International Journal of Scientific Research in Science and Technology
Available online at : www.ijsrst.com
OPEN ACCESS
Print ISSN: 2395-6011 | Online ISSN: 2395-602X
doi : https://doi.org/10.32628/IJSRST52310558

A Review on Phytochemical Constituents and Pharmacological Activities of *Buchanania lanzan* Sprang., *Millettia peguenensis* Ali., *Evolvulus alsinoides* L.

Riya Kadia[1], Smit Bhavsar[2], Nainesh Modi[3]

[1]Master of botany, Department of botany, USSC, Gujarat University, Ahmedabad, Gujarat, India
[2]Research Scholar, Department of Botany, USSC. Gujarat University, Ahmedabad, Gujarat, India
[3]Professor, Department of botany, USSC, Gujarat University, Ahmedabad, Gujarat, India

ARTICLEINFO

Article History:

Accepted: 07 Sep 2023
Published: 30 Sep 2023

Publication Issue
Volume 10, Issue 5
September-October-2023
Page Number
409-420

ABSTRACT

In this study, Buchanania lanzan sprang.,Millettia peguenensis Ali., and Evolvulus alsinoides L. were analyzed in terms of phytochemical composition, distribution, and ethnomedicinal uses. These plants are used in Ayurveda, Unani, and Chinese medicine as ethnomedicine. Plants have numerous properties, such as antioxidants, antibiotics, anti-bacterial, anti-ulcer, anti-inflammatory, antistress, and antidiabetic. In this review, we intend to demonstrate the phytochemical constituents, as well as the traditional medicinal uses of these herbs. Based on a comprehensive review of various research papers and literature available on these three plants, as well as the present research done by us, we have tried to compile information regarding Buchanania lanzan sprang.,Millettia peguenensis Ali., and Evolvulus alsinoides L.. Various scientific databases were used to find information on the anti-diabetic properties of B. lanzan, M. peguensis, and E. alsinodes, like Scopus, PubMed, ScienceDirect, and Google Scholar. Different parts of the plants were examined for their phytochemical, toxicological, antioxidant, antidiabetic, antiinflammatory, antistress, and many more. They contain a number of phytochemical compounds, including flavonoids, saponins, alkaloids, tannins, terpenes, and glycosides, which are responsible for their ability to treat diabetes, wounds, and oxidative stress. A crude extract of the different parts has valuable bioactive properties and could have ethnopharmacological relevance for managing different kinds of diseases. These phytoconstituents can be used in the formation of drugs.

Keywords : Buchanania lanzan Sprang., Milletia pegunensis Ali., Evolvulus alsinoides L., Ethnomedicinal use, Phytochemical study, Pharmacological activity

I. INTRODUCTION

Natural medicines have been used by people throughout history to cure their maladies (Stojanoski,1999). There was insufficient information about the causes of a particular illness in ancient times as well as which plant and how it could be used to cure it, so everything was based on experiences. Over time, specific medicinal plants were discovered to be beneficial for treating certain diseases; therefore, the use of medicinal plants for treating diseases gradually became less dependent on an empiric framework and settled on explanatory facts. Until the advent of phytochemistry in the 16th century, plants were the source of treatment and prophylaxis (Kelly, 2009). Many communities around the world have used medicinal plants as a healing source for thousands of years. About 85% of the world's population still uses it as primary healthcare. 80% of all synthetic drugs originate from them (Pešić et al.,2015; Bauer et al.,2014). In general, phytochemicals are divided into primary and secondary constituents based on how they function in plant metabolism. The purines and pyrimidines of nucleic acids, common sugars, amino acids, proteins, chlorophyll, and other substances are among the primary ingredients. While the remaining plant compounds, such as curcumin, saponins, phenolics, flavonoids, lignans, alkaloids, terpenes, and flavonoids as well as plant steroids, make up the secondary ingredients (Saxena et al. 2013; Thakur et al. 2018). Fruits and vegetables have been extensively linked to enhanced digestive wellness, clear vision, and a decreased risk of heart disease, stroke, chronic illnesses like diabetes, and some types of cancer, therefore consuming a diet high in fruits and vegetables regularly offers unquestionable health benefits (Ren et al. 2003).

Historical sources relevant for the study of medicinal plant use

Herbal medicines have been used in traditional medicine since prehistoric times when medicinal plants were discovered and used as medicines. In addition to synthesizing hundreds of chemical compounds, plants also have mechanisms for protecting themselves against insects, fungi, diseases, and herbivorous mammals. Many phytochemicals are found to have biological activity. The effects of using whole plants for medicinal purposes remain unclear, however, due to their large diversity of phytochemicals. There is also a lack of scientific research to assess the phytochemical content and pharmacological action of many plants with medicinal potential to determine their efficacy and safety (Ahn, 2017). About 5000 years ago, a Sumerian clay slab from Nagpur was found with written evidence of medicinal plants' usage. The book contained recipes for the preparation of over 250 plants (Kelly, 2009). Emperor Shen Nung wrote the Chinese book Pen T'Sao in the second millennium BC that covers 365 herbs (dried parts of plants), many of which are still used today like Rhe rhisoma, camphor, Theae folium, Podophyllum, the great yellow gentian, ginseng, jimson weed, cinnamon bark, and ephedra (Bottcher, 1965; Wiart, 2006). There are a number of medicinal plants in the Vedas of India, which are majorly used bythe people of the country. Nutmeg, pepper, clove, and other spices are still in use today which originated in India (Tucakov,1971). Throughout history, Ayurvedic medicine has used thousands of herbs and spices that possess medicinal properties, such as turmeric, which contains curcumin (Aggarwal et al., 2007; Dwivedi et al.,2007). Such herbs and spices are documented in the Atharva Veda, Rig Veda, and the Sushruta Samhita (Collins M.,2000). Mimosa rubicaulis Lam roots for injuries, stomach cramps, and sprains. For nausea, powdered root is used, and for burns, bruised leaves are applied. The smoke of the gum is used as a disinfectant[A.M Tamboli, Dr K A Wadkar; A RECENT Review on Phytochemical Constituents and Medicinal Properties of Mimosa rubicaulis Lam.]

