IJBPAS, October, 2025, 14(10): 5356-5370

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

AN UPDATED REVIEW OF "CRYPTOLEPIS BUCHANANI R – A RICH AND ANCIENT REPOSITORY FOR HERBAL HERITAGE

DHIKALE RS[*1], MAHALE S[1], AHIRE Y, TAYDE M[1] AND GULECHA V[1]

1: Associate Professor, Department of Pharmacognosy, SPES SNPT Institute of Pharmacy, Nashik, Maharashtra, India-422003.

2: Assistant Professor, Department of Pharmaceutics, SPES SNPT Institute of Pharmacy, Nashik, Maharashtra, India-422003.

3: Assistant Professor, Department of Pharmacology, SPES SNPT Institute of Pharmacy, Nashik, Maharashtra, India-422003.

4: Professor, Department of Pharmaceutical Chemistry, SPES SNPT Institute of Pharmacy, Nashik, Maharashtra, India-422003.

5: Principal, Department of Pharmacology, SPES SNPT Institute of Pharmacy, Nashik, Maharashtra, India-422003

***Corresponding Author: Dr. Rupali S. Dhikale: E Mail: rupadhikale@gmail.com**

Received 25th July 2024; Revised 8th Sept. 2024; Accepted 1st Oct. 2024; Available online 1st Oct. 2025

https://doi.org/10.31032/IJBPAS/2025/14.10.9466

ABSTRACT

Cryptolepis buchanani Roem & Schult. (Asclepiadaceae), commonly known as Jambupatra sariva and Karanta, is a climbing shrub. It is a well-known ayurvedic plant found throughout India. It is also used in Thai traditional medicine for the treatment of muscle and tendon pains by decoction. The plant is used in Indian folkloric medicine (Ayurveda) for its antidiarrhoeal, antiulcerative, anti-inflammatory, blood purifier, anticough, antibacterial, demulcent, diaphoretic, diuretic properties and in treatment of rickets in children. The roots of this plant are well studied for its medicinal properties but the aerial parts (leaves & stem) are nearly virgin. The chemical composition of *Cryptolepis buchanani* is much complex and found to have variety of phytocompounds such as tannins, alkaloids, saponins, glycosides, terpenes, flavonoids, phenol, protein, and steroids. This review discusses the traditional importance as well as the phytochemical, ethnomedical, pharmacological, and toxicological importance of this plant. This review attempts to reports the pharmacological activities and complex chemistry profile of *C.*

buchanani for ease of further research activities. The current review will be helpful in identifying grey areas in the research on this medicinal plant and also provides comprehensive data thus far to continue research on this plant.

Keywords: *Cryptolepis Buchanani*, Morphology, Microscopy, Phytochemistry, Herbal Heritage, Pharmacological use

INTRODUCTION

Nature has blessed us with enormous wealth of herbal plants which are widely distributed all over the world as a source of therapeutic agents for the prevention and cure of various diseases **[1]**. Plants are recognized as a major resource for mankind, which are used as food material, in cosmetics and mostly in health care system. From human civilization update plants are primary resources of medicines. Different civilizations used plants in various ways for medicinal purposes. Millions of the people in the world use herbal medicines because they believe in them and medicine regard them as their own system of medicine **[2]**. Around 80% of the world's population has faith in traditional medicine, particularly plant drug for their primary health care **[3]**.

In Ayurvedic system of medicine, Sariva is a renowned and significant plant that has been broadly used since the primeval time for the treatment of different diseases and disorders of a human being. In Ayurvedic text as well as other texts several plants are known by the name 'Sariva', that are *Hemidesmus indicus* (Linn.) R. Br. (Asclepiadaceae), *Cryptolepis buchanani* (Linn.) Roem. & Schult. (Asclepiadaceae*), Ichnocarpus frutescens* R. Br. (Apocynaceae) and *Decalepis hamiltonii* Wight and Am. (Asclepiadaceae). *Hemidesmus indicus* is known as Sweeta Sariva and *Ichnocarpus frutescens*, *Cryptolepis buchanani* are known as Krishna Sariva **[4]**.

Habitat/Geographical Source:

Krishnasariva consists of dried roots of *Cryptolepis buchanani Roem. & Schult*. (Fam. Asclepiadaceae), a perennial, much branched climber with milky juice, found throughout the country from Western Kashmir to Assam, ascending to 1200 m in the Himalayas and in south upto Kerala **[5]**. The plant is found in Thailand, India, Nepal, Myanmar (Burma), Sri lanka, China and Indo-china. The plant is widely used as folk medicine in Southeast asia. In India, the plant is located in Assam, Meghalaya, Arunachal Pradesh and Nagaland in Northeast, Kashmir in northern and Travancore in Southern India **[5, 6]**.

