosus***	***Artabotrys Zeylanicus***
Length of petiole	1	0	0	0	0	0
Length of leaflet	1	0	0	0	0	0
Width of leaflet	1	0	0	0	0	0
Number of leaflet	1	1	1	1	1	1
Leaf shape	1	1	0	0	0	0
Leaf margin	1	1	0	1	1	1
Leaf tip	1	1	1	1	1	1
Leaf arrangement	1	1	0	0	0	0
Leaf texture	1	1	0	1	0	0
Leaf venation pattern	1	1	1	1	1	1
Leaf type	1	1	1	1	1	1

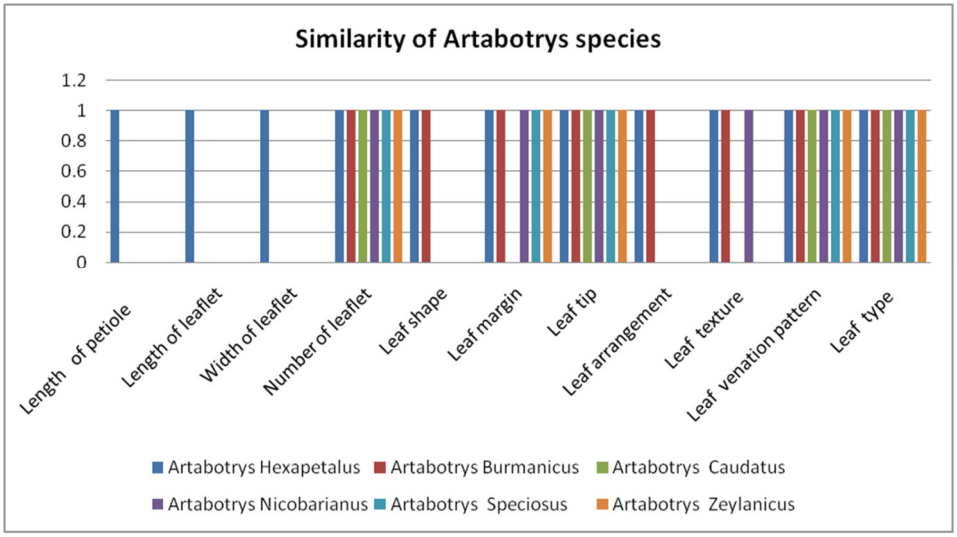


Fig 1: Chart of similarity charecters of different species of Artabotrys leave

Table 3: dissimilarity

Special Characters	*Artabotrys Hexapetalus*	*Artabotrys Burmanicus*	*Artabotrys Caudatus*	*Artabotrys Nicobarianus*	*Artabotrys Speciosus*	*Artabotrys Zeylanicus*
Artabotrys Hexapetalus	*1*	*0.7*	*0.3*	*0.5*	*0.4*	*0.4*
Artabotrys Burmanicus	*0.7*	*1*	*0.4*	*0.6*	*0.5*	*0.5*
Artabotrys Caudatus	*0.3*	*2.3*	*1*	*1.4*	*1.1*	*1.1*
Artabotrys nicobarianus	*0.5*	*1.6*	*0.7*	*1*	*0.8*	*0.8*
Artabotrys Speciosus	*0.4*	*2*	*0.8*	*1.2*	*1*	*1*
Artabotrys Zeylanicus	*0.4*	*0.8*	*1.2*	*1*	*1*	*1*