1.1 Uses of different ethnomedicinal plants from different forest regions

A key element of ethnomedicine is the study or comparison of traditional medicines that are based on bioactive compounds found in plants and animals and may be practiced by various ethnic groups, especially those without easy access to Western medicines, as is the case with indigenous peoples. In some cases, ethnomedicine is used as a synonym for traditional medicine (Acharya et al.,2008). Generally, tribal people use stem gum of Sterculia urens Roxb. as an adhesive and it has unknown medicinal properties, which is why they collect and sell it in the market. Stem gum is edible and applied externally on wounds (Patel et al., 2010). In Indian Ayurvedic medicine, Emblica officinalis (family: Euphorbiaceae) fruits and Evolvulus alsinoides (family: Convolvulaceae) whole plants heal various illnesses (Alamgir et al., 2010). In China, Boswellia carterii or Boswellia serrata are used as traditional herbal formulas to treat inflammatory arthritis. Both contain boswellic acids, which are effective at treating inflammation and arthritis (Chevrier et al., 2005). From the regions of Jaunsar-Bawar; Uttar Pradesh, Achyranthes aspera L., Ainsliaea latifolia D. Don, Apluda mutica L., etc. were used by the tribals of this region to decrease the efficiency and effect of snake poison. To treat snake poison, they made pests from the plant and applied to bitten areas and put plant juice drops in nostrils, ear and nasal cavity (Jain et al,1984). Gujarat is home to around 2000 blooming plant species. Around 1275 species have been identified as having therapeutic use. Plant medicine is an ancient, global tradition that many rural communities and residents in developing countries rely on as a primary source of health treatment (Robbin, 2000). From the forest area of the Jhalod district, Achyranthus aspera L. root powder is given to the pregnant lady for easy delivery (Maru et al.,2014).

1.2 About flora of Ratan mahal forest

The Ratan Mahal Forest in Gujarat state's Panchmahal district lies in the southeast of the region. It is part of an irregular chain of hilly forests along the eastern border of the state. Bhils, Kolis, Patlias and Ravanas are the main tribes of this forest. Around 42 plant families were reported and used ethnomedicinally or ethnobotanically by the tribal people of Ratan Mahal Forest. Approximately 72 ethnomedicinal plants are reported and they belong to 42 different families. These plants were used by the tribes of Ratan Mahal Forest to cure different diseases like wound healing, skin diseases, dysentery, fever, body pain, cold, cough, diabetes, and so on (Bedi, 1978).

Plant description, Phytochemical screening, and Pharmacological activity of selected ethnomedicinal plants:

2.1) Kingdome: Plantae
Division: Angiosperm
Class: Rosids
Order: Sapindales
Family: Anacardiaceae
Genus: Buchanania
Species: lanzan

Buchanania lanzan Sprang. Sub deciduous trees, up to 18 m tall, with 10-12 mm thick bark, surface black or dark brown, rough, tessellate fissures, some like crocodile leather; blaze red. Leaves are simple, alternate, and estipulate; petiole 12-22 mm, stout, glabrous; lamina 10-23.5 x 5-12 cm, broadly oblong, base round or acute, apex obtuse or emarginate, margin entire, glabrous above and densely tomentose beneath, coriaceous; lateral nerves 10-20 pairs, pinnate, prominent, pubescent, secondary Flowers are bisexual and greenish-white in colour.

Phytochemical Constituents

Leaves of this plant having Tannins, triterpenoids, saponins, flavonoids, kaempferol-7-o'glucosides, quercetin-3-rahmnoglucoside, quercetin, gallic acid, kaempferol, and reducing sugars, including a novel glycoside, and myricetin-3'-rhmnoside-3-galactoside (Mehta et al.,2010). Stem containing tannins, alkaloids, and saponins and seeds have a number of fiber,

carbohydrates, minerals, fats, vitamins B1, B2, B3, C, calcium, chlorine, copper, iron, magnesium, phosphorus, potassium, sodium, sulfur, fatty oils, and β-amylin (Khare et al.,2007).

Vernacular Name:

Marathi: Char; **Tamil:** Charam; **Hindi:** Chirongi, Piyal; **Gujarati:** Charoli; **Sanskrit:** Akhatth, Muni; **English:** Calumpong nut; **Bengali:** Piyal, Sarop;**Kannada:** Charole

Distribution:

Buchanania lanzan Sprang is generally distributed in various states of India like Andhra Pradesh, Kerala, Maharashtra, Odisha, and Tamilnadu. It is also found in Myanmar and Sri Lanka.

Ecology: It is a plant of mainly drier areas in the tropics and subtropics, where it is found at elevations up to 1,200 meters. It grows best in areas where annual daytime temperatures are within the range 32 - 42°c but can tolerate 5 - 48°c. It prefers a mean annual rainfall in the range of 1,000 - 1,500mm but tolerates 750 - 2,200mm. Grows well in full sun but can also tolerate considerable shade, especially when small. Prefers a pH in the range of 5.5 - 6, tolerating 4.9 - 7.2

Description of the plant:

Leaves: Simple, alternate, estipulate, petiole 12-22 mm, stout, glabrous, lamina 10-23.5 × 5-12 cm, broadly oblong, base rounded or acute, apex obtuse or emarginate, margin entire, lateral nerves 10-20 pairs, pinnate, prominent, pubescent, secondary laterals prominent, intercostae reticulate, prominent, glabrous above and densely tomentose beneath, coriaceous; lateral nerves 10-20 pairs, pinnate, prominent, pubescent, secondary laterals prominent, intercostae reticulate, prominent

Flower: calyx lobes 5; petals 5, oblong, reflexed, pilose; stamens 10, inserted at the base of a fleshy disc; filaments free, glabrous; disc cupular, 5 lobed, pilose; carpels 5-6, free, superior, tomentose, 4 reduced to thread-like processes, one fertile, ovule one, pendulous; style lateral; stigma truncate.

