ISSN 2456-3110
Vol 6 · Issue 2
Mar-Apr 2021

Journal of Ayurveda and Integrated Medical Sciences

www.jaims.in

JAIMS

An International Journal for Researches in Ayurveda and Allied Sciences

Charaka Publications

Indexed

Journal of
Ayurveda and Integrated Medical Sciences
ISSN 2456-3110
REVIEW ARTICLE Mar-Apr 2021

The Buzz Button to your Toothache – *Spilanthes acmella* : A Review

Dr. Soundarya Vishwanathan[1], Dr. Nandan N[2], Dr. Anitha C[3], Dr. Manjushree R[4], Dr. Sunil Raj N[5].

[1]Senior Lecturer, [2]Reader, [3]Reader, [4]Senior Lecturer, [5]Professor and Head, Bangalore Institute of Dental Sciences, Bangalore, Karnataka, INDIA.

ABSTRACT

Spilanthes acmella, commonly known as toothache plant, is an important medicinal plant belonging to family Asteraceae. It has been reported to possess various biological activities like anti-pyretic, anti-diuretic, anti-inflammatory, anti-oxidant, immunomodulatory, hepatoprotective, anticancer and anti-toothache etc. The bioactive chemical component is spilanthol, an alkamide which is present in roots and all aerial parts of the plant. Spilanthol has high industrial demand for its use in pharmaceutical, cosmetic and toothpaste industry. S.*acmella* is quickly getting depleted from its natural habitat, because of its wider applications for commercial use.

Key words: *Anti - toothache plant, Dentistry, medicinal plants, Spilanthes acmella.*

INTRODUCTION

Phytotherapy, the use of herbal agents as medicines has become the focus of research in the recent years.[1] Herbal medicines are the oldest remedies known to mankind and have been used by all cultures to treat injuries or illness. A medicinal plant is any plant in which one or more of its organ, contains substances that can be used for therapeutic purposes, or which are precursors for chemical, pharmaceutical and semi-synthetic materials.[2] *Spilanthes acmella* refers to the important medicinal plant distributed in the tropical and sub-tropical regions around the world with rich source of therapeutic and medicinal constituents.[3] *Spilanthes acmella* commonly known as toothache plant or Paracress or Eyeball plant is an important medicinal plant belonging to family Asteraceae.[4] The main constituents, namely, "spilanthol" and "acmellonate", are sometimes used to reduce the pain associated with toothaches and can induce saliva secretion.[5,6] The leaves and flower heads of *S. acmella* have analgesic, anti-fungal, anti-helminthic, anti-bacterial, immunomodulatory, adaptogenic, lithotriptic, anti-scorbitic, sialagogine, local astringency and digestive property. The plant also has vasorelaxant and antioxidant and local anaesthetic and antipyretic activities due to presence of spilanthol which have been substantiated by lab and animal studies.[7] In particular, this plant is famous as a folklore remedy for toothache and for throat and gum infections. The flowers are crushed and applied at the site of toothache, particularly in "Irula tribe of Hasanur hills in Erode district of Tamil Nadu" where it is known by the local name "Mandal Poo Chedi".[8] Apart from Tami Nadu, root paste of the plant is used in throat problems in Chindwara and Betul district of Madhya Pradesh.[9]

The recent past has witnessed a tremendous revival of interest in the use of medicinal plant products due to the various drawbacks associated with synthetic medicines. However, efforts are needed to explore,

Address for correspondence:
Dr. Soundarya Vishwanathan
Senior Lecturer, Bangalore Institute of Dental Sciences, Bangalore, Karnataka, INDIA.
E-mail: drsoundarya13@gmail.com

Submission Date: 17/03/2021 Accepted Date: 11/04/2021

Access this article online

Quick Response Code

Website: www.jaims.in

Published by Maharshi Charaka Ayurveda Organization, Vijayapur, Karnataka (Regd) under the license CC-by-NC-SA

ISSN: 2456-3110 REVIEW ARTICLE Mar-Apr 2021

standardise, and validate *Ayurvedic* medicines for their potency, safety, and efficacy in order to bring them to market as main line therapeutics.

This article reviews the botanical description and the outline of therapeutic potential of *S.acmella* in dentistry.

