

Anacyclus pyrethrum (Akarkara)

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Abstract

Anacyclus pyrethrum also called as Akarkara, is a perennial herb that grows in the Himalayan. Anacyclus Pyrethrum root have unique ayurvedic value. The other parts of this herb possess insecticidal property. Anacyclus Pyrethrum is used in South Asia to treat toothache, facial neuroglia and chronic catarrh. Basically, Anacyclus Pyrethrum (Akarkara) is described in unani system of medicine as a great drug used in various purposes. In Akarkara medicinal part is root, It have pungent taste and are slightly aromatic. Which has considered as tonic used in remedy since ancient times, to aid the nervous system. The main contribution of this work is to study herbal application and biological study of Anacyclus Pyrethrum. This review will help us to understand multidimensional uses of Akarkara and helps to future study.

Keywords: anacyclus pyrethrum, akarkara, akarkarbha

Introduction

Today, the medicinal plants have become more important in primary health care, because of their secondary metabolites which may play copious biological activities, against cancer and infectious diseases [1]. About 70% of population of all the world use traditional medicines derived from plant species for their treatment [2]. Anacyclus pyrethrum DC (Spanish chamomile) commonly known as Akarkara. It is widely recognized in ayurvedic system of Indian medicine as tonic and rejuvenator [3]. It is described by Dioscorides in the name of Pyrethron. It is also known as Spanish Pellitory. It is native to Mediterranean region, North Africa and Algeria. Asian and Europeans were previously not familiar with this root. It is called Akarkarbha in Sanskrit [4]. Pyrethrum is cultivated in tropics at an altitude of 1500 to 3500 meters, requiring dry to soft sandy soil, 800-1300 mm rainfall, 15-25°C temperature and sunny periods interrupting rainfall for its cultivation.



Fig 1: Anacyclus Pyrethrum (Akarkara)

The leaves are smooth, pinnate and alternate, with cutted segments. Stems lie on the ground and bear one large terminal flower, with yellow disk and white rays. Fruit is a obovate

achen. Bark contain 1-2 circles of resin ducts, having distinct odour; sweet taste, pungent, tingling, acrid showing sialagogue effect. The flower is picked up when it is about 70% open. Plant produces 300 to 400 kg drugs/hectare [5]

Classification

Scientific name: Anacyclus pyrethrum (L.)

Family: Asteraceae Synonyms

Sanskrit: Akallaka Assamese

Bengali: Akarakara

English: Pellitory

Gujrati: Akkalkaro, Akkalgaro

Hindi: Akalkara

Kannada: Akkallakara, Akallakara, Akalakarabha, Akallaka Hommugulu

Kashmiri: --

Malayalam: Akikaruka, Akravu

Marathi: Akkalakara, Akkalakada

Oriya: Akarakara

Punjabi: Akarakarabh, Akarakara

Tamil: Akkaraka, Akkarakaram

Telugu: Akkalakarra

Urdu: Aqaraqarh [6].

General Information

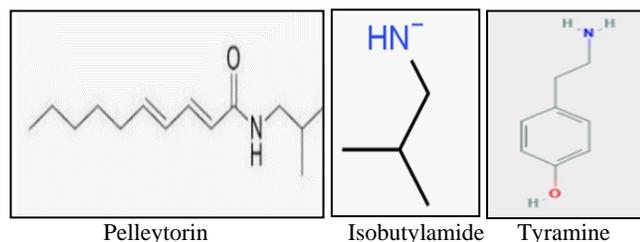


Fig 2: Flower and roots of Anacyclus pyrethrum

Table 1: Identity, Purity and Strength (API) [6]

Foreign matter	Not more than 2 percent
Total Ash	Not more than 10 percent,
Acid-insoluble ash:	Not more than 2 percent,
Alcohol-soluble extractive:	Not less than 8 percent,
Water – soluble extractive:	Not more than 22 percent,

Description

**Fig 3:** T.S. of root (Anacyclus Pyrethrum)**Fig 4**

Macroscopic

Akarkara is a perennial, procumbent herb. Stem lies on the ground, before rising erect. The leaves are smooth, alternate, pinnate, pale green, with deeply cut segments. Fruit obovate achene. The root is almost cylindrical crowned with a tuft of grey hairs. Externally it is brown and wrinkled, with bright black spots [7, 8].

Microscopic

Mature root shows cork, sclerenchyma, parenchymatous cells, secondary phloem, cambium 2-5 layered and secondary xylem consisting of xylem vessels, tracheids and xylem parenchyma. Inulin, oleo-resinous schizogenous glands and calcium oxalate crystals in rosette form present in secondary cortex, secondary phloem.

Secondary xylem and medullary Rays cells [7, 8].

Phytochemistry (Chemical Composition)

The exact biochemical composition of Anacyclus Pyrethrum is not well known. Some Studies suggested that Akarkara root contains alkaloid pelletorin (pyrethrin) and Alkyl amides. Alkyl Amide in the Akarkara roots is made of Tyramine amides and Isobutyl amides. Alkyl Amides have libido stimulant and neuroprotective properties.

The aerial parts of Akarkara plant contain Anacyclin. Other active constituents are Inulin, Sesamin and Hydrocarolin [9].