Fruit: Drupe, 10-13 x 8 mm in size, oblong, laterally compressed, Blackstone-hardboard, two valved; the seed is one.

Ethnomedicinal uses of Buchanania lanzan:

The fruits are diuretic and laxative, and they're used to treat thirst, body odour, fever, cough, and asthma (Neelakanth et al.2012). The immune stimulant and astringent characteristics of dry fruits have been observed (Naseeb et al.,2014). The root's extract is also employed as an expectorant, in the treatment of biliousness, and in the treatment of blood disorders (Siddiqui et al.,2014). A gum derived from the bark is used to alleviate diarrhoea and intercostal aches. Because it is analgesic, the gum is blended with goat's milk for beneficial and curative outcomes in intercostal aches. The leaves' juice is used as a blood purifier, thirst quencher, digestive aid, expectorant, aphrodisiac, and purgative (Chanda et al.,2013) Leaves are used to treat diarrhoea, rheumatism, skin disorders, wound healing, and ophidian. (Samant et al.,2011).

Preliminary phytochemical analysis:

Preliminary phytochemical screening of Buchanania lanzan Sprang. Leaves in Petroleum ether, Chloroform, ethyl acetate, Methanol, ethanol, and water extraction medium shows the presence of Glycosides, Carbohydrates, Sterols and Flavonoids (Meheta et al.,2010). Extraction of seeds in the medium of ether, dichloromethane and methanol shows the presence of steroids, saponins, Tannins and flavonoid (Khatoon et al.,2015). Ethanolic extract of bark is undergone the process of preliminary phytochemical screening (Jain et al.,2012). Gum from the bark shows the presence of Flavonoids, saponins, amino acids, Carbohydrates and tannins (Siddiqui et al. 2016).

Pharmacological activity:

- Antistress activity:

The antistress effect of a methanolic extract of Buchanania lanzan leaves was assessed using a swim endurance model in all groups under normal and stressed settings, using urine vanillylmandelic acid

(VMA) and ascorbic acid as non-invasive biomarkers. In both normal and stress-induced rats, the methanolic extract of Buchanania lanzan was found to have considerable anti-stress action (Mehta et al.,2011).

- Anti-inflammatory and Analgesic activity:

In an animal model, the anti-inflammatory and analgesic effects of Buchanania lanzan Spreng. methanolic root extract was examined. Anti-inflammatory activity was investigated in a carrageenan-induced rat paw oedema model and analgesic activity in an acetic acid-induced writhing paradigm in mice and a hot plate reaction time experiment in rats. In comparison to the control, the methanolic root extract considerably reduced writhes in experimental mice, and a hot plate test revealed a significant licking effect in rats. The volume of the paws of treated animals was dramatically reduced, indicating that methanolic extract could be a promising anti-inflammatory and analgesic drug (Patsnaik et al.,2011).

- Anti-diabetic activity:

On Wister rats, the anti-diabetic and anti-hyperlipidaemic action of Buchanania lanzan of methanol leaf extract was investigated using streptozotocin or streptozotocin & nicotinamide delivered intraperitonially to generate types I and II diabetes. For 21 days, Wister rats with blood glucose levels greater than 1908 mg/dl were given methanol leaf extract or a positive control, and their blood glucose and lipid profiles were assessed. In streptozotocin-induced types I and II diabetic rats, the blood glucose level and serum lipid profile were significantly lower than the usual value (Sushma et al.,2013).

- Anti-diarrhoeal activity:

Castor oil-induced diarrhoea was utilized to test the anti-diarrheal potential of Bunchania lanzan, which is employed in India's traditional medicine system. The methanol extracts demonstrated considerable inhibitory action against castor oil-induced diarrhoea in a dose-dependent manner, as well as a significant reduction in gastrointestinal motility in a charcoal meal test, and no signs of toxicity in the animals in acute toxicity testing. The findings were aimed at explaining their traditional use as anti-diarrhoeal medicines (Sumithra et al., 2012).

- Antioxidant activity:

A DPPH assay was used to measure the antioxidant potential of gum exudate. As compared to ascorbic acid (95.54%), black gum exudates from Umaria showed the highest percent inhibition (67.58 %), with an EC50 value of 16.59 mg/ml (Siddiqui et al.,2016)

- Wound healing activity:

A study was conducted using Wistar albino rats weighing 150-200 grams. When compared to the control, the 10% B. lanzan ointment exhibited a significant increase in wound contraction (73.28 percent) (from the 9th day on). On the other hand, the standard antibiotic, soframycin, performed well, generating significant wound constriction by the sixth day (Pattnaik et al,2013).

2.2) Kingdome: Plantae
Division: Angiosperm
Class: Eudicots
Order: Fabales
Family: Fabaceae
Genus: Milletieae
Species: peguensis

Millettia peguenensis is commonly known as the Moulmein rosewood. It is a deciduous tree and is generally planted as an ornamental plant. It is a 12-15 m tall legume tree. The leaves are pinnate, with oval leaflets. The trunk is straight, with a smooth grey bark that flakes off in little irregular spots. When it's in full bloom, it's quite stunning. In the spring and early summer, it produces racemes of mauve pea-like flowers.