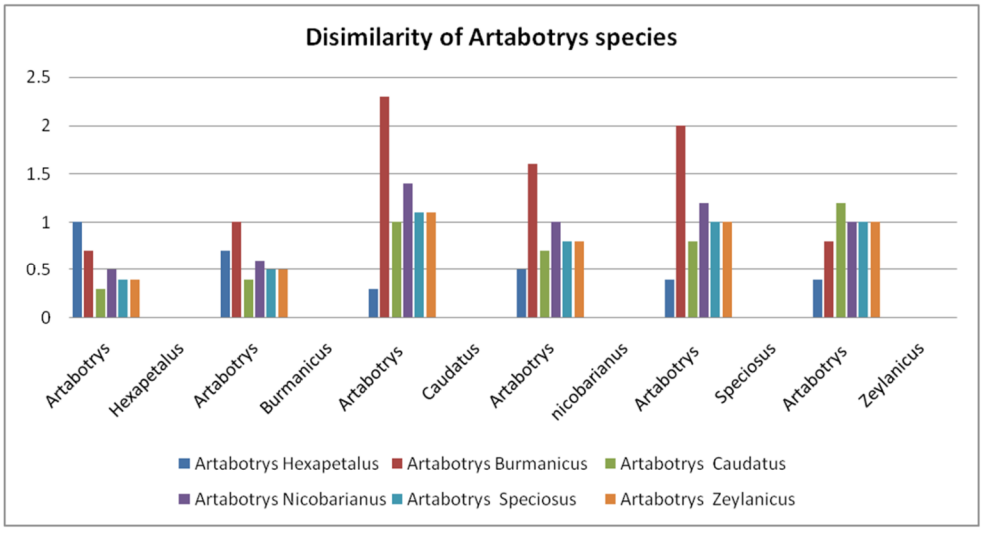


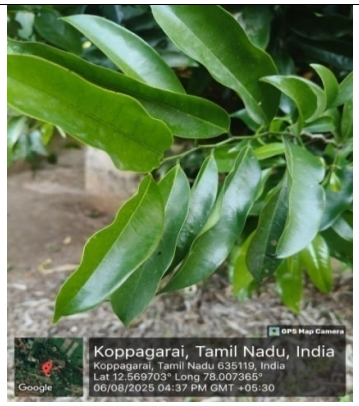
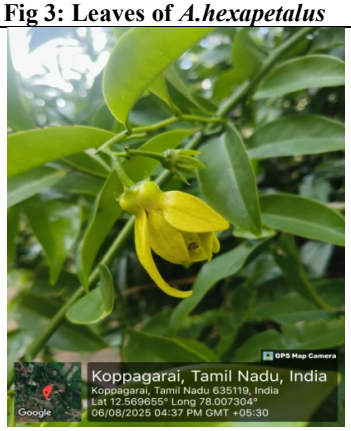
Fig 2: Chart of dissimilarity characters of different species of Artabotrys leave

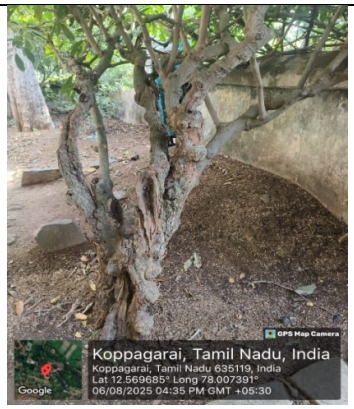
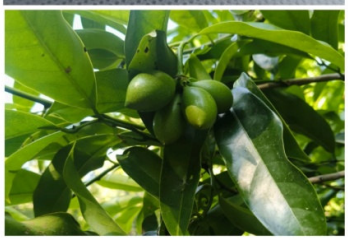
Sample matching coefficient

SSM = NS/NS+ND*100
Where,
NS= Number of similar characters – 38
ND = Number of Dissimilar characters – 27
N = Number of samples - 6
SSM of AP = 50%
The matching coefficient of *Artabotyrs hexapetalus* with respect to the other species was found to be 50%

Pharmacognostical review

Study of morphology: Leaves measure 6–15 cm in length and 2–4.5 cm in width. Yellow flowers on hooked and curled branches can be seen alone or in pairs. Oblong, lanceolate, short acuminate, glabrous, glossy, and sharp at the base are the characteristics of the leaves.Studying at the macro level:An upper and lower layer of epidermis is visible in the leaf's TS.The transverse segment (TS) of the petiole is flat on the top and round on the bottom.The root's TS are unusually round in shape, with noticeable ridges and grooves. The stem's diagrammatic TS is round in shape and displays a single layer of round cells in the outermost layer of the epidermis, with collenchymatous cells making up the hypodermis beneath. There are one or two seeds in every fruit. Ovoid or oval in shape, seeds have grooves on both sides and a generally smooth surface. The ventral side is concave, while the dorsal side is convex. The seed is light brown to brown, 1-2 cm long, 1-1.5 cm wide, and 1.5-2 cm in diameter.[1, 2, 14]