Taxonomical Classification: [7]

Kingdom	**Plantae**
Phylum	**Tracheophyta**
Class	**Magnoliopsida -dicotyledons**
Order	**Gentianales**
Family	**Asclepiadaceae**
Genus	**Cryptolepis**
Species	**Cryptolepis buchananii Schultes ex Roemer & Schultes**

Synonym: *Cryptolepis reticulata, Echites cuspidate, Echites reticulata, Nerium reticulatum, Periploca viridiflora, Trachelospermum cavaleriei***,** *Cryptolepis dubia, Wax Leaved Climber*. **[8, 9]**

Common Names Vernacular Names: [5, 10, 11]

Sanskrit Name	**Krishnasariva, Jambupatra, Syama,Kishnavalli, Krishnamuli, Gopa, Gopasatu**
Hindi name	**Kaleesar, Kalee Anantmool, Karanta, Kala bel**
English name	**Indian Sarsaparilla**
Trade name	**Shyamlata**
Marathi name	**Mothi Kawalee, Kallee Kawalee, Dudh-vel, Kavali, Kaoval, Kawavel**
Tamil name	**Pala koti, Palkoti,Paalkodi.**
Malayalam name	**Katupaalvalli, Kilipalvalli, Palvalli, Kalipalvalli,**
Telgu name	**Adavipalatige, Rokallipala, Naltig, Adavi, Gunji**
Kannada	**Karccumbu, Metaguli, Hambu, Karanta**

DESCRIPTION:

Morphology: The plant is large evergreen laticiferous, shade-loving and found as woody climber on some selected plant species such as Soti. Sometimes it is also found as creeper on ground. It may attain height as much as the tree on which it grows for support. The mature plant has a stem of 30 cm in diameter. Leaves of the plant are oblong-elliptic, acute, apiculate coriaceous, smooth and glossy above, glaucous beneath and with acute base. The bark of the plant is smooth, copper colored peeling off in papery rolls in old stem. Flowers are pale yellow in a lax dichotomous cyme. Follicles 4 by 7 cm stout, diverticate, tepering and pointed at apex. Seeds compressed, oblong-ovate. The flowering time is May to July and Fruiting time is September to November **[6]**. The plant is known for its following properties and actions as per Ayurveda: **[5]**

Rasa: Madhura, Katu, Tikta

Guna: Laghu

Virya: Sita

Vipaka: Madhura

Karma: Caksusya, Kaphahara, Vrsya, Cedini, Mukhadaurgandhyanasaka, Vasti, Visodhani

a) Macroscopic

Roots vary in length and are 1 to 1.5 cm thick; slender, cylindrical, dark brown or blackish; rough due to fine longitudinal ridges and wrinkles running sinuously lengthwise; thicker roots show a few

transverse cracks, fissures and longitudinal wrinkles with remnants of rootlets and a few lenticels; cork easily peelable; fracture, short and fibrous; odour, slightly aromatic; taste, sweet and astringent.

b) Microscopic:

The microscopic features of roots of *Cryptolepis buchanani* shows thin cork layer consisting of 4 to 14 layers of thin-walled, rectangular to tangentially elongated cells, arranged radially. It is followed by cork cambium layer which is single layered. There is wide zone of secondary cortex composed of polyhedral, oval to tangentially elongated cells having fibers in single or in groups of two to ten. Fibers are long, thick-walled but very occasionally also appear as elongated stone cells. Secondary phloem is wide consisting of sieve elements, phloem parenchyma, fibers and a few crystal fibers, and traversed by phloem rays. The phloem fibers occur in small groups or rarely in singles, somewhat similar in shape to those of secondary cortex with comparatively thicker walls. Crystal fibers are elongated, thick-walled and divided into chambers, usually 7 to 17 in number, each chamber containing a prismatic crysta1 of calcium oxalate. The medullary rays are uni-to triseriate; cambium 2 to 4 layered; secondary xylem composed of vessels, tracheids, fiber-tracheids, fibers and parenchyma and traversed by xylem rays. Vessels are found with bordered pits and filled with tyloses. Tracheids are long and narrow having bordered pits, and moderately thick-walls. The xylem parenchyma usually rectangular in shape with pitted walls but some of the pits become T or Y shaped with reticulate thickening. The xylem elements are thick-walled and lignified. Simple and compound starch grains are found in abundance in all parenchymatous cells, simple being elliptical to oval, measuring 3 to 19 µ in diameter, with central hilum and compound with 2 or 3 components.

Powder Microscopy: - Light grey; shows fragments of cork cells, vessels having bordered pits, tracheids, fibres, prismatic crystals of calcium oxalate, numerous starch grains (Simple and compound), elliptical to oval, measuring 3 to 19 µ in diameter, with

central hilum and compound with 2 or 3 components **[5]**.

Ethnomedical uses of plant:

Cryptolepis buchanani known as "Thao En On" in Thailand. It has been used for treating inflammatory conditions such as muscle and joint pain. Its stem extract is being used in the treatment of muscle tension, stiffness of tendons, and arthritis. Its leaves are used as poultices on the inflamed area for the treatment of myalgia and arthritis **[12-15]**. The plant is known as Ganglong in assam - Arunachal Border and traditionally used for the treatment of bone fracture **[6]**. The plant has also been used in Indian folk medicine (Ayurveda) as anti-diarrhoeal, antiulcerative, anti-inflammatory, blood purifier, cough treatment, and anti- bacterial **[16, 17]**. It is widely used as demulcent, diaphoretic, diuretic, cure for paralysis, rickets in children **[18, 19]**. The plant is used as conventional medicine as an anti-ulcerative, anti-inflammatory, antidiarrhoeal, antibacterial, anti-cough, blood purifier, and lactation in women **[20, 21]**.