Description

Spilanthes as a genus is composed of 60 species is very popular among the ancient tribal community. *S. acmella* is native to Brazil and is cultivated throughout the year as ornamental or medicinal plant. *S. acmella* is a very beautiful, erect herb that and flourishes with gold and red floral inflorescences. It is an annual or short-lived herb that is 40-60 centimetres tall. The plant grows naturally in damp areas or as a potted herb in a rich soil with compost.[10] The plant has striking yellow/red cone-like flowers. Leaves are opposite, acute or obtuse at apex, petiolate, broadly ovate, narrowed at base, flowering and fruiting in March-April.[11] Its flowers and leaves have pungent taste and when touched it is accompanied by tingling sensation and numbness[12] but when cooked, the plants lose their strong flavour and may be used as a green leafy vegetable. *Spilanthes acmella* is commonly known as Toothache plant and its various synonyms are *Bidens acmella*, *Bidens ocymifolia*, *Pyrethrum acmella*, *Spilanthes ocymifolia*, *Verbesina acmella*, and *Blainvillea acmella.*

Classification[2,10]

Table 1: Classification of the plant.

Kingdom : Plantae
Subkingdom : Tracheobionta
Phylum : Tracheophyta
Division : Magnoliophyta
Super division : Spermatophyte
Class : Magnoliopsida
Sub Class : Asteridae
Order : Asterales
Family : Asteraceae
Subfamily : Mimosoideae
Genus : Spilanthes
Species : Acmella

Other Names[13,2]

Jambu, Toothache plant, Electric daisy, Buzz buttons, Schezuan buttons, Jotang, jocong and Dung getang, Akarkara, Jotang, jocong and Xiao tong chui, Tian wen cao, Bian di hong.

Distribution

S.acmella is widely distributed in the tropical and sub-tropical regions of the world including America, North Australia, Africa, Malaya, Borneo, India and Sri Lanka.[14] The plants of this genus are reported in some regions of India such as South India, Chhattisgarh and Jharkhand.

Bio Active Compounds

Phytochemicals are active components present in plants that have protective or disease preventive properties. The most common alkamide present in *Spillanthes acmella* is called *Spilanthol*. More than 45 other compounds have been isolated, the dominating ones being hexanol, tridecanone, germacrene, hexanol, caryophyllene and Sequesterpenes.[15]

Medicinal Uses

Chakraborty *et al.*[16] studied the antipyretic activity of *S.acmella* which was carried out by yeast induced method. The antipyretic activity of *S.acmella* demonstrated in the study is attributed to the presence of flavonoids which are predominant inhibitors of either cyclo-oxygenase or lipo-oxygenase. The anti-inflammatory activity of *S.acmella* has been carried out by the researchers. The activity was attributed to the presence of flavonoids which are potent inhibitors of prostaglandins at later stages of acute inflammation.[4] Noor Jahan *et al.*[17] demonstrated that the ethanolic extract of *S.acmella*

ISSN: 2456-3110 REVIEW ARTICLE Mar-Apr 2021

showed antimicrobial activity against *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Streptococcus pyogenes*, *Enterococcus faecalis*, *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Proteus mirabilis*, *Salmonella typhi*. *Shigella dysenteriae* the extracts also showed activity against resistant bacteria harbouring *Blagene*. The diuretic potential of whole plant of *S. acmella* as well as fresh flowers, showed strong diuretic activity when given orally in a single dose diuretic potential of whole plant of *S. acmella* as well as fresh flowers, showed strong diuretic activity when given orally in a single dose.[18] The diuresis induced by the *S.acmella* flowers was found to be strong with intensity similar to that of furosemide and accompanied by marked increases in both urinary Na+ and K+ levels. The onset of the diuretic action of the aqueous extract was extremely rapid, and it also had a fairly long duration of action.[4] The flower heads of *S.acmella* are used to prevent scurvy and aid digestion. The roots of the plants are chewed to treat GIT disturbances.[10] The leaves are used as immunomodulatory, adaptogenic, lithotriptic, anti-scorbitic and digestive. Extract of *S. Acmllea* contains an active component used in beauty care cosmetics as a fast-acting muscle relaxant to accelerate repair of functional wrinkles. The plant extract was also used for stimulating, reorganizing and strengthening the collagen network in anti-age applications, e.g. in anti-wrinkle cream formulations. An Indian tribe uses *S. Acmella* to treat fungal skin conditions, such as athletes' foot, ringworm and nail infections.[19]

In India, *S. Acemella* flower heads are used to treat stammering in children. Leaves and flowers of the plant are also used to treat leucorrhoea in females among people of tribes in Bangladesh[20] The whole plant paste of *Spilanthes acmella* is also used as "poisonous sting" in Chittagong hill tracts of Bangladesh where the plant is also known as Jhummosak.[21] It protects the individual from colds and flu. An extract of the leaves and flowers is traditionally used for the stomatitis, flu, cough, rabies diseases and tuberculosis, throat complaints, headache and fever.[10]

Dental Uses

Toothache

Traditionally, *S. Acmella* is called as anti-toothache plant. The pungent flower heads and/or leaves is chewed or placed in tooth cavities to relieve pain.[22] The flower heads also provide relief to throat problems or paralysis of the tongue. The component responsible for this is *Spilanthol*.[19]