Vernacular name:
Gujarati: Kanaji; **English:** Moulmein rosewood; **Bengali:** Tuma; **Hindi:** Mitoshika.

Distribution

This plant species is generally grown in Lower Burma and Siam. Its cultivated plant species are generally found in Burma, India, and Pakistan.

Ecology:

This plant species can tolerate intense heat and sunlight. It has a dense network of lateral roots that's why it can also tolerate drought. In root portion there are nitrogen fixation nodules are present, which will convert N_2 into ammonia. Due to its dense canopy, less water will be evaporated.

Morphology of plant:

This tree species attained a height up to 15-25 m. It has large canopy. It may be deciduous for short period. It has straight or cork trunk, 50-80 cm in diameter, with grey-brown bark. This bark can be smooth or vertically fissured. Branches are glabrous with pale stipule scars. Leaves are imparipinnate and having short stalked, at the besal portion it is rounded or cuneate.

Description of plant part:

Small Deciduous tree.Leaves are Imparipinnate, Leaflets 5-7, Ovate, Elliptic, Obtuse, Acminate, Glabrous. Bark is Rough, Dark Brown coloured. Flowers are 5-20 cm long racemes young branches. Calyx is 1-2 mm glabrous.Corolla is Purplish blue. Pods are Oblong, Glabrouswith sutures.Flowering and Fruiting Time is on February- April

Ethnomedicinal uses:

To cure Eczema, apply bark juice to it. In some of the forests of Africa, their tribals used various parts of plants part to cure skin diseases, eczema, snake bite, mouth ulcer, and many more (Banzouzi et al.,2008). The root, bark, stem, and leaves of this plant are used to cure the infected wound, toxicity, skin infection, cough, boils, sore throat, and so on. Because of its tonic properties, Northern Thailand, boiled in water and took a bath from it (Khuankaew et al.,2014). Seeds are used to cure worm infections and pain (Tu et al.,2019). Leaves and stem bark aqueous decoction are used to cure intestinal parasitosis, febrile aches, renal pains, cough, and female infertility in Congo. Stem bark infusion is used in the bath to treat syphilitic wounds (Banzouzi et al.,2008). In India, the Gujjar tribe follows the use of M. extensa (Benth.) Baker barks paste for the treatment of wounds (Sharma et al., 2013). The Bhilla tribe in Maharashtra, India also used its bark juice for the wound by applying it once a day for a time period of 4–5 days (Kamble et al., 2010). It is also used for the treatment of cough and skin infections (Padhi et al., 2017). The Tai Yai community in Northern Thailand used the leaves and stem of M. auriculata Brandis by boiling it with water and used in a bath due to its tonic property (Khuankaew et al., 2014). M. pachycarpa Benth. seeds are promptly used for the treatment of worm infection, pain, and bruises (Tu et al., 2019).

Chemical constituents:

Several phytoconstituents have been identified from M. peguenensis, including flavonoids such as pongamol, lanceolatin-B, kanjone, milletenone, ovaliflavanone-A, ovalitenone, pongaglabol, and other bioactive phytoconstituents (Ganapaty et al., 1998).

Preliminary Phytochemical screening

Leaf extraction in Hexane, Chloroform, and petroleum ether was used by Packiyalakshmi et al.,2017 for the phytochemical screening.

Pharmacologic activity

- Antimicrobial activity:

The antibacterial activity of hexane and EtOAc extracts of stem bark was assessed by measuring the minimum inhibitory concentration (MIC) against bacterial and fungal species, with MIC values ranging from 64 to 512 mg/mL (Havyarimana et al.,2012). Methanolic extracts of root and leaf have antifungal action against Mycobacterium phlei (Gautam et al.,2007).

- Antioxidant activity:

The presence of polyphenols and flavonoids in the ethanol extract of leaves explains its antioxidant activity, which was tested in albino rats after oral administration of the extract (300 mg/kg body mass).

Reduced glutathione, glutathione peroxidase, catalase, and superoxide dismutase levels increased significantly, while conjugative dines, hydroxy peroxide and thiobarbituric acid reactive substances levels decreased significantly. The findings revealed that the extract protects against lipid peroxidation, implying a possible mechanism for antioxidant activity (Pulipati et al.,2018). The DPPH test technique was used to assess the antioxidant activity of hexane and EtOAc extracts of the stem bark, and it found that millaurine had the highest activity when compared to other substances (Havyarimana et al., 2012).

- Anthelmintic activity:

Chloroform extracts of leaves and stems of M. auriculata Brandis was tested against the standard medicine Albendazole using Pheretima posthuma at a dose of 10 mg/mL, with the leaf's extracts being found to be more potent than the stem extract and standard (Jena et al.,2020).

- Antiulcer activity:

The methanol extract of seeds of M. pinnata (L.) Panigrahi was tested in vivo and found to have an antiulcerogenic effect at a dose of 25 mg/kg in a pyloric ligation and aspirin-induced ulcer model (Pulipati et al.2018).

- Cytotoxicity:

MMT test on the root of Milletia brandiasiana in dichloromethane solution reveals considerable action against HepG2, A549, and HuccA1. Numerous bioactive flavonoids, such as lanceolatin B as well as isoloncho, have been identified and contribute to this action (Pailee et al., 2019). M. pinnata (L.) flower in green artificial nanoparticles Several concentrations of the extract, including 11.11, 33.33, 100, and 300 lg/mL, were assessed using the brine shrimp lethality assay, which led to a reduced LD50 value of 36.41 lg/mL. This reduced LD50 value demonstrates the potential of the synthesized green silver nanoparticles to cause cytotoxicity. The elevated activity supports the existence of possibly toxic substances, which is a pathway for anticancer action (Rajakumar et al., 2017).

