

Journal of Pharmaceutical Advanced Research

(An International Multidisciplinary Peer Review Open Access monthly Journal)

Available online at: www.jpardonline.com***Spilanthes acmella* - A Potential Therapeutic plant**K.Sudheer Kumar*^{1,2}, N. Ravindra¹¹Dept. of Pharmacology, MAK College of Pharmacy, # 6 -195/1, Beside JBIT Moinabad Hyderabad - 501504, Telangana, India.²Pacific Academy of Higher Education and Research University, Udaipur, Rajasthan, India.

Received: 27.08.2018

Revised: 29.08.2018

Accepted: 30.08.2018

Published: 31.08.2018

ABSTRACT: Herbal medicines find important market in India as nutraceuticals. *Spilanthes acmella* belonging to family *Asteraceae* is a well-known anti-toothache plant with high medicinal usages. From its traditional uses in health care and food, extensive phytochemical studies have been reported. Considering data from the literature, it could be demonstrated that *S. acmella* possesses diverse bioactive properties and immense utilization in medicine, health care, cosmetics and as health supplements. As a health food, it is enriched with high therapeutic value with high potential for further development. The traditional information revealed that various parts of this plant possess Therapeutic activities like diuretic, anti-inflammatory, analgesic, antioxidant and vasorelaxant. Need of the hour for extensive research study on *S. Acmella* to find out its phytoconstituents, establishment of its Pharmacognostic properties. The review study also proposed to explore scientifically its various therapeutic values to prove its Folklore use by traditional people.

Corresponding author*

Mr. K.Sudheer Kumar
MAK College of Pharmacy,
Beside JBIT Moinabad Hyderabad - 501504,
Telangana, India.
Mail ID. sudheer.y2k8@gmail.com
Tel No. +91-9014485137.

Keywords: *Spilanthes acmella*,
Pharmacognostic, Nutraceuticals, *Asteraceae*,
Folklore.

INTRODUCTIONS:

Herbal medicines are also called as botanical medicine or phytomedicine because its various plant parts like plant's seeds, berries, root, leaves, bark or flowers are using for medicinal purposes. India is a central a major place in the global market for herb-based medicines. Exports of herbal materials and medicines can jump from just Rs. 456 crores now to Rs.10, 000 crore by 2010 [1-3]. Herbal medicines also find market as nutraceuticals (health foods), whose current market is estimated at about \$ 80-250 billion in USA and in Europe. There is a worldwide 'green revolution, which is

reflected in the belief that herbal remedies are safer and less damaging to the human body than synthetic drugs as suggested by literature [4,5]. Furthermore, underlying this upsurge of interest in plants is the fact that many important drugs in use today were derived from plants or from starting molecules of plant origin. It was only during 1950s that the very first clinically useful psychoactive drugs were fortuitously identified or serendipitously discovered [6,7].

Spilanthes acmella is an important medicinal plant, found in tropical and subtropical countries mainly India and South America. Popularly, it is known as toothache plant which reduces the pain associated with toothaches and can induce saliva secretion. Various extracts and active metabolites from various parts of this plant possess useful pharmacological activities [8,9]. Literature survey proposed that it has multiple pharmacological actions, which include antifungal, antipyretic, local anaesthetic, bioinsecticide, anticonvulsant, antioxidant, aphrodisiac, analgesic, pancreatic lipase inhibitor, antimicrobial, antinociception, diuretic, vasorelaxant, anti-human immunodeficiency virus, toothache relieve and anti-inflammatory effects. This review would assist researchers to search scientific information in the future for more significant establishment of this plant as per therapeutic uses [10-12].

PHYTO-PHARMACOGNOSTICAL STUDY:

Taxonomical Classification [12,13]:

Unranked: Angiosperms, Eudicots, Asteroids and Asterales.

Family: Asteraceae.

Genus: *Spilanthes*.

Species: *Acemella*.

Vernacular names:

Sanskrit: Sarahattika, Hindi: Akarkar, Telugu: Akarkar, Tamil: Vana-Mugali, Malayalam: Akravu, Kannada: Hemmugalu, Gujarati: Marethi and Marathi: Akkalkadha [13].

Morphology:

S. acmella is very beautiful, erect or ascending stout herbs. It is 20 to 50 cm high and can be grown as an annual in most climates. A small, erect plant, it grows quickly and sends up gold and red flowers inflorescences. *S. acmella* has no flowers petals. This plant exhibits golden buds with a rust red center. Leaves are opposite, petiolate, broadly ovate, narrowed at base, acute or obtuse at apex, flowering and fruiting in March

and April. Due to sensation quality, *S. acmella* has no odour, but when eaten it has an interesting flavor that slowly develops from pleasant and salty to a strong ticking-burning pungency that leaves back a numb feeling in the mouth [13,14].