Local Anaesthetic Activity

Local anaesthesia is the loss of sensation in a circumscribed area of the body caused by depression of excitation in nerve endings or inhibition of the conduction process. The local anaesthetic activity of *S.acmella* has been carried out using two different animal models. The mean onset of local anaesthetic action was very potent which could be attributed to the presence of alkyl amides. Studies by Chakraborthy et al.[23] showed the local anaesthetic property of *S. acmella* in rats in comparison with xylocaine. The well-recognized local anaesthetics are comprised of mostly amide compounds such as xylocaine (lidocaine). Its mechanism of action involves the blockage of voltage-gated Na+ channels. By the same analogy, the alkamides of *S. acmella* extracts produced local anaesthetic action presumably through the blockage of Na+ channels.[19] Extracts from the plant is used as a pain relieving oral gel with no known side-effects described, *S.acmella* having a hot burning taste which causes salivation.[24]

Dentifrice

Spilanthol has been incorporated in tooth pastes and mouth rinses. The objective is to provide a lasting fresh minty flavour; it also increases salivation, which improves appetite. The *spilanthol* present also has a mild anaesthetic effect thus enabling people with toothache to brush comfortably.[10]

Anti-Fungal Agent

S. acmella shows only minimal antifungal activity. However, they are proven to have activity against the fungi *Cryptococcus neoformans* and *Microsporum*

ISSN: 2456-3110 REVIEW ARTICLE Mar-Apr 2021

gypseum which are common opportunistic pathogens in AIDS patient.[25]

Periodontitis

Periodontitis is due to inflammation of gums. Chewing on the flower heads and roots has shown to decrease gum inflammation and have been used in the treatment of periodontitis.[10]

Recurrent Apthous Stomatitis

Recurrent apthous stomatitis is a disease characterized by multiple ulcerations on the mucosal tissue. It is commonly precipitated by stress, hormonal changes in women, trauma and chemical irritants. The leaves of *S. Acmella* have shown to be effective on treating recurrent aphthous stomatitis.[10]

Intra - Canal Medicament

The effect of *S. acmella* on *C. albicans* was studied at various concentrations and compared with the anti-fungal property of calcium hydroxide. The results showed *S.acmella* was effective against *C.albicans* in all concentrations and compared with the anti-fungal property of calcium hydroxide. The results showed *S. Acmella* possesses remarkable antibacterial and antifungal activity against common root canal pathogens which are responsible for repeated endodontic failures such as *E. faecalis* and *C. albicans* when compared with medicaments like calcium hydroxide.[26]

Conclusion

The main gaps in knowledge about of the plant are mainly related to its use in treating certain conditions and the risks associated with very high levels of consumption. *S.acmella* is one of such important medicinal plants that is quickly getting depleted from its natural habitat, because of its wider applications the plant is not meeting the demand due to less cultivation. It is, therefore, imperative to develop more efficient methods for its conservation and large-scale propagation.

References

1. Vinod A, Nandan N, Raj N S, Vishwanathan S. Turmeric - The Serendipitous Herb : A Review. J Ayurveda Integr Med Sci. 2018;3(6):114–24.
2. Arif M, Juyal D, Joshi A. A review on pharmacognostic and phytochemical study of a plant Spilanthes acmella Murr. 2017;6(5):172–7.
3. Dubey S, Maity S, Singh M, Saraf SA, Saha S. Phytochemistry, Pharmacology and Toxicology of Spilanthes acmella : A Review. Adv Pharmacol Sci. 2013;2013.
4. Rani AS, Sana H, Sulakshana G, Puri ES, Keerti M. Spilanthes acmella- an important medicinal plant. Int J Minor Fruits, Med Aromat Plants. 2019;5(December):15–26.
5. Sharma V, Boonen J, Chauhan N, Thakur M.Spilanthes acmella ethanolic flower extract: LC-MS alkylamide profiling and its effects on sexual behavior in male rats.Phytomedicine. 2011;18(13):1161– 1169.
6. Ramsewak R., Erickson A., Nair M. Bioactive N-isobutylamides from the flower buds of Spilanthes acmella. Phytochemistry. 1999;51(6):729–32.
7. Borate P, Disale S. Studies on Antibacterial Activity of Acmella oleracea (L.) Murr. Int J Pharma Sci Heal Care. 2013;5(3):36–42.
8. Revathi P, Parimelazhghan T. Traditional knowledge on medicinal plants used by Irula tribe of Hasanur hills, Erode District, Tamil Nadu, India. Ethnobot Leafl. 2010;14:136–60.
9. Vijendra N, Kumar K.Traditional knowledge on ethnomedicinal uses prevailing in tribal pockets of Chhindwara and Betul Districts, Madhya Pradesh, India. African J Pharm Pharmacol. 2010;4(9):662–70.
10. Srinath J, Laksmi T. Therapeutic potential of Spilanthes acmella - A dental note. Int J Pharm Sci Rev Res. 2014;25(1):151–3.
11. Savadi R, Yadav R, Yadav N. Study on immunomodulatory activity of ethanolic extract Spilanthes acmella Murr. Leaves. Indian J Nat Prod Resour. 2010;1(2):204–7.
12. Wongsawatkul, O Prachayasittikul, S Isarankura-Na-Ayudhya, C Satayavivad J, Ruchirawat, S Prachayasittikul V. Vasorelaxant and antioxidant