2.3.) Kingdome: Plantae
Division: Angiosperm
Class: Eudicots
Order: Sonanales
Family: Convolvululaceae
Genus: Evolvulus

It is a herbaceous plant, annual or perennial, with more or less numerous, prostrate or ascending stems, slender, with appressed and spreading hairs.

Vernacular names:

English: Dwarf morning glory; Hindi: Vishnukranta, Shyam kranta; Marathi: Vishnukranti; Tamil: Vishnukranthi; Malayalam: Vishnukranthi; Telugu: Vishnukrantha; Kannada: Vishnukranti, Vishnukranta; Sanskrit: Vishnugand

Distribution:
It has a natural pantropical distribution encompassing tropical and warm-temperate regions of Australasia, Indomalaya, Polynesia, Sub-Saharan Africa, and the Americas
Ecology:
This plant needed shady and humid climate conditions for favorable growth. It needs marshland and wet forest lands.
Morphology of plant:
This is a slender, branched, spreading or ascending herb that is usually extremely hairy. The stems range in length from 20 to 70 cm and are not twining. The leaves are variously clad, lanceolate to ovate, and normally 0.5 to 1 cm in length (but maybe greater); the apex is blunt with a small point, and the base is pointed; the leaves are thickly coated with appressed, white, and silky hairs. The flowers are pale blue with a diameter of 6-8 mm. The fruit (capsule) is normally spherical and contains four seeds. Dwarf Morning Glory is a South American native that has spread around the world, including India.

Description of plant part:

Leaves: petiolate or subsessile, are 0.7 to 2.5 cm long and 5 to 10 mm long.

Flowers: Isolated or grouped in pauciflorous cymes, borne by filiform peduncles, 2.5 to 3.5 cm long.

Calyx: is formed by villous, lanceolate sepals 3 to 4 mm long.

Corolla: Rounded with pentameric symmetry, blue in colour, rarely white, is 7 to 10 mm in diameter.

Stamens: Filiform filaments, are united at the base of the corolla tube.

Ovary: Glabrous, is surmounted by two freestyles.

Fruit: Globular capsule, with four valves, generally containing four seeds that are black and smooth.

Chemical constituents:

The plant contains alkaloids: betaine, shankhapushpine and evolvine. Fresh plant contains volatile oil. It also contains a yellow neutral fat, an organic acid and saline substances. An unidentified compound has been isolated (Goyal et al., 2005). Scopoletin, scopolin, umbelliferon, 2-methyl-1,2,3,4-butanetetrol, ferulic acid esters with alcohols C14-C17 and palmitic, stearic, oleic, 8-methyldecanoic and heptadecanoic acids have been reported (Cervenka et al.,2008).

Ethnomedicinal uses of Evolvulus alsinoides:

E. alsinoides L. is mostly utilized in East Asian traditional medicine. The plant is used as a brain tonic in Ayurvedic medicine to treat neurodegenerative disorders, asthma, and amnesia (Goyal et al.,2005). Dysentery and depression are treated using the plant's roots and stem extracts in Sri Lanka. Asthma and mental problems benefit from the leaves In the Eastern Ghats of Andhra Pradesh, India, a decoction of root is drunk three times a day for three days to cure cough and cold (Rajakaruna et al.,2002). The whole plant of E. alsinoides is used for the treatment of venereal illnesses, according to an ethnobotanical survey done among Kani/Kanikaran ethnic groups in India's Southern Western Ghats (Ayyanar et al.,2005). In Sri Lanka, the plant's roots and stem extract are used to treat depression and dysentery. For asthma and mental health issues, leaves are suggested (Rajaqkaruna, Harris, and Towers, 2002).

Preliminary Phytochemical screening

Whole plant extraction was prepared in distilled water and ethanol. Ethanolic extract shows the presence of alkaloid, glycosides, saponins, tannins, and flavonoids while distilled water extract shows the presence of glycosides and alkaloids (Omogbai et al.,2011). The whole plant extract was prepared in petroleum ether, chloroform, ethyl acetate, ethanol, and hydrochloric acid for the preliminary phytochemical screening (Yadav et al.,2018). Ethanolic and aqueous extract of plant shows the presence of alkaloid, Flavonoid, glycosides, polyphenols, sterols, tannins, and triterpenes (Elangovan et al.,2013).

Pharmacological activity

• Antibacterial activity

The zone of inhibition was observed in Pseudomonas aeruginosa, Salmonella typhi, and Escherichia coli in the ethanolic and distilled water extract. The lowest zone of inhibition was observed in St. reus (8 mm). Higher growth inhibition was observed in the ethanolic extract as compared to aqueous extract (Omogbai et al.,2011).

• Adaptogenic (Antistress) and Anti amnesic:

In the acute stress paradigm, male Sprague–Dawley rats weighing 180–200 g was immobilized for 150 minutes once only, whereas in the chronic unpredictable stress model, rats were exposed to several types of stressors daily for seven days. In both acute and chronic unexpected stress, increased adrenal gland weight, plasma creatine kinase, and corticosterone levels have been linked to stomach ulceration. Plasma glucose, on the other hand, was only elevated in the presence of acute stress. For three days, rats were given graded doses of crude ethanolic extract of E. alsinoides (100, 200, and 400 mg/kg p.o.) and then exposed to acute stress 45 minutes following the final treatment. Phenolics and flavonoids are extracted from the ethanol extract of E. alsinoides as an n-BuOH soluble fraction technique. Then it was

tested for anti-stress activity in adult male Sprague–Dawley rats with acute stress-caused metabolic alterations. Plasma glucose, adrenal gland, plasma creatine kinase, and corticosterone levels have all increased significantly in response to stress. By regulating hyperglycemia, plasma corticosterone, creatine kinase, and adrenal hypertrophy, one ingredient showed the most promising antistress impact, while others were also successful in correcting most of these stress indicators (Siripurapu et al., 2005).

