A REVIEW ON PHYTOCHEMICAL AND PHARMACOLOGICAL PROPERTIES OF LEPTADENIA RETICULATA (RETZ)

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ABSTRACT
Leptadenia reticulata (Retz) is a twining shrub to Asclepiadaceae family. It is very valuable plant popularly known as methidodi or jivanti. It is specially known for its stimulant, galactogogue, and restorative properties in ayurveda. Jivanti is one of the important Rasayana drugs in Ayurveda and is used as an ingredient in formulations like Jivantadya Gharita, Jivatayadi rasa, Jivantayadi taila, Ashwagandhadi Gharita, Anuthaila, Chandanadi thaila which are used in treatment of tuberculosis, emaciation, fever, hemorrhage and cardiac ailments to mention a few. It principle constituent are Leptadenol, β-sitosterol, α-amyrin and alkaloid like Jibentin and α and β-Jivantic acids. It possesses the alterative, aphrodisiac, astringent, Galactogogue, diuretic and used as a tonic in debility due to seminal discharges, also useful in asthma. This herb is beneficial if used externally in various skin diseases, wounds and inflammation of the skin. This review is to compiles its valuable phytochemical and pharmacological actvites under same platform.

Keywords: Leptadenia reticulata (Retz), Galactogogue, stimulant herb.

INTRODUCTION
Herb is concentrated food that provides nutritional value like vitamins, minerals along with health benefits to the human body. They are used by man since the beginning of civilization. Today health-conscious public is now realizing that herbs, in combined with proper diet and exercise program can help them to achieve and maintain good health. Ayurveda that improved the general health of body by scavenging free radical. Rasayana is one of the classes of ayurveda that improved the general health of the body. It nourishes and rejuvenates the body and increases Memory, longevity, immunomodulation and adoption. Herbs are a natural path to maintain and preserve good health such as Jivanti (svarnajivantz) in Sanskrit Jiv mean life indicates that the plant is considered to have ability to promote health and vigour. Jivanti is sweet in taste and useful in alleviating all the three doshas, namely, vata, pitta and kapha.Mainly the roots
and the whole plant are used for medicinal purposes so it also included vitalizing group (1).

Leptadenia reticulata (Retz) or jivanti is a much branched twining shrub belongs to Asclepiadaceae family. Jivanti grows throughout India, flower are greenish yellow, in many flowered cymes or subaxillary cymes, the follicles are sub woody and turgid Stem is cylindrical and bent occasionally at places. It is 5 to 10 cm long, 0.5 to 2.5 mm in diameter. The surface is rough, longitudinally ridged, wrinkled and furrowed, transversely cracked and with vertically elongated lenticels at places (1). Externally whites brown, internally pale brown, fracture short and splintery, odour and taste are sweet. The bark is yellowish brown, corky, deeply cracked. Leaves are ovate to cordate, 4 to 8 cm long, 2 to 5.5 cm broad, entire, acute, subacute, to mucronate, base symmetrical, petiole 1 to 3 cm long, pubescent below, green colour, and taste and odour are characteristic (Figure 1). The root are externally rough, white with longitudinal ridges and furrows and in transverse section the wide cork, lignified stone cell layer, madullary rays can be seen. The root size varies from 3 to 10 cm in length and 1.5 to 5 mm in diameter. Flowering stage occurs in May and June, while fruiting begin in October and continues up to November (2).

HABITAT
Especially it grows in the sub-Himalayan tracts of Punjab to Sikkim, Khasi hills, Utter Pradesh, Gujarat and throughout the Deccan Peninsula up to an altitude of 900 m and found particularly in hedges in India (3). It is also distributed throughout Mauritius, Madagascar, Sri Lanka, The Himalayas and Burma Punjab, Gujarat and Kondan. Indian synonyms: Bengali: Bhadjivai, English: Leptadenia, Gujarati: Methidodi or Dodi, Hindi: Dori, Kannada: Hiriyahalle, Marathi: Haranvel, Sanskrit: Jivanti and Telugu: Kalasa (4).
TAXONOMIC HIERARCHY

Kingdom: Plantae
Class: Angiospermae
Cladus: Eudicots
Order: Gentianales
Family: Asclepiadaceae
Sub Family: Asclepidoideae
Tribe: Ceropegieae
Genus: Leptadenia
Species: reticulata