CHEMICAL CONSTITUENTS:

Plant contains a pyridine alkaloid, buchanamine, a nicotinoyl gluco-alkaloid and triterpenoids. Leaves contain a cardenolide, cardiac glycoside, crypyosin, a- and ß-amyrin; four alkaloids, quindoline, cryptolepine, cryptolepine HCl and hydorxycryptolepine, which strongly inhibited the growth of Gram-positive bacteria **[7]**.

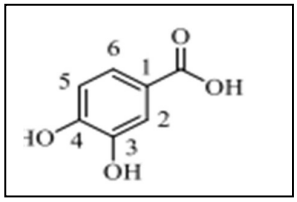
The secondary metabolites from *C. buchanani* were reported in leaves, stems and roots. The cardenolide, cryptosin, sarmentogenin, sarmentocymarin and cryptanosides A-D were reported from the leaves **[6-8]**. The root contains fixed oil and volatile oil. Germanicol docosanoate is a major constituent of the root extract **[8]**. Other chemicals including isoscopoletin, (+)-3-hydroxy-β-ionone, (3R, 6R, 7E)-3-hydroxy-4, 7-megastigmadien-9-one, ficusic acid, (+)-pinoresinol, (+)-8-hydroxypinoresinol, (+)-syringaresinol, diaaurantiamide acetate, loliolide, (-)-balanophonin, chrysoeriol, 9-hydroxy-10E, 12Z-octadecadienoic acid methyl ester and ficusesquilignan. A were isolated from the stems and leaves of *C. buchanani* **[9]**. The buchananine and 1, 3, 6-O-trinicotinoyl-α-D-glucopyranose were isolated from the stems **[10-11]**. Herein, we report the chemical constituents from stems of *C. buchanani*. The 4 compounds (1-3and 5) are isolated from this plant for the first time and also found isoscopoletin. (4) **[22]** Nine triterpene glycosides including seven previously undescribed compounds (1–7), were isolated from leaves of *Cryptolepis buchananii* R.Br. ex Roem. and Schult. using various chromatographic methods. The chemical structures of the compounds

were elucidated to be 3-O-β-D-glucopyranosyl-(1 → 6)-β-D-glucopyranosyluncargenin C 28-O-α-L-rhamnopyranosyl-(1 → 2)-β-D-glucopyranosyl ester (I), 3-O-β-D-glucopyranosyl-(1 → 2)-β-D-glucopyranosyluncargenin C 28-O-α-L-rhamnopyranosyl-(1 → 2)-β-D-glucopyranosyl ester (II), 3-O-β-D-glucopyranosyl-(1 → 2)-β-D-glucopyranosyluncargenin C 28-O-β-D-glucopyranosyl-(1 → 4)-α-L-rhamnopyranosyl-(1 → 2)-β-D-glucopyranosyl ester (III), 3-O-β-D-glucopyranosyl-(1 → 2)-β-D-glucopyranosylhederagenin 28-O-α-L-rhamnopyranosyl-(1 → 2)-β-D-glucopyranosyl ester (IV), 3-O-β-D-glucopyranosylarjunolic acid 28-O-α-L-rhamnopyranosyl-(1 → 2)-β-D-glucopyranosyl ester (V), 3-O-β-D-glucopyranosyl-(1 → 2)-β- D-glucopyranosyl-6β,23-dihydroxyursolic acid 28-O-α-L-rhamnopyranosyl-(1 → 2)-β-D-glucopyranosyl ester (VI), 3-O-β-D-glucopyranosyl-6β,23-dihydroxyursolic acid 28-O-α-L-rhamnopyranosyl-(1 → 2)-β-D-glucopyranosyl ester (VII), asiatic acid 28-O-α-L-rhamnopyranosyl-(1 → 2)-β-D-glucopyranosyl ester (VIII), and 3-O-β-D-glucopyranosylasiatic acid 28-O-α-L-rhamnopyranosyl-(1 → 2)-β-D-glucopyranosyl ester (IX), through infrared, high-resolution electrospray ionization mass spectrometry, one- and two-dimensional nuclear magnetic resonance spectral analyses **[23]**. 3,4-Dihydroxyl benzoic acid , vanillic acid, syringaldehyde , isoscopoletin and stigmast-4-ene-3,6-dione were isolated from hexane and Ethanolic crude extracts of stem **[24]**.