• Hyperlipidemia activity:

The Swiss albino rats were selected for this activity. At a dosage of 200mg/kg, ethanolic extract and its chloroform fraction decreased the level of cholesterol levels by 36.11 and 34.77 %, respectively. In contrast, at a dose of 400mg/kg, ethanolic extract and its chloroform fraction reduced serum of total cholesterol levels by 40.37 and 38.22 %, respectively. Ethanolic extract and chloroform fraction at doses of 200mg/kg elevated serum HDL cholesterol levels by 10.72 and 14.20 %, respectively. In contrast, at a dose of 400mg/kg, ethanolic extract and fraction elevated serum HDL cholesterol levels by 13.94 and 16.74 %, respectively. At a dosage of 200mg/kg, ethanolic extract and its chloroform fraction lowered blood triglyceride levels by 36.64 and 45.88 %, respectively. In contrast, at a dose of 400mg/kg, ethanolic extract and its chloroform fraction reduced blood triglyceride levels by 40.65 and 53.74 %, respectively. At a dose of 200mg/kg, the ethanolic extract and chloroform fraction reduced LDL cholesterol levels by 69.25 and 72.06 %, respectively. However, at 400mg/kg, ethanolic extract and its chloroform fraction reduced LDL cholesterol by 73.13 and 78.07 %, respectively (Iyer et al.,2011).

II. CONCLUSION

Various tribal people over world use different part of plant for the treatment of skin infection, boils, sore throat, wounds, cough, and pain. Different species of Milletia have therapeutic effects such as anti-cancer, anti-cytotoxic, anti-ulcer, anti-helmintic, anti-oxidant, and antimicrobial action.

III. REFERENCES

[1]. Stojanoski, N. (1999). Development of health culture in Veles and its region from the past to the end of the 20th century. Veles: Society of science and art, 13, 34-34.

[2]. Kelly K. 2009, History of medicine. New York: Facts on file; pp. 29–50.

[3]. Pešić, M., & Stanković, S. (2015). Development of natural product drugs in a sustainable manner. Brief for United Nations Global Sustainable Development Report.

[4]. Bauer, A., & Brönstrup, M. (2014). Industrial natural product chemistry for drug discovery and development. Natural product reports, 31(1), 35-60.

[5]. Saxena, M., Saxena, J., Nema, R., Dharmendra, S. and Gupta, A. 2013. Phytochemistry of Medicinal Plants. J. Pharmacogn. Phytochem., 1(6): 168- 182.

[6]. Thakur, A., Sharma, V. and Thakur, A. 2018. Phytotoxin-a mini-review. J. Pharmacogn. Phytochem., 7(6): 2705-2708.

[7]. Ren, W., Qiao, Z., Wang, H., Zhu, L. and Zhang, L. 2003. Flavonoids: Promising Anticancer Agents. Medicinal Research Reviews, 23(4): 519-53.

[8]. Ahn, K. (2017). The worldwide trend of using botanical drugs and strategies for developing global drugs. BMB reports, 50(3), 111.

[9]. Bottcher, H. (1965). Miracle drugs. Zagreb: Zora, 23-139.

[10]. Wiart, C. (2006). Ethnopharmacology of medicinal plants: Asia and the Pacific (pp. 1-50). New Jersey: Humana Press. doi, 10, 978-1.

[11]. Tucakov, J. (1971). Healing with plants–phytotherapy. Beograd: Culture, 180-90.

[12]. Aggarwal, B. B.; Sundaram, C.; Malani, N.; Ichikawa, H. (2007). Curcumin: the Indian solid gold. Advances in Experimental Medicine and Biology. Vol. 595. pp. 1–75. doi:10.1007/978-0-387-46401-5_1. ISBN 978-0-387-46400-8. PMID 17569205.

[13]. Dwivedi, Girish; Dwivedi, Shridhar (2007). History of Medicine: Sushruta – the Clinician – Teacher par Excellence (PDF). National Informatics Centre. Archived from the original (PDF) on 10 October 2008. Retrieved 8 October 2008.

[14]. Collins, Minta (2000). Medieval Herbals: The Illustrative Traditions. University of Toronto Press. p. 32. ISBN 978-0-8020-8313-5.

[15]. A.M Tamboli, Dr K A Wadkar; A RECENT Review on Phytochemical Constituents and Medicinal Properties of Mimosa rubicaulis Lam.

[16]. Acharya, D., & Shrivastava, A. (2008). Indigenous herbal medicines. Aavishkar Publishers, Distributors.

[17]. Patel KC and Patel RS (2010). Survey of Plant Species used for the Treatment of Teeth Diseases by the Tribals of Ambaji and Danta Forest areas of North Gujarat. Life Science Leaflets, 7: 206-209.

[18]. Alamgir, M., & Uddin, S. J. (2010). Recent advances on the ethnomedicinal plants as immunomodulatory agents. Ethnomedicine: a source of complementary therapeutics, 37(661), 2.

[19]. Chevrier, M. R., Ryan, A. E., Lee, D. Y. W., Zhongze, M., Wu-Yan, Z., & Via, C. S. (2005). Boswellia carterii extract inhibits TH1 cytokines and promotes TH2 cytokines in vitro. Clinical and Vaccine Immunology, 12(5), 575-580.

[20]. S.P Jain and H.S Puri (1984). Ethnomedicinal plants of Jaunsar-Bawar Hills, Uttar Pradesh, India. Journal of Ethnopharmacology, 12(1984) 213-222. Elsevier Scientific Publisher Ireland Ltd.

[21]. Robbin CS (2000). Comparative analysis of management Regimes and Medicinal Plants Trades Monitoring Mechanism for American Ginseng. Conversation Biology, 14: 1422-1434.