S. No	Plant region	Phyto-chemical constituent	Medicinal uses
1.	 **Fig 3: Leaves of *A.hexapetalus***	Flavanoids:Taxifolin,apegenin-7-0-Apiosylglucoside,glucolutiolin e,3,7-dimethyl-2,6-0ctadiene,11Hexadecyna,Apin n,Cynaroside,Kaempferol,quercetin,Rutin.[2,12]	Mosquito repellency, anti-oxidant,hepatopritetive, cholera, anticancer
2.	 **Fig 4: Flower of *A. hexapetalus***	Sesquiterpenoids:(β-caryophyllene, Caryophyllene oxide),monoterpenes:(acylic,linalool),cubenol,ledol,limonene,B-Gurjunene,Ethyl acetate[2,12]	For antibacterial activity, antipyreticactivity, leucoderma

3.	 **Fig 5: Stem of *A. hexapetalus***	Alkaloids: Artabotrine hexapetalines A and B,Toluic acid,a-cadinol,7,11-Dimethyl-3methyl-1,6,10-dodecaterie***n***e.[2,12]	Antimicribial,antileishmanial,Mosquito repellency
4.	  **Fig 6: Fruit of *A. hexapetalus***	Organic acid: Succinic, Fumaric acid,Tuliplalin B,Artapetalin B, Humulene[2,12]	Hepatoprotective, fungalinfection, scrofula, antibacterial, antiulcer, fever, diarrhea

Phytochemical review

Qualitative phytochemical analysis

For Tannin –Ferric chloric test; A brownish green colouration was seen when a few drops of 5% ferric chloride were added to 1 millilitre of plant extract**.**

Lead acetate test; The lead acetate test involved taking one millilitre of the fruit extract filtrate and adding three drops of a 0.1% lead acetate solution. Positive results for the presence of tannins are provided by the creamy, gelatinous precipitate.[5,15,16]

For Alkaloid – Dragendroff's test; Dragendorf's reagent was added to one millilitre of the fruit extract filtrate. Alkaloids were confirmed by the production of a reddish-brown precipitate.[5,15]

For phenols- Ferric chloride test; The fruit extract filtrate was obtained in one millilitre for the ferric chloride test. The 5% ferric chloride solution was added in a few drops. Phenolic molecules are responsible for the bluish-black hue.[5,15]

For saponins- Forthing test; One ml of the filtrate of fruit extract was mixed with 1 ml of distilled water, and then shaken vigorously. The persistent froth formation after shaking provide the evidence for the presence of saponin.[5,15]

For Flavanoids – Alkaline reagent teast; Three drops of diluted HCL and two millilitres of 2% NaOH solution were added to one millilitre of the fruit extract filtrate. With NaOH solution, the hue first became a bright yellow and then became colourless. The presence of flavonoids was confirmed by this colour shift. The presence of flavonoids is confirmed by the formation of a yellow colouration that goes away after standing when 5 millilitres of diluted ammonia solution and concentrated sulphuric acid are added to a portion of the extract in that order.[5,15,16]

For steroids –Salkowski's; They took one millilitre of the fruit extract filtrate. It was mixed with 1 millilitre of concentrated sulphuric acid and 1 millilitre of chloroform. A positive result for steroids is shown by the emergence of upper red and lower yellow with green fluorescence.[5,15]

For reducing sugers – Keller-Kiliani Test; After obtaining methanol extract, the extract was dried out.Two milliliters of chloroform were used to dissolve fifty milligrams. After adding sulfuric acid to create a layer, the color at the inret phase was noted. Deoxysugars in cardenolides have a brown ring at the inert phase.[17]

Quantitative phytochemical analysis

A quantitative analysis of the aqueous leaf extract from *Artabotrys hexapetalus* revealed the presence of proteins, amino acids, carbohydrates, flavonoids, tannins, and phenolic content.

Estimation of carbohydrate; It was discovered that *A. hexapetalus* had 43.16± 1.0 mg of carbohydrates per gramme of extract.[18]
Estimation of Amino acid; It was discovered that *A. hexapetalus* had 19.33± 1.30 mg of amino acid per gramme extract.[18]
Estimstion of Flavanoids; It was discovered that *A. hexapetalus* had 28.3 ± 0.91 mg of flavanoids per gramme of extract.Three classes could be distinguished based on the total phenolic content of crude extracts: low (less than 10 mg GAE/g), medium (between 10 and 50 mg GAE/g), and high (more than 50 mg GAE/g). Ethanol extracts of the stem and leaves showed exceptionally high total phenolic levels of 268.29±12.36 mg GAE/g and 154.91±4.26 mg GAE/g, respectively, under this categorisation. This might be because phenolic chemicals dissolve better in ethanol.[18,19]
Estimation of Tannins; It was discovered that *A. hexapetalus* had 24.53 ± 1.02 mg of tannins per gramme extract.[18]
Estimation of phenols; The total amount of Phenols in *A. hexapetalus* was found to be 7.63 ± 0.85 mg/g extract.[18]
Estimation of proteins; The total amount of proteins in *A. hexapetalus* was found to be 60.4 ± 0.88 mg/g extract.[18]