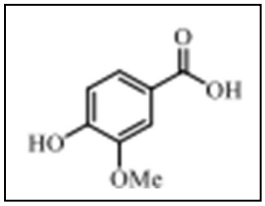
The structures of cryptanosides A and C, the major cardenolide glycosides of the leaves and roots respectively of *Cryptolepis buchanani*, have been established as sarverogenin 3-O-α-L-oleandroside and sarverogenin 3-O-[β-D-glucopyranosyl-(1→4)-α-L-oleandroside] on the basis of their 1H and 13C NMR spectroscopic properties and chemical correlation with sarverogenin. Cryptanoside B, a minor constituent of the leaf extract, is isosarverogenin 3-O-α-L-oleandroside. Cryptanoside D, the corresponding isosarverogenin derivative of cryptanoside C, was isolated, as its acetate, from the crude product of acetylation of cryptanoside C. Germanicol docosanoate is a major constituent of the root extract **[25]**.

The methanol extract of the *Cryptolepis buchananii* fruit has 4 pentacyclic triterpenene glycosides namely uncargenin C 28-O-α-L-rhamnopyranosyl-(1→2)-β-D-glucopyranosyl ester, 3-O-β-D-glucopyranosyluncargenin C 28-O-α-L-rhamnopyranosyl-(1→2)-β-D-glucopyranosyl ester, 3-O-β-D-glucopyranosyl-(1→6)-β-D-

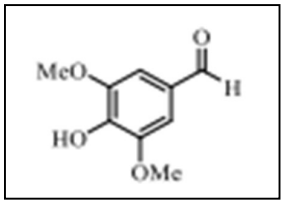
glucopyranosyl-6β,23-dihydroxyursolic acid 28-O-α-L-rhamnopyranosyl-(1→2)-β-D-glucopyranosyl ester, 3-O-β-D-glucopyranosyl-(1→2)-β-D-glucopyranosylasiatic acid 28-O-α-L-rhamnopyranosyl-(1→2)-β-D-glucopyranosyl ester. It also found to contain five pentacyclic triterpenenes namely asiatic acid, 2α,3β,23-trihydroxyoleana-11,13(18)-dien-28-oic acid, arjunolic acid, 6β-hydroxyarjunolic acid and actinidic acid **[26]**.