[22]. Maru, R., & Patel, r. (2014). 4. Certain ethno-medicinal plants used to treat gynaecological disorders by tribal people of jhalodtaluka of dahod district_ gujarat_ india by rn maru and rs patel. Life sciences leaflets, 58, 26-to.

[23]. Bedi, S. J. (1978). Ethnobotany of the Ratan Mahal Hills, Gujarat, India. Economic Botany, 32(3), 278-284.

[24]. Mehta, S. K., Mukherjee, S., & Jaiprakash, B. (2010). Preliminary phytochemical investigation on leaves of Buchanania lanzan (chironji). Int J Pharm Sci Rev Res, 3(2), 55-59.

[25]. Khare et al 2007

[26]. Neelakanth, M. J., Bhat, M. R., Taranalli, A. D., & Veeresh, B. (2012). Effect of Buchanania lanzan seeds on learning and memory in normal and memory deficit rats. Journal of Researchers in Pharmabiomedica, 22(1), 33-38.

[27]. Naseeb, K. M., Karunakar, H., Aamir, S., Deepak, T. K., & Ashar, K. (2014). Evaluation of antivenom activity of ethanolic extract of Buchanania lanzan bark against Naja kaouthia snake venom. UJPBS, 2(2), 39-45.

[28]. Siddiqui, M. Z., Chowdhury, A. R., Prasad, N., & Thomas, M. (2014). Buchanania lanzan: a species of enormous potentials. World Journal of Pharmaceutical Sciences, 374-379.

[29]. Chanda, S. U. M. I. T. R. A., Bhayani, D. I. L. I. P., & Desai, D. I. S. H. A. N. T. (2013). Polyphenols and flavonoids of twelve Indian medicinal plants. Bioscan, 8(2), 595-601.

[30]. Samant, S. S., Vidyarthi, S., Pant, S., Sharma, P., Marpa, S., & Sharma, P. (2011). Diversity, distribution, indigenous uses and conservation of the medicinal plants of Indian Himalayan region used in cancer. Journal of Biodiversity, 2(2), 117-125.

[31]. Khatoon, N., Gupta, R. K., & Tyagi, Y. K. (2015). Nutraceutical potential and phytochemical screening of Buchanania lanzan, an underutilized exotic Indian nut and its use as a source of functional food. Journal of Pharmacognosy and Phytochemistry, 4(1).

[32]. Jain, R., & Jain, S. K. (2012). Effect of Buchanania lanzan Spreng. bark extract on cyclophosphamide induced genotoxicity and oxidative stress in mice. Asian Pacific journal of tropical medicine, 5(3), 187-191.

[33]. Siddiqui, M. Z., Chowdhury, A. R., & Prasad, N. (2016). Evaluation of phytochemicals, physico-chemical properties and antioxidant activity in gum exudates of Buchanania lanzan. Proceedings of the National Academy of Sciences, India Section B: Biological Sciences, 86(4), 817-822.

[34]. Mehta SK, Jaiprakash B, Nayeem N. Isolation and phytochemical investigation on leaves of Buchanania lanzan (Chironji). Ann Biol Res 2011;2(3):469-73.

[35]. Patsnaik, A. K., Kodati, D., Pareta, S. K., Patra, K. C., & Harwansh, R. K. (2011). Analgesic and anti-inflammatory activities of Buchanania lanzan spreg. Roots. Res J Pharm Biol Chem Sci, 2(1), 420.

[36]. Sushma, N., Smitha, P. V., Gopal, Y. V., Vinay, R., Reddy, N. S., Mohan, M., & Raju, B. (2013). Antidiabetic, antihyperlipidemic and antioxidant activities of buchanania lanzan spreng methanol leaf extract in streptozotocin-induced types I and II diabetic rats. Tropical Journal of Pharmaceutical Research, 12(2), 221-226.

[37]. Sumithra M, Anbu J, Suganya S. Antidiarrhoeal activity of the anagainst castor oil induction methanolic extract of Bunchanian lanz. Ijapbc. 2012 1(1): 225-234.

[38]. Pattnaik, A., Sarkar, R., Sharma, A., Yadav, K. K., Kumar, A., Roy, P., ... & Sen, T. (2013). Pharmacological studies on Buchanania lanzan Spreng.-A focus on wound healing with particular reference to anti-biofilm properties. Asian Pacific Journal of Tropical Biomedicine, 3(12), 967-974.

[39]. Banzouzi, J. T., Prost, A., Rajemiarimiraho, M., & Ongoka, P. (2008). Traditional uses of the African Millettia species (Fabaceae). International Journal of Botany.

[40]. Sharma, J., Gaur, R.D., Gairola, S., Painuli, R.M., Siddiqi, T.O., 2013. Traditional herbal medicines used for the treatment of skin disorders by the Gujjar tribe of SubHimalayan tract, Uttarakhand. Indian J. Tradit. Knowl. 12, 736–746.

[41]. Kamble, S.Y., Patil, S.R., Sawant, P.S., Sawant, S., Pawar, S.G., Singh, E.A., 2010. Studies on plants used in traditional medicine by Bhilla tribe of Maharashtra. Indian J. Tradit. Knowl. 9, 591–598.

[42]. Padhi, L., Panda, S.K., Leyssen, P., Neyts, J., Luyten, W., Liu, M., 2017. Antimicrobial, anthelmintic, and antiviral activity of plants traditionally used for treatinginfectious disease in the similipal biosphere reserve, Odisha, India. Front. Pharmacol. 8, 1–15.

[43]. Khuankaew, Sunee, Srithi, Kamonnate, Tiansawat, Pimonrat, Jampeetong, Arunothai, Angkhana Inta, P.W., 2014. Ethnobotancal study of medicinal plants used by Tai Yai in Northern Thailand. J. Ethnopharmacol. 151, 829–838.