Pharmacological review
Anticancer activity

Artabotrys hexapetalus leaf metabolic extract shown antitumor efficacy against human breast cancer cell lines MC-7.After 24 hours at 90°C*, Artabotrys hexapetalus* aqueous extract was used in a green synthesis process to produce silver nitrate nanoparticles (AgNO3 NP).The compounds were tested for anticancer activity using a variety of assays on the Colon Cancer HCT 116 cell line.AgNO3 NPs show modest inhibition of tumour cells and high anti-colon cancer cell line efficacy[20]. A fruit extract from A. odoratissimus caused the MIA PaCa-2 pancreatic cancer cells to undergo apoptosis and decreased their rate of growth[21]. Cytotoxic and antitumor activities are two more important pharmacological characteristics of A. hexapetalus. Several cancer cell lines have been shown to be cytotoxically affected by diterpenoids and alkaloids extracted from the roots, including liriodenine and artabotrine. These substances cause cancer cells to undergo apoptosis, or programmed cell death, and stop proliferating.[22]

Anti-inflammatory activity

Inflammation is a normal physiological response of living cells or tissues to external stimuli, allergens, or damage. In the anti-inflammatory test, the *A. hexapetalus* extract dramatically and dose-dependently decreased the paw oedema in mice over the observation period. Notably, polyphenolic compounds such as flavonoids and tannins have strong anti-inflammatory properties by reducing the synthesis of other pro-inflammatory chemicals and the activity of enzymes like COX and phospholipase A 2 that are involved in the metabolism of arachidonic acid. Quercetin, kaempferol, myricetin, gallic acid, taxifolin, luteolin 7-O-beta glucoside, apigenin, apiin, cosmosiin, guaija verin, isoquercetin, hexadecanoic acid, beta caryophyllene oxide, and hyperoside are among the compounds found in *A. hexapetalus* extract that have been demonstrated to have anti-inflammatory qualities. There are anti-inflammatory qualities to the ethanolic extract of *Artabotrys hexapetalus's* aerial parts. Extracts from *Artabotrys hexapetalus* are used to treat rheumatism, arthritis, and muscle discomfort due to the anti-inflammatory properties of its alkaloids and polyphenols. [23,7]

Anti-fertility activity

Male Wistar rats, female Sprague Dawley rats, and rabbits were used to test the antifertility effects of a hydroalcoholic extract of *A. hexapetalus* leaves in vivo.Changes in testicular histology were compared with the control rats, and the impact of hydroalcoholic extract on reproductive organs, sperm count, serum testosterone, testicular cholesterol, and alkaline phosphate levels was recorded. The testis' weight, seminal vesicles and sperm count, serum testosterone, testicular cholesterol, and alkaline phosphates level all decreased, and the testis' histological analysis revealed that the decrease in seminiferous tubule diameter was caused by hypercellularity of Leydig cells. Non-progestogenic, progestational, or anti-progestational effects were demonstrated by the pregnancy maintenance assay.In vitro investigations of *Artabotrys hexapetalus* seeds revealed antifertility,

sperm diminution, anti-implantation, abortifacient, and spermatozoa immobility.to control the amounts of steroidal hormones[2,7].

Anthelminitic activity

The methanolic bark extract of *A. hexapetalus* was examined for in vitro anthelmintic properties by Niaz M. et al. in 2012.Using albendazole as the reference standard and a methanolic bark extract (50 mg/ml), the worms were paralysed at 68.33 minutes and died at 84.0 minutes to assess the anthelmintic activity. In contrast, worms were paralysed and killed in 17 and 48 minutes, respectively, at a dosage of 10 mg/ml of conventional albendazole. Thus, it validated the bark extract of A. hexapetalus's strong anthelmintic properties. When applied to mature earthworms (Pheretima posthuma), a methanolic bark extract of *Artabotrys hexapetalus* exhibited anthelmintic action.[2,7]