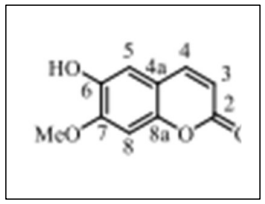
3,4-Dihydroxyl benzoic acid



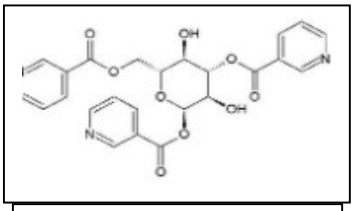
Vanillic acid



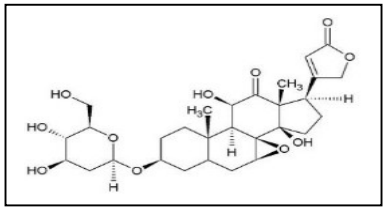
Syringaldehyde



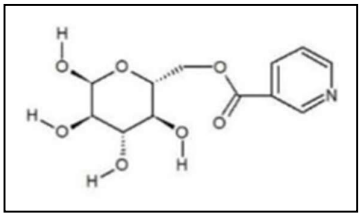
Isoscopoletin



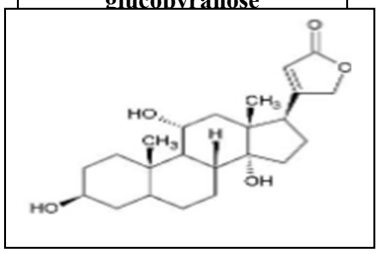
1,3,6-O-trinicotinoyl-α-D-glucopyranose



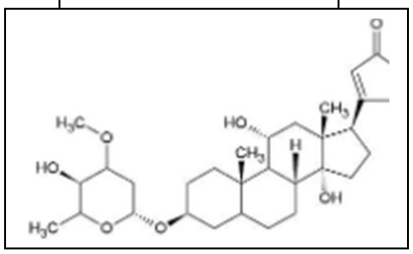
Cryptosin



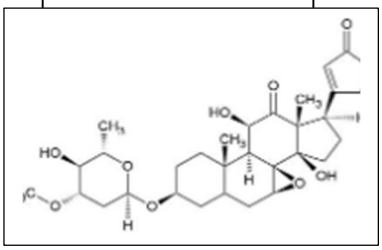
Buchananine



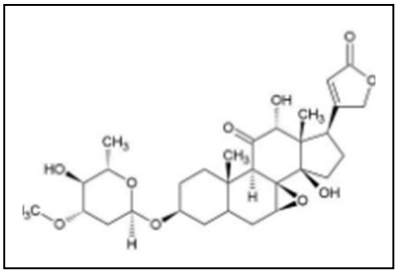
Sarmentogenin



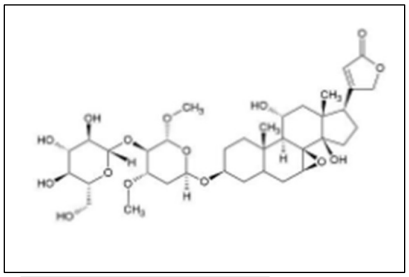
Sarmentocymarin



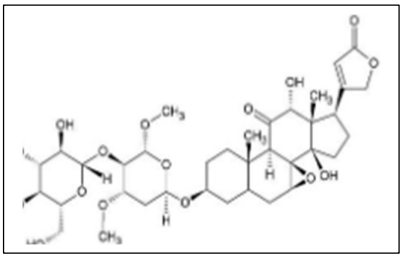
Cryptanosides A



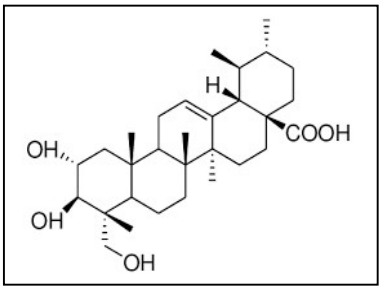
Cryptanosides B



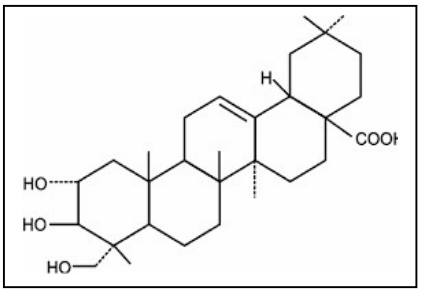
Cryptanosides C



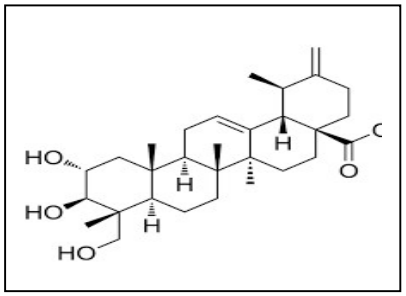
Cryptanosides D



Asiatic Acid



Arjunolic acid

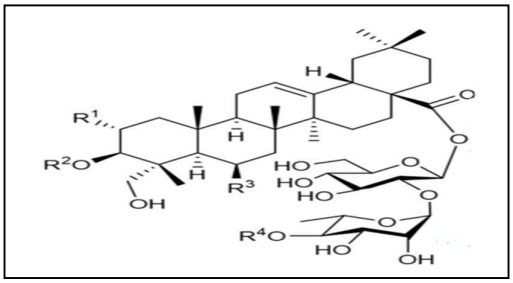


Actinidic acid

S1= Glc = β-D-glucose

S2 = Glc(1→6)Glc

S3 = Glc(1→2)Glc

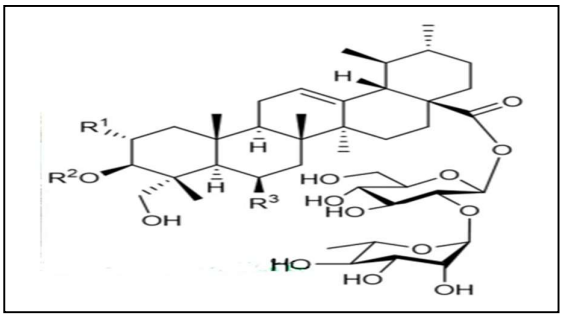


S. No.	Name of Compound	R1	R2	R3	R4
1	3-O-β-D-glucopyranosyl-(1 → 6)-β-D-glucopyranosyluncargenin C 28-O-α-L-rhamnopyranosyl-(1 → 2)-β-D-glucopyranosyl ester	H	S2	OH	H
2	3-O-β-D-glucopyranosyl-(1 → 2)-β-D-glucopyranosyluncargenin C 28-O-α-L-rhamnopyranosyl-(1 → 2)-β-D-glucopyranosyl ester	H	S3	OH	H
3	3-O-β-D-glucopyranosyl-(1 → 2)-β-D-glucopyranosyluncargenin C 28-O-β-D-glucopyranosyl-(1 → 4)-α-L-rhamnopyranosyl-(1 → 2)-β-D-glucopyranosyl ester	H	S3	OH	S1
4	3-O-β-D-glucopyranosyl-(1 → 2)-β-D-glucopyranosylhederagenin 28-O-α-L-rhamnopyranosyl-(1 → 2)-β-D-glucopyranosyl ester	H	S3	H	H
5	3-O-β-D-glucopyranosylarjunolic acid 28-O-α-L-rhamnopyranosyl-(1 → 2)-β-D-glucopyranosyl ester	OH	S1	H	H

S1= Glc = β-D-glucose

S2 = Glc(1→6)Glc

S3 = Glc(1→2)Glc



S. No.	Compound	R1	R2	R3	R4
6	3-O-β-D-glucopyranosyl-(1 → 2)-β- D-glucopyranosyl-6β,23-dihydroxyursolic acid 28-O-α-L-rhamnopyranosyl-(1 → 2)-β-D-glucopyranosyl ester	H	S2	OH	H
7	3-O-β-D-glucopyranosyl-6β,23-dihydroxyursolic acid 28-O-α-L-rhamnopyranosyl-(1 → 2)-β-D-glucopyranosyl ester	H	S3	OH	H

PHARMACOLOGICAL ACTIVITIES:

The various pharmacological activities have been performed on *Cryptolepis buchanani.*