[44]. Tu, Yanbei, Wu, Chuanhi, Kang, Yunyao, Li, Qin, Zhu, Chao, Y.L., 2019. Bioactivityguided identification of flavonoids with cholinesterase and beta-amyloid peptide aggregation inhibitory effects from the seeds of Millettia Pachycarpa. Bioorg. Med. Chem. Lett. 29, 1194–1198.

[45]. Ganapaty, S., Pushpalatha, V., Babu, G. J., Naidu, K. C., & Waterman, P. G. (1998). Flavonoids from Millettia peguensis Ali

(Fabaceae). Biochemical systematics and ecology, 1(26), 125-126.

[46]. Packiyalakshmi, D., Athilakshmi, P., Gayathri, S., Karthiga, P., & Thiri, R. (2017). Antimicrobial potential of different solvents leaf extract of Millettia peguensis against selected pathogens. The Pharma Innovation Journal, 6(10), 119-124.

[47]. Havyarimana, L., Ndendoung, S. T., de Dieu Tamokou, J., de Théodore Atchadé, A., & Tanyi, J. M. (2012). Chemical constituents of Millettia barteri and their antimicrobial and antioxidant activities. Pharmaceutical Biology, 50(2), 141-146

[48]. Gautam, R., Saklani, A., & Jachak, S. M. (2007). Indian medicinal plants as a source of antimycobacterial agents. Journal of ethnopharmacology, 110(2), 200-234.

[49]. Pulipati, S., Babu, P. S., Lakshmi, D. N., Navyasri, N., Harshini, Y., Vyshnavi, J., & Prasanth, M. (2018). A phyto pharmacological review on a versatile medicinal plant: Pongamia pinnata (L.) pierre. Journal of Pharmacognosy and Phytochemistry, 7(4), 459-463.

[50]. Pailee, Phanruethai, Mahidol, Chulabhorn, Ruchirawat, Somsak, Prachyawarakorn, Vilailak, 2019. Diverse flavonoids from the roots of Millettia brandisiana. Phytochemistry 162, 157–164.

[51]. Rajakumar, Govindasamy, Gomathi, Thandapani, Thiruvengadam, Muthu, Devi Rajeswari, V., Kalpana, V.N., Chung, Ill-Min, 2017. Evaluation of anticholinesterase, antibacterial and cytotoxic activities of green synthesized silver nanoparticles using from Millettia pinnata flower extract. Microb. Pathog. 103, 123–128.

[52]. Jena, R., Rath, D., Rout, S. S., & Kar, D. M. (2020). A review on genus Millettia: Traditional uses, phytochemicals and pharmacological activities. Saudi Pharmaceutical Journal, 28(12), 1686-1703.

[53]. Goyal, P.R. and Singh, K.P. 2005. Evolvulus alsinoides L. A medicinal herb. Int. J. Mendel. 22(3-4): 124-125.

[54]. Cervenka, F., Koleckar, V., Rehakova, Z., Jahodar, L., Kunes, J., Opletal, L., ... & Kuca, K. (2008). Evaluation of natural substances from Evolvulus alsinoides L. with the purpose of determining their antioxidant potency. Journal of Enzyme Inhibition and Medicinal Chemistry, 23(4), 574-578.

[55]. Rajakaruna, N., Harris, C. S., & Towers, G. H. N. (2002). Antimicrobial activity of plants collected from serpentine outcrops in Sri Lanka. Pharmaceutical Biology, 40(3), 235-244.

[56]. Ayyanar, M., & Ignacimuthu, S. (2005). Traditional knowledge of kani tribals in Kouthalai of Tirunelveli hills, Tamil Nadu, India. Journal of ethnopharmacology, 102(2), 246-255.

[57]. Rajaqkaruna N, Harris CS, Towers GHN. Antimicrobial activity of plants collected from Serpentine outcrops in Sri Lanka. Pharm Biol 2002; 40: 235-244.

[58]. Omogbai, B. A., & Eze, F. A. (2011). Phytochemical screening and susceptibility of bacteria pathogens to extracts of Evolvulus alsinoides. Science world journal, 6(1), 5-8.

[59]. Yadav, M. K., Singh, S. K., & TRIPATHI JS, T. Y. (2018). Phytochemical screening and in-vitro antioxidant activity of evolvulus alsinoides extracts. International Journal of Pharmaceutical Sciences and Research, 9(3), 1247-50.

[60]. Elangovan, K., Supriya, K., Murugesan, K., & Aravind, R. (2013). Screening of phytochemicals and in vitro antioxidant activity of Evolvulus alsinoides L. J Acad Industr Res, 2(4), 230-234.

[61]. Siripurapu, K. B., Gupta, P., Bhatia, G.., Maurya,C., Nath, C. & Palit, G. (2005). Adaptogenic and anti-amnesic properties of

Evolvulus alsinoides in rodents. Pharmacology Biochemistry and Behaviour 21:424-432

[62]. Iyer, D., & Patil, U. K. (2011). Effect of Evolvulus alsinoides L. ethanolic extract and its fraction in experimentally induced hyperlipidemia in rats. Pharmacologyonline, 1, 573-580.

Cite this article as :

Riya Kadia, Smit Bhavsar, Nainesh Modi, "A Review on Phytochemical Constituents and Pharmacological Activities of Buchanania lanzan Sprang., Millettia peguenensis Ali., Evolvulus alsinoides L. ", International Journal of Scientific Research in Science and Technology (IJSRST), Online ISSN : 2395-602X, Print ISSN : 2395-6011, Volume 10 Issue 5, pp. 409-420, September-October 2023. Available at doi : https://doi.org/10.32628/IJSRST52310558
Journal URL : https://ijsrst.com/IJSRST52310558