PHYTOCHEMICAL STUDIES

Leptadenia reticulata (Retz) is a branched twining shrub contain many important phytocomstituents of various part of plant like α-amyrine, β-amyrine, ferulic acid, luteolin, diosmetin, rutin, β-sitosterol, Stigmasterol, Henriciacontanol, A triterpene alcohol simiarenol, apigenin. Some other pregnane glycosides Reticuline, Deniculine, Leptaculine isolated from aerial parts which on hydrolysis give calogenin tocopherols other are acetyl alcohol, lupanol 3-o diglucoside, leptidine 1, saponins, Flavanoid, luteolin, diosmitin and tannin. Leaves contain two resins and also contain bitter neutral principal, albuminous and colouring matter, ca oxalate glucose, carbohydrate and tartaric
The structure of three novel pregnane glycosides viz, like Reticuline like Deniculine, Leptaculine, isolated from Leptadenia reticulata were elucidated with modern physicochemical method and chemical transformation was defined as calogenin-3-o-β-cymaropyranosyl-(1>4)-o-3-o-methyl -α- D-galactopyranosyl-(1—4)-o-β-D-digitoxopyranosyl-(1-4)-o-β-D-Cymaropyranoside, Calogenin -3-o-3-o- methyl -α- D-galactopyranosyl-(1-4)-o-β-D-digitoxopyranoside and calogenin-3-o-β-D-glucopyranosyl-(1-4)-o-β-D-glucopyranosyl-(1-4)-o-β-D-cymaropyranoside respectively. The preliminary phytochemical studies of stem of Leptadenia reticulata consist of 6 to 7% moisture, 5.5 to 6% total ash, 6 to 7% different Flavonoid content, 0.2% acid insoluble ash, calcium 0.6%, sodium and potassium content calculated as chloride (2.16 to 2.24 %), reducing sugar, aldohexose, pentose, ketohexose other constitute like protein, gum, mucilage, volatile substance. They also indicated the absences of alkaloids, free catechol, starch, Flavonoid and saponin its aqueous extract. There are developed a sensitive method HPTLC method for estimation of rutin and Lupeol. This method was validate for precision (intra and interday), repeatability and accuracy for estimation of rutin content in leaves of Leptadenia reticulata (Retz) develop two high performance thin layer chromatographic methods for separate quantitative analysis of stigmasterol and dl-α-tocopherols acetate, two marker compounds in Leptadenia reticulata. The methods are rapid, simple, and accurate and can be used for routine quality testing.

Figure 2: Chemical constituent of Aerial part of Leptadenia reticulata(Retz)
PHARMACOLOGICAL ACTIVITIES

Toxicity study: Leptadenia reticulata reported the toxicity study of Leptadenia reticulata aqueous extract. During acute toxicity study of aqueous extract and leptaden administered orally for three alternate days to rats which dose safely tolerated up to 3.125 gm/kg. A high in dose led to an increase in mortality (9).

Anti depressant Activity: Leptadenia reticulata reported the use of Leptadenia reticulata in the anti depressant drug named as Celastrus paniculata, Acorus calamus, Nardostachys jatamansi, And Leptadenia reticulata. Usual dose of drug was 10 to 20 mg/kg for every 10 to 15 min per day. In some Ayurvedic literature the dose was up to 60 min per day. The drug is effective in depression along with other drug without producing any side effect and also showed in marked improvement in hysteria or epilepsy (10).

Vasodilator activity: Agarwal et al. (1960) demonstrated the vasodilator, Transient negative inotropic, chronotropic and prolonged hypotensive effect of aqueous extract of stem of Leptadenia reticulata (11).

Antianaphylactic effect: Leptadenia reticulata also used study the anti anaphylactic effect of polyherbal formulation like DLH-3041 on the rat mesenteric mast cell. DLH-3041 formulated by Himalaya drug company, Bangalore. It is a herbal formulation of Stem of Leptadenia reticulata is one of the content of this formulation. DLH-3041 showed beneficial effect on mast cell degranulation induced by 0.5 ml Horse serum and DPT vaccine in rat. It showed significantly increase the no of intact mast cell on intestinal mesenteric tissue (12).

Anti abortificient activity: it is clinically tried the use of leptaden in the threatened and recurrent abortion. Leptaden is a herbal drug and each table consists of jeevanti (Leptadenia reticulata) 150 mg and Kamboji (breynia patens) 150 mg. during the trial period all the patients have non history of abortion were provided the leptaden: 2 tablet t.d.s. and progesterone 125 mg. I.M. was given once a week till 22 nd week of pregnancy. They did not receive any other hormone treatment. Leptaden with progesterone seen to have brought down the incidences of recurrent abortion. Safe and simple dosage of Leptaden is an additional advantage for its use through pregnancy (13).
Oligospermic Activity: Madaan et al studied and evaluated the speman tablets in the case of oligospermia. Speman tablet of the Himalaya drug company company contain many reputed herbal medicinal plants. Leptadenia reticulata is one of them with composition of 32 mg in each tablet. During the experimental it was provided 2 ter in die. orally for three months to the oligospermia patients. It was observed that the spemen remarkably improved the total count and motility of the sperms. Spemen is proved to be economical and very effective without producing any side effect in oligospermia\(^{(14)}\).

Prostatic hyperplasia: Spemen an Ayurvedic herbal preparation contaicing Leptadenia reticulata (without root whole plant 16 mg/kg quantity per tablet. It is used for treatment of prostatic hyperplasia. When the tablet of speman 325 mg (as per instruction given by manufacturer, Himalaya drug Co. Ltd, Bombay) was given to the patients of benign prostatic hyperplasia, the drug bring about symptomatic relief by improving micturation which is disturbed by BEP\(^{(15)}\).