Analgesic, anti-inflammatory and chondroprotective activity:

An analgesic activity of the methanol extract of *C. buchanani* (CBE) was evaluated using acetic acid-induced writhing response in mice, anti-inflammatory activity using ethyl phenylpropiolate- (EPP-) induced ear edema and carrageenan-induced paw edema in rats. The study demonstrated that CBE significantly reduced acetic acid-induced writhing response. It also inhibited edema formation in both EPP-induced ear edema and carrageenan-induced paw edema models. In cartilage explant culture, CBE significantly reduced the sulfated glycosaminoglycan and hyaluronan released into culture media while it reserved the uronic acid and collagen within the cartilage tissues. It also suppressed the matrix metalloproteinase-2 activity with no effect on cell viability. In conclusion, CBE shows analgesic, anti-inflammatory, and chondroprotective effects in preliminary study **[27]**.

Antioxidant and hepatoprotective Activity:

The development of hepatotoxicity induced by acetaminophen is promoted by oxidative stress. The hepatoprotective and antioxidant activities of the ethanolic extract of *Cryptolepis buchanani* was investigated on acetaminophen induced hepatotoxicity in rats. The ethanolic extract of *Cryptolepis buchanani* conferred hepatoprotectivity. Biochemical observations confirmed the beneficial roles of *Cryptolepis buchanani* and silymarin against acetaminophen induced liver injury in rats. Ethanolic leaf extract of *Cryptolepis Buchanani* significantly protects against liver injuries as well as oxidative stress, resulting in increased serum biochemical parameters such as SGOT, SGPT and SALP. The reduced levels of SOD, CAT, GSH, GPX, and GST in acetaminophen treated rats were significantly increased by treatment with the extract **[28]**.

Anti-dermatological activity:

The antifungal activity of methanol and aqueous extracts of *Cryptolepis buchanani* Roem. & Schult was determined against human dermatophytic fungi. The in vitro antifungal activity of solvent extracts was carried by Agar well diffusion method. Marked antifungal activity was observed. Methanol extract caused more inhibition of *T. rubrum* while, *C.keratinophilum* was found to be more sensitive to aqueous extract than other fungi. The preliminary phytochemical analysis showed the presence of phytoconstituents namely saponins, alkaloids and tannins in solvent extracts which may be responsible for antifungal activity **[29]**.

Antimicrobial activity:

The antimicrobial and antifungal activity of shoot extracts of *Cryptolepis buchanani* was tested by disc diffusion and cup plate methods. The zone of inhibition of different extract were measured and anti-microbial activity of each extract was compared with standard Ampicillin 10 µg/disc, Tetracycline 30 µg/disc and Vancomycin 30 µg/disc. The methanol extracts exhibited significant antimicrobial activity **[30]**.

Immunomodulatory activity:

The ethanol extract (95%) of the root of the plant *Cryptolepis buchanani* was investigated for immunomodulatory activity in mice and rats. The oral administration of ethanolic extract caused significant stimulation of the delayed type hypersensitivity (DTH) reaction and humoral antibody production. The oral LD50 was found to be more than 3 g/kg in both rats and mice **[31]**.

Insecticidal and in vitro antioxidant Activity:

The insecticidal and antioxidant efficacy of *Cryptolepis buchanani* Roem. & Schult was performed on methanol, acetone and chloroform extracts of leaves using in vitro DPPH radical scavenging assay, hydroxyl radical scavenging assay and Fe^{+3} reducing assay were. Insecticidal activity was tested against second instar larvae of *Aedes aegypti*. Antioxidant activity of solvent extracts was found to be dose dependent. The extracts revealed dose dependent mortality of the larvae. The larval mortality was recorded as 100% in the case of 15mg/ml concentration of methanol and acetone extracts. The antioxidant activity of extracts could be chiefly due to the presence of various phytoconstituents **[32]**.

Anti-bacterial Activity:

The aqueous extract of *Cryptolepis buchanani* leaves was tested against food-borne pathogen bacteria (*S. aureus* ATCC 25923, *E. coli* ATCC 25922 and *S. typhimurium* ATCC 14028), nosocomial infection bacteria (*K. pneumoniae* ATCC 10031, *P. vulgaris* ATCC 13315 and *Ps. aeruginosa* ATCC 9721) and normal flora bacteria (*L. plantarum* ATCC 14917 and *S. epidermidis* ATCC 12228). The plant aqueous extract showed inhibitory effect against *S. aureus* ATCC 25923, *E. coli* ATCC 25922, *S. typhimurium* ATCC 14028, *K. pneumoniae* ATCC 10031, *P. vulgaris* ATCC 13315, *B. subtilis* ATCC 6633, *L. plantarum* ATCC 14917 *and S. epidermidis* ATCC 12228. The MICs (Minimal Inhibitory Concentrations) and MBCs (Minimal Bactericidal Concentrations) of this plant against all tested bacteria are in the range of 1-16 and 2-32 g L-1, respectively. In conclusion, *C. buchanani* leaves aqueous extract showed broad-spectrum antimicrobial activity against food-borne pathogen bacteria, nosocomial infection bacteria and some normal flora bacteria at

low concentration. This may support the use of *C. buchanani* aqueous extract as food-borne pathogen bacterial growth control additive and nosocomial infections treatment remedy **[33]**.