Anti- diabetic activity

It has been observed that *A. hexapetalus* possesses antidiabetic properties. By improving insulin sensitivity and decreasing intestinal glucose absorption, the plant's flavonoids and phenolic chemicals aid in blood glucose regulation. Many cultures manage diabetes using traditional leaf and root medicines.[22]

Anti-leishmanial effect

When compared to other extracts, the petroleum ether extract of *Artabotrys hexapetalus's* aerial portions demonstrated antileishmanial activity in vitro. Extracts from *A. hexapetalus* have been shown to possess antileishmaniac properties. The extracts with >40% inhibition at the tested concentrations were deemed to have strong antileishmanial potential in the preliminary analysis. The antileishmanial efficacy of *A. hexapetalus* extracts against Leishmania donovani (L. donovani) promastigotes was assessed in vitro by Bajaj S. et al. in 2018. After 24, 48, 72, and 96 hours of incubation, the plant extracts had a 50% inhibitory concentration and stopped L. donovani's growth in vitro.[3,2]

Anti-microbial activity

The leaves of *A. hexapetalus* show antifungal and antibacterial properties when extracted in methanol. Flavonoids like quercetin and kaempferol, as well as alkaloids like artabotrine and liriodenine, are thought to be in charge of this activity. Significant antibacterial activity against Salmonella typhi, Bacillus subtilis, and E. coli was demonstrated by the ethanolic extract. With regard to Staphylococcus aureus, acetone extract exhibited the largest zone of inhibition. Antifungal activity against Candida albicans was demonstrated by the aqueous extract of *Artabotrys hexapetalus* flowers. Proteus vulgaris, Salmonella, Staphylococcus, Pseudomonas, Vibrio cholera, Streptococcus, Corynebacterium, and Escherichia coli were all susceptible to the antibacterial effects of the butanol extract of *Artabotrys hexapetalus* flowers. When it comes to Colletotrichum oxysporum, *A. hexapetalus* ethanolic extract exhibits absolute fungitoxicity.[2,7,22,21,24]

Musquito repllency

A. hexapetalus essential oil has larvicidal properties that can be utilised to create mosquito repellant. Mosquito-repelling properties have been demonstrated by essential oils derived from hydro-distilled leaf and stem bark extracts. Three separate tests of the extracted essential oils' dose-response repellency against female Anopheline mosquitoes (An. gambiae) at varying concentrations were conducted. Because of the presence of β-caryophyllene oxide, the essential oil fractions from *A. hexapetalus* were found to have a significant mosquito repellent activity. *A. hexapetalus* leaves' essential oil showed high action, with repellent concentrations (RC50) of 1.81×10-5 mg/cm2 and 2.79×10-5 mg/cm2.[2,21,25]

Anti-pyretic activity

Using yeast-induced pyrexia in albino rats, the antipyretic properties of an ethanolic extract of *A. hexapetalus* flowers were evaluated. When compared to the normal dosage of 200 mg/ml of Paracetamol, a considerable decrease in body temperature was seen in patients with yeast-induced pyrexia at 500 mg/kg body weight. [26]

Hepatoprotective activity

The rats' hepatotoxicity caused by paracetamol was reversed by the alcoholic extract of A. *hexapetalus*, suggesting that it has hepatoprotective properties[2].Serum enzymes such as ALP, ACP, SGPT, SGOT, total bilirubin, and direct bilirubin were all raised in rats given paracetamol. In contrast, rats given an alcoholic extract of *Artabotrys hexapetalus* had lower serum enzyme levels than the normal group[7]. *A. hexapetalus's* hepatoprotective action is ascribed to its capacity to lessen inflammation and oxidative stress in the liver, shielding it from harm brought on by toxins and long-term illnesses[22].The currently study's experimental evidence showed that the leaf of *A.hexapetalus* has hepatoprotective function against PCT,ETN,IR-induced liver toxicity.[27]

CONCLUSION

Artabotrys hexapetalus (L.f) Bhandari has a variety of phytochemicals, is classified according to taxonomy, and has ethanomedicial applications.Research has shown that *Artabotrys hexapetalus* has a number of pharmacological qualities, including anticancer, anti-inflammatory, antifertility, antianthelminitic, mosquito-repelling, antidiabetic, hepatoprotective, antiileishmanial, and antibacterial characteristics. Six distinct artabotry species of Indian provenance will be discussed, together with their numerical classification .

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