Marketed products

**Fig 5**

Pharmacological activity

Bacterial and antifungal activity

Antibacterial Activity and Antifungal Activity In the oral cavity approximately or more than 500 different species of bacteria presents. After the first year of life Streptococcus mutans colonies appears but Streptococcus sanguinis colonies appears after tooth eruption. About the periodontal diseases, streptococcus sanguinis and staphylococcus aureus lead to gingivitis and peri implantitis respectively [10, 11]. The main reason of the tooth decay is Streptococcus mutants. It has different uses for dental and periodontal disease. The antibacterial effect of Anacyclus pyrethrum root was tested *in vitro* [11, 12]. For the screening of medicinal plants and identification of active principles a versatile microplate bioassay method is use for the quick and sensitive determination of antibacterial activity [13]. The pure extract of Akarkara gave the zone of inhibition 20mm, 17mm, 18mm and 17 mm against staphylococcus aureus. The effective zone was calculated by subtracting the observed zone from actual diameter of disc i.e. 5mm. Anacyclus pyrethrum gave the antibacterial activity with the alcoholic extract [14].

Antidiabetic activity

In a study conducted by Tyagi *et al.* for the purpose of evaluating the anti diabetic effect of aqueous extract of root of Anacyclus pyrethrum DC. on alloxan induced diabetic rats showed that the elevated blood glucose level in diabetic rats reverts back to near normal when they were orally administered aqueous root extract of A. pyrethrum DC in dose of 150 to 300mg /kg b. wt [15].

Antioxidant activity

Sujith *et al.* evaluated Antioxidant activities of ethanolic extract of *Anacyclus pyrethrum* for *in vivo* and *ex-vivo* by using different experimental model at different concentration 25, 50, 100, 200, 400 micro-gram/ml. The result suggested the Antioxidant potential of *Anacyclus pyrethrum* root may be due to their photochemical constituents such as Phenol, Flavonoids, Tannins and Alkaloids ^[16].

Loss of libido

Akarkara (*Anacyclus pyrethrum*) has aphrodisiac, libido stimulant, and spermatogenic actions. It influences the secretion of androgens and increases their production. Alkylamide, the main alkaloid in Akarkara root increases the production of testosterone. It may likely to work on hypothalamus stimulation due to Alkyl-amide. Overall, Akarkara enhances fertility, increase spermatozoa count, and improves libido in male. As per ayurvedic theories, *Anacyclus Pyrethrum* roots acts as libido stimulant for men because of its action on brain and nerves. It stimulates desire and increases blood supply to genitals. To increase its aphrodisiac action and sustain its effect for a long term after stopping Akarkara supplementation, it is used in combination of other herbs ^[9].

Toothache

A gentle massage of Akarkara root powder with Camphor helps in toothache. It is also used with black pepper, Ajwain Khurasani (*Hyoscyamus Niger*) and Vaividang (*Embelia ribes*) for reducing toothache ^[9].

Memory Enhancing Activity

Anacyclus pyrethrum ethanolic extract is useful in memory dysfunction. Three types of passive avoidance paradigms, elevated plus maze and social learning task is used for assess learning and memory. If the group is treated with *Anacyclus pyrethrum* extract then the transfer latency is decreased and cognition improvement indication in Elevated plus maze model. Ethanolic extract of *A. pyrethrum* improve the memory in different experimental paradigms in social learning task when it is given orally and brain cholinesterase level was measured to use central cholinergic activity. The ethanolic extract study of *Anacyclus pyrethrum* it increases the brain cholinesterase level and possess the memory enhancing activity in scopolamine induced amnesia model by enhancing central cholinergic neurotransmission ^[17].

Antidepressants activity

Badhe *et al.* determined antidepressant activity. Root extract showed an increase in ambulatory behaviour indicating a stimulant effect of the actophotometer, produces a significant antidepressant effect in both Forced swim test (FST), and Tail suspension test (TST) as they reduced the immobility, was found to be effective in reversing hypothermia produced by clonidine and reserpine, inhibited haloperidol induced catalepsy ^[18].

Therapeutic uses

Akarkara is indicated in toothache, mouth diseases, dry mouth and paralysis of the tongue. Internally, it is useful as a tonic in weak digestion, as an aphrodisiac, in gout, sciatica, epilepsy

and lethargy, constipation, malaria, chronic rheumatism, worms; as a sternutatory in chronic head and nasal catarrh for the preparation of "pyrethrum vinegar" as a mouthwash for toothache and in various recipes such as *Tinctura odontalgicahamburgensis* (*Tinctura Spilanthis comp.*) In Myanmar (Burma) *Pyrethri radix*, together with *Cardamomi fructus*, *Liquiritiae radix* and *Caryophylli flos*, forms part of the traditional medicinal formulation *laymyoshitsei hsay* (Huxley, 1992). In India, as a gargle for toothache and as an infusion for rheumatic complaints (Gautam, 2011; Loscher & Schmidt, 1998), 1988) as a nerve tonic in facial paralysis. Paralysis, hemiplegia, epilepsy and cholera, and also in rheumatism, sciatica and oedema. Local application to the forehead is said to cure headaches ^[6]. They possess rejuvenative properties and were considered as aphrodisiac and sexual stimulant in male ^[20, 21, 22]. The flowers have long been exploited commercially for their natural insecticides collectively known as pyrethrins ^[5, 23]. *Pyrethrum* flower produces Pyrethrins that kill insect by disrupting their nervous systems. They are toxic to the "sodium channel," the cellular structure that allows sodium ions to enter a cell as part of the process of transmitting a nerve impulse. This leads to repetitive discharges by the nerve cell which causes paralysis and death and is a safest insecticide which is "nontoxic to humans and pets ^[19]. Akarkara is also helpful in impotency caused by weakness of nerves. It is used as Rasayana in Kapha diseases.

It promotes a free flow of saliva. It is used as a masticatory, and in the form of lozenges for its reflex action on the salivary glands in dryness of