In vitro and in vivo anti-inflammatory Activity: The potential anti-inflammatory activity of a 50% ethanol extract of *Cryptolepis buchanani* was evaluated in a number of experimental models. For anti-acute inflammatory activity, results showed that the extract caused reduction of carrageenan-induced rat paw edema in addition to significant reduction of eicosanoid production from calcium ionophore A23187-stimulated rat peritoneal leukocytes. In a test for anti-chronic inflammatory potential utilizing the cotton thread-induced granuloma, the extract caused significant lowering of granulation tissue formation. The reduction of tumor necrosis factor-alpha (TNF-alpha) release from LPS-stimulated human monocytic cell line (THP-1) was also demonstrated in cells that were pre-incubated with the extract. An additional important feature of *Cryptolepis buchanani* is its low toxicity, especially by oral treatment, which significantly encourages clinical trials of the extract in the human. In conclusion, the results give scientific support to the traditional use of this plant for combating inflammation **[12]**.

Inhibition of Nitric Oxide Production activity:

Nine triterpene glycoside compounds were isolated from leaves of *Cryptolepis buchananii* R.Br. ex Roem. and Schult. using various chromatographic methods. The isolated compounds were tested for their ability to inhibit the production of Nitric oxide. It was found that the compounds inhibited nitric oxide production in lipopolysaccharide-activated RAW 264.7 cells, with half-maximal inhibitory concentration (IC50) values of 18.8–58.5 μM, compared to the positive control compound, dexamethasone, which exhibited an IC50 of 14.1 μM **[24]**.

CONCLUSION

The documented folkloric benefits of *C. Buchanani* are already available in literature. There has been an attempt to verify some of these benefits by performing sizeable research on this plant. However, there is significant gap remaining to be filled concerning research on this plant which holds importance in medicine. Although there has been multiple literature available regarding the medicinal applications of this plant, very less of these applications have been verified and scientifically investigated. This review article will be beneficial for future researchers so as to identify the thirst area which till date is not yet touched in terms of scientific validation. Also, their hidden potential of medical activities could

be decisive in the treatment of present and future studies. The significance of this review is aimed to provide a detailed and collective scientific evaluation of the key phytocompounds isolated from plant and its pharmacological action for the possible development of new ethnomedicine in the future. This review will also enlighten the phytochemistry of plant.

REFERENCES:

[1] Dhikale RS, Jadhav AG., Gulecha VS, Zalte AG. Medicinal plants used as whole against Arthritis. Global Trends Pharm Sci, 2020; 11 (4): 8404 – 24.

[2] Chawdhury RR, Why herbal medicines? IN: Herbal Medicine for Human Health. Regional Publications; 1992:1-3.

[3] Dubey NK, Rajesh Kumar, Pramila Tripathi: Global promotion of herbal medicine: India`s opportunity. Current science 2004; 86(1):37-41.

[4] Ragunathan K and Roma M: Pharmacognosy of Indigenous Drugs. The central council for Research in Ayurveda and Siddha, New Delhi 1999; II: 897-04.

[5] The Ayurvedic Pharmacopoeia of India, Part- I, Volume – IV, Government of India, Ministry of Health and Family Welfare, Department of Ayush, First Edition, 2008:47.

[6] Kumananda Tayyung and Nabin Saikia. *Cryptolepis Buchanani*- A less-known medicinal plant used in bone fracture. Indian J of Traditional Knowledge. 2003; 2(4): 371-74.

[7] Priyanka, Singh AB, Juyal Divya. Antimicrobial potential of root part of *Cryptolepis buchanani* (Roem and Schult). The Pharma Innovation Journal. 2018; 7(6): 39-41.

[8] http://www.theplantlist.org/tpl1.1/record/kew-2746366FRLHT's – Encyclopedia of Indian Medicinal Plants, Flowers of India.

[9] Kunte K, Sondhi S and Roy P. (Chief Editors). Butterflies of India, v. 4.27. Indian Foundation for Butterflies. URL: https://www.ifoundbutterflies.org.)

[10] https://indiabiodiversity.org/species/show/229387.

[11] Anonymous: Ayurvedic Pharmacopoeia of India, the Indian system of Medicine & Homeopathy, Govt. of India Ministry of Health and Family Welfare. The Controller of Publication Civil Lines, New Delhi 2001; IV: 54-56.

[12] Laupattarakasem P, Wangsrimongkol T, Surarit R and Hahnvajanawong C. In vitro and in vivo antiinflammatory potential of *Cryptolepis buchanani*. J

Ethnopharmacol. 2006; 108(3): 349-54.

[13] Mace MD. Histochemical localization of phenols in healthy and diseased tomato roots. Phytopathol. 1963; 16: 915-25.

[14] Wuthithammawēt W. Encyclopedia of Herbal Medicine. Collection of Thai Pharmaceutical Principles, Samnakphim Odian Sato, Krung Thep Maha Nakhon, Bangkok, 1997.