ISSN: 2456-3110 **REVIEW ARTICLE** Mar-Apr 2021

activities of Spilanthes acmella Murr. Int J Mol Sci. 2008;9:2724–44.

13. Memorial Sloan Kettering Cancer Center. 2021. Spilanthes Acmella. [online] Available at: <https://www.mskcc.org/cancer-care/integrative-medicine/herbs/spilanthes-acmella-jambu> [Accessed 6 January 2021]. [Internet]. Available from: https://www.mskcc.org/cancer-care/integrative-medicine/herbs/spilanthes-acmella-jambu
14. Yadav K, Singh N. Micropropagation of Spilanthes acmella Murr. – An Important Medicinal Plant. Nat Sci. 2010;8(9):5–11.
15. Jirovetz L, Buchbauer G, Wobus A, Shafi MP, Abraham GT. Essential oil analysis of Spilanthes acmella Murr. Fresh plants from Southern India. Journal of Essential Oil Research. 2005 Jul 1;17(4):429-31.
16. Chakraborty A, Devi BRK, Sanjebam R, Khumbong S, Thokchom IS. Priliminary studies on local anesthetic and antipyretic activities of Spilanthes acmella Murr. in experimental animals models. Indian J Pharmacol. 2010;42(5):277–9.
17. Noor Jahan, Razia Khatoon, Siraj Ahmad, Anwar Shahzad, Evaluation of antibacterial potential of medicinal plant Spilanthes acmella Murr and it's in vitro raised callus against resistant organisms especially those harbouring bla genes. Journal of Applied Pharmaceutical Science, 7(10), 2013, 476-481
18. Ratnasooriya WD, P. PKP, Samaratunga, U., Jayakody JR. Diuretic activity of Spilanthes acmella flowers in rats. J Ethnopharmacol. 2004;91:317–20.
19. Prachayasittikul V, Prachayasittikul S, Ruchirawat S, Prachayasittikul V. High therapeutic potential of Spilanthes acmella: A review. EXCLI J. 2013;12:291–312.
20. Hossan S, Agarwala B, Sarwar S, Karim M, Jahan R, Rahmatullah M. Traditional use of medicinal plants in Bangladesh to treat urinary tract infections and sexually transmitted diseases. Ethnobotany Research and Applications. 2010 Apr 7;8:061-74.
21. A. Biswas,M. A. Bari, M. Roy, and S. K. Bhadra.Inherited folk pharmaceutical knowledge of tribal people in the Chittagong hill tracts, Bangladesh.Indian Journal of Traditional Knowledge.2010; 9(1)77–89,.
22. Paulraj J, Govindarajan R, Palpu P. The Genus Spilanthes Ethnopharmacology, Phytochemistry, and Pharmacological Properties: A Review. Adv Pharmacol Sci. 2013;2013.
23. Chakraborty A, Devi BR., Rita S, Singh IT. Local anaesthetic effect of Spilanthes acmella in experimental animal models. Indian J Pharmacol. 2002;34:144–5.
24. Joseph B, George J, M.V J. The role of acemella oleracea in medicine- a review. World J Pharm Res. 2014;2(6):2781–92.
25. Phongpaichit, Souwalak, Sanan Subhadhirasakul, Chatchai Wattanapiromsakul. Antifungal activities of extracts from Thai medicinal plants against opportunistic fungal pathogens associated with AIDS patients. Mycoses.2005; 48(5), 2005:333-338.
26. Sathyaprasad S, Jose BK, Chandra H S. Antimicrobial and antifungal efficacy of Spilanthes acmella as an intracanal medicament in comparison to calcium hydroxide: An in vitro study.Indian J Dent Res 2015;26:528-532.

How to cite this article: Dr. Soundarya Vishwanathan, Dr. Nandan N, Dr. Anitha C, Dr. Manjushree R, Dr. Sunil Raj N. The Buzz Button to Your Toothache – Spilanthes acmella : A Review. J Ayurveda Integr Med Sci 2021;2:77-81.

Source of Support: Nil, **Conflict of Interest:** None declared.

****