The stems are prostrate or erect, often reddish, hairless. Leaves are broadly ovate to triangular, 5 to 11 cm long, 4 to 8 cm wide, margins toothed, tip sharp. Flower-heads arise singly, elongated-conical, containing primarily disc florets, 1 to 2.4 cm long, 1.1 to 1.7 cm in diameter. Disc florets are many, yellow to orange, 2.7 to 3.3 mm long. Achenes are black, 2 to 2.5 mm long [14,15].

Eating Toothache Plant is a memorable experience. The leaf has a smell like any green leafy vegetable. The taste, however, is somewhat reminiscent of Echinacea, but lacking the bitter and sometimes nauseating element of that medicinal. First, strong, spicy warmth spreads outward across one's tongue, turning into a prickling sensation [16].

Growing Instructions:

Start *Spilanthes* indoors in early spring. Surface sow seeds in trays as light is needed for germination. Water at base and seal in bag until germination in 7 to 14 days. Transfer to pots when big enough then transplant to permanent position in rich soil in late spring early summer. Space 12 inches apart. Can take full sun but moderate is preferred. Water regularly until mature [17].



Fig 1. *Spilanthes acmella* plant bearing flower and leaves.

CHEMICAL CONSTITUENTS:

The literature study revealed that the plant *Spilanthes acmella* possess main chemical constituents that are

spilanthol and acmellonate. The leaves of *Spilanthes acmella* contain alkaloids, carbohydrates, tannins, steroids, carotenoids, provitamin A, β -carotene and α -carotene, essential oils, sterols, sesquiterpenes and amino acids [16-18].

MEDICINAL IMPORTANCE [19-23].

The chemical constituents of this plant are spilanthol and acmellonate. These are sometimes used to reduce the pain associated with toothaches. These chemicals can induce saliva secretion.

Preliminary studies have reported use of *Spilanthes acmella* as diuretic, anti-inflammatory and analgesic, antioxidant and vasorelaxant. The flowers are chewed as whole to relieve toothache. They also produce redness of gums and increase salivation.



Fig 2. Matured form of inflorescence of *Spilanthes acmella*.

An extract of leaves and flowers is traditionally used for the remedy of toothache because of anesthetic properties, stomatitis, flu, cough, rabies diseases, tuberculosis and throat complaints.



Fig 4. Dried leaves of *Spilanthes acmella* for paste preparation.

It has also used in remedy of rheumatism and fever. It has strong diuretic activity and the ability to dissolve urinary calculi.

It also exhibits antimalarial, antiseptic, antipyretic, antifungal, anthelmintic, antibacterial properties.

Leaves are used as immunomodulatory, adptogenic, toothache, lithotriptic, antiscorbutic, ailogogine and digestive.

The flower of heads of *Spilanthes acmella* can be chewed to relieve toothache and as a haemostatic and analgesic. Ayurvedic system of medicine, flower heads and roots are used in treatment of Scabies, Psoriasis, Scurvy, infectious of gums, paralysis of tongue and remedy for stammering in children and mouth washes.

The flower bud of *S. acmella* was found to have pancreatic lipase inhibitory activity. It was suggested that this has the potential of being developed into an anti-obesity drug.

The bioactive principle of *Spilanthes acmella* that is spilanthol shows the anti-inflammatory activity of the plant due to its attenuation of the LPS-induced inflammatory responses via the inactivation of NF-kappa B.

The plant extracts of *S. acmella* is effective against 27 strains of microorganisms including *Corynebacterium diphtheriae* and *Bacillus subtilis*.

Toxicity:

High doses of hexane extracts of *S. acmella* in doses of between 100-150 mg/kg had been found to produce full tonic-clonic convulsion accompanied with typical electrographic seizure in EEG in Wistar rats [24,25].



Fig 5. Cultivation of plant *Spilanthes acmella*.

CONCLUSION:

This review study concluded that there must be extensive research study on this plant *Spilanthes acmella* to establish its significant Pharmacological activities, as

it is considered as multi therapeutic value plant. It's flower most important use as dental paste.

ACKNOWLEDGEMENT:

Authors wish to thanks authorities of MAK College of Pharmacy, Hyderabad and Pacific Academy of Higher Education and Research University, Udaipur, for providing Library facilities to complete this review study.