Anti cancer activity: it is also evaluated the effect of ethanolic extract of Leptadenia reticulata leaves (LELR) against dalton’s ascetic Lymphoma (DAL). It was found that the ethanolic extract of leaves (200 mg/kg, i.p.) resulting in significant increase in the life span and decrease the cancer cell number and tumor weight. The extract also normalized Hematological parameters. The decrease in the cancers cell number observed in the LELR treated group indicates that the test drug is having significant inhibitory effect on the tumor cell proliferation\(^{(16)}\).

Anti microbial activity: Leptadenia reticulata studied the antimicrobial activity of methanol and acetone extract of Leptadenia reticulata against five Gram- and positive bacteria. The acetone extract of Leptadenia reticulata did not any activity against the five Gram-positive bacteria investigated, while the methanol extracts showed strong bactericidal activity\(^{(18)}\).

Cardiovascular activity: Leptadenia reticulata was explored that a large number of medicinal plants are used in the ayurveda depending on the dosha affecting the hrd roga(Cardiac diseases) or to reduce obesity(Medroga) or Inflammation (Shota) are described. All these plants are used in ayurveda for the management of cardiac vascular diseases as per the specific etiology of the patients according to Ayurvedic principles.
Leptadenia reticulata is one of the plants used for curing disease and also act as hypotensive (17).

**Galactogogue activity:** Leptadenia reticulata was the studies evaluated that the root and leaves of the Leptadenia reticulata (Retz) significantly increase milk flow so plant possesses the potent lactogenic, anabolic and galactogogue effect (19).

**Anti-implantation activity:** Leptadenia reticulata used to studied anti implantation and hormonal activities of the Ethanolic extract of the whole plant of Leptadenia reticulata. Ethanol extract of plant (300 mg/kg) exhibited the strong anti-implantation (Inhibit 100%) and uterotrophic activity but no antiestrogenic activity was detected. It also induces a significant increase in the weight of genital organs of the ovariactomized rats (20).

**TRADITIONAL USES**

Leptadenia reticulate, whole herb used as stimulant and restorative, general tonic or weak debility. so it used in Eye-diseases, General weakness, Cough, Dyspnoea, Fever, Asthma, Constipation, Sore throat, Gonorrhea, Diarrhea, Abdominal tumors, Piles, Odem a, toothache, Lack of craving. Leptadenia tonic is useful for general weakness. Take one to two teaspoonful twice a day. The root is to treat skin conditions and ringworms. The root bark is useful in toothaches. The leaves are beneficial for arthritis, gout, odema, cough and other respiratory conditions (21). The stem is also helpful in piles. The flowers are useful in lack of craving. The root powder is useful for diarrhea. The powder is taken one to two teaspoonfuls twice a day with water. The leaves and roots are used in the skin infection such as Ring worm, wound, Nose and ear disorders, and asthma and in the treatment of habitual abortion in woman. It is given commonly those suffering from weak debility or lack of energy. It gives the general strength to the body. Extract of roots and leaves of the plant act as an anti-bacterial and anti fungal agent.21 It promotes health and vigour, improve voice and three dosa like vatta, pita and kapha. It also cure Eye, blood, cough, dyspnoea, burning sensation. (22). Leptadenia reticulata is one of the ingredient of the patented siladan which is claimed to be used in different kinds of mental disorders like sex neurosis. A Gharita preparation of plant (50 gm) is having beneficial effect in diarrhea. Decoction of jivanti root should be taken 20 ml in fever. The bark leaves and
whole plant are improved decreased milk flow in ruminants. The whole plant is also used to stimulant heat and prevents abortion. The leaves are also used to treat eye disease in swine. *L. reticulata* is an ingredient of Dābur chyawanprash, a traditional poly herbal formulation (23).

**MARKETED FORMULATION OF JIVANTI**

Leptadenia reticulata (Retz) is one of component of at least 43 marketed poly herbal formulations which are used against wide range of health ailment and physiological disorders. The list are like Jivantadya Gharita, Jivatayadi rasa, Jivantayadi Taila, Ashwagandhadi Gharita, Anuthaila, Chandanadi thaila, Ashoka Gharita, Balaristha, Brahama rasayana, Chyvanprash avleha, Madhuyastyadi Taila, Speman, Leptaden, vidaryadi Gharita, Shatawaryadi Gharita (24).

**CONCLUSION**

Leptadenia reticulata (Retz) is one of component of at least 43 marketed poly herbal formulations which are used against wide range of health ailment and physiological disorders. So *Leptadenia reticulata* (Retz) has been used to recovered various physiological, Bacterial or even from use as galactogogue in ruminant, cancer and asthma. Only few researchers worked on different extract of plant on few of diseases occurring in the human being. Still Many pharmacological properties of the plant are remaining unexplored. Its antioxidant immunomodulatory and anti cancererous activity is due to Flavanoid, and saponin glycoside. It anti inflammatory and vasodilator properties is due to Phytosterol and Pentacyclic triterenoidal content like β-sitosterol and α-amyrine etc. Jivanti is well known herb known for its galactogogue.

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**REFERENCES**


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