[15] Bunyaprapatsorn N. and Chokchaicharoenporn O. Textbook of Community Herbal Medicines 2. 1997; Office of Information on Herbal Medicine, Faculty of Medicine, Mahidol University.

[16] Laupattarakasem.P, Houghton PJ, Hoult JRS and Itharat A. An evaluation of the activity related to inflammation of four plants used in Thailand to treat arthritis. J.ethnopharmacol., 2003; 85: 2007-15.

[17] Panthong A, Kanjanapothi D and Taylors WC. Ethnobotanical review of medicinal plants from Thai traditional books. Part I, Plants with anti-inflammatory, antiasthamatic and antihypertensive properties. J. Ethnopharmacol., 1986; 18:213-28.

[18] Datta SK, Sharma BN, Sharma PV Buchanine, a novel pyridine alkaloid from *Cryptolepis buchanani*. Phytochemistry 1978; 17:2047-48.

[19] Chopra RN, Nayar SL, Chopra LC. Glossary of Indian Medicinal plants. New Delhi: CSIR; 1956:82

[20] Bhakuni DS, Dhar ML, Dhar MM, Dhawan BN and Mehrotra BN: Screening of Indian plants for biological activity. Ind J of Experimental Biology. 1969; II: 250-62.

[21] Panneerselvam R, Usharani S and Priyadarshini FJ. Physicochemical and Preliminary Phytochemical Screening of Root of *Cryptolepis buchanani*. International Journal of Zoological Investigations. 2023; 9 (1): 572-77.

[22] LI JL. Chemical constituents from stems and leaves of *Cryptolepis buchanani*. Chinese Traditional and Herbal Drugs. 2014;1677-81.

[23] Bang NA, Duy ND, Tai BH. Cryptobuchanosides A–G: seven previously undescribed triterpene glycosides from *Cryptolepis buchanani* R.Br. ex Roem. and Schult. with nitric oxide production inhibition activity. J Nat Med. 2024.

https://doi.org/10.1007/s11418-024-01805-2.

[24] Supakorn Arthan and Chavi Yenja. Chemical Constituents and Their Anti-inflammatory Activities from the Stems of *Cryptolepis buchanani*. Trends In Sciences. 2023; 20(2): 6366.

[25] Purushothaman, KK, Vasanth S, Connolly JD and Rycroft DS. New sarverogenin and isosarverogenin glycosides from *Cryptolepis buchanani* (Asclepiadaceae). Revista Latinoamericana de Química. 1988; 19(1): 28-31.

[26] Duc Duy N, Anh Bang N, Hai Yen P, Thi Trang D, Thi Nha Trang B, Thi Kim Thuy N, Thi Cuc N, Xuan Nhiem N, Van Kiem P, Khac Ban N, Huu Tai B. Four New Pentacyclic Triterpene Glycosides Isolated from the Fruits of *Cryptolepis buchananii* R.Br. ex Roem. & Schult and Their Inhibition of NO Production in LPS-activated RAW264.7 Cells. Chem Biodivers. 2023 Dec;20(12): e202301683. doi: 10.1002/cbdv.202301683. Epub 2023 Dec 5. PMID: 38012075.

[27] Hanprasertpong N, Teekachunhatean S, Chaiwongsa R, et al. Analgesic, anti-inflammatory, and chondroprotective activities of *Cryptolepis buchanani* extract: In vitro and in vivo studies. Biomed Res Int. 2014: 1-8.

[28] Padmalochana K, Rajan MS, Lalitha R, Sivasankari H. Evaluation of the antioxidant and hepatoprotective activity of *Cryptolepis buchanani*. J App Pharm Sci. 2013; 3(2): 99-104.

[29] Vinayaka KS, Kekuda TR, Prashith N. Mallikarjun, V.N. Sateesh, Anti-dermatophyte activity of *Cryptolepis buchanani* Roem. & Schult. Pharmacognosy Journal. 2010; 2(7): 170-72.

[30] B. Aswarthappa, B. T. Reddy, D. A. Moulali, M. V. C. Sekhar, T. Pullaiah. Antimicrobial activity of shoot extract of *Cryptolepis buchanani*. Journal of Tropical Medicinal Plants. 2011; 12 (1): 1-3

[31] Kaul A, Bani S, Zutshi U, Suri KA, Satti NK, Suri OP. Immunopotentiating properties of *Cryptolepis buchanani* root extract. Phytotherapy Research. 2003; 17 (10) :1140-44.

[32] Ashwini SK, Kiran R, Soumya KV, Sudharshan SJ, Prashith Kekuda TR, Vinayaka KS, Raghavendra HL. Insecticidal And In Vitro Antioxidant Potency of Extracts of *Cryptolepis Buchanani* Roem. &

Schult. International Journal of Pharmaceutical Sciences. 2010; 2: 418-25.

[33] Sittiwet C and Puangpronpitag D. Anti-Bacterial Activity of *Cryptolepis buchanani* Aqueous Extract. International Journal of Biological Chemistry. 2009;3: 90-94.