REFERENCES:

- Jain SK. Dictionary of Indian folk Medicine and Ethnobotany. New Delhi: Deep publication; 1991. pp. 223-240.
- Warrier PK. Indian Medicinal Plants: A compendium of 500 species. Vol. 3. 1995. pp. 280-291.
- Rath B. Globalisation, Global Trend in Herbal Market and The Impact Thereof on Medicinal Plants in Odisha. 2005.
- Shankar D, Ved DK. Indian literature incorporates a remarkably broad definition of medicinal plants. Indian Forester, 2003; 129: 275-288.
- Dahanukar SA, Kulkarni RA, Rege NN. Pharmacology of medicinal plants and natural products. Indian J Pharmacol, 2000; 32: S81-S118.
- Ozarkar KR. Studies on anti-inflammatory effects of two herbs *Cissus quadrangularis* Linn. and *Valeriana wallichii* DC using mouse model. Ph.D. Thesis. Mumbai: University of Mumbai; 2005.
- Kirtikar KR, Basu BD. Indian Medicinal Plants. 2nd ed. Dehradun International Book Distributors; 1988.
- Yoganarasimhan SN. Medicinal Plants of India. Vol. II. Bangalore: Interline Publishing Pvt. Ltd; 1996.
- The Wealth of India, A dictionary of India Raw Materials and Industrial Products, C.S.I.R. New Delhi: Publication and Information Directorate; 1988.
- Savadi RV, Yadav R, Yadav N. Study on immunomodulatory activity of ethanolic extract of *Spilanthes acmella* murr. Leaves. Indian J Nat Prod Resour, 2010; 1(2): 204-207.
- Nadkari AK. Indian Material Media. Bombay: Popular Prakashan Pvt. Ltd; 1976.
- Rastogi RP, Mehrotra BN. Compendium of Indian medicinal plants. Vol. I. CDRI, Lucknow: Publication and Information Directorate; 1989. pp. 316-325.
- Rastogi RP, Mehrotra BN. Compendium of Indian medicinal plants. Vol. II. CDRI, Lucknow: Publication and Information Directorate; 1993.
- Manohar U, Anand D, Ramachandra B. A Review on medicinal herb genus *Spilanthes* and its applications in oral hygiene. Univers J Pharmacy, 2013; 2(6): 25-33.
- Nakatani N, Nagashima M. Pungent alkamides from *Spilanthes acmella* L. var. *oleracea* Clarke. Biosci Biotech Biochem, 1992; 56(5): 759-762.
- Shimada T, Gomi T. Spilanthol-rich essential oils for manufacturing toothpastes or other oral compositions. J Pharmacy Pat, 1995; 122: 322-237.
- Nagashima M, Nakatani N. LC-MS analysis and structure determination of pungent alkamides from *Spilanthes acmella*, Murr. Flowers. Lebenson Wiss Technol, 1992; 25(5): 417-421.
- Ekanem AP, Wang M, Simon JE, Moreno DA. Antiobesity properties of two African plants (*Afromomum meleguetta* and *Spilanthes acmella*) by pancreatic lipase inhibition. Phytother Res, 2007; 21(12): 1253-1255.
- Ratnasooriya WD, Pieris KP, Samaratunga U, Jayakody JR. Diuretic activity of *Spilanthes acmella* flowers in rats. J Ethnopharmacol, 2004; 91(2-3):317-320.
- Moreira VM, Maia JG, de Souza JM, Bortolotto ZA, Cavalheiro EA. Characterization of convulsions induced by a hexanic extract of *Spilanthes acmella* var. *oleracea* in rats. Braz J Med Biol Res, 1989; 22(1):65-67.
- Burkill IH. A dictionary of the economic products of the Malay Peninsula. Vol. II. London: Published on behalf of the governments of the Straits settlements and Federated Malay states by the Crown agents for the colonies; 1935. pp. 2065-2081.
- Prachayasittikul S, Suphamong S, Worachartcheewan A, Lawung R, Ruchirawat S, Prachayasittikul V. Bioactive metabolites from *Spilanthes acmella* Murr. Molecules, 2009; 14(2): 850-867.
- Nadkarni KM, Nadkarni AK. Dr. K.M. Nadkarni's Indian Materia Medica. Vol. II. Mumbai: Popular Prakashan; 1994. pp. 1164-1175.
- Wu LC, Fan NC, Lin MH, Chu IR, Huang SJ, Hu CY, Han SY. Anti-inflammatory effect of spilanthol

from *Spilanthes acmella* on murine macrophage by down-regulating LPS-induced inflammatory mediators. J Agric Food Chem, 2008; 56(7): 2341-2349.

25. Raner GM, Cornelious S, Moulick K, Wang Y, Mortenson A, Cech NB. Effects of herbal products and their constituents on human cytochrome P450(2E1) activity. Food Chem Toxicol, 2007; 45(12): 2359-2365.

Conflict of Interest: None

Source of Funding: Nil

Paper Citation: Kumar KS, Ravindra N. *Spilanthes acmella*: A Potential Therapeutic plant. J Pharm Adv Res, 2018; 1(6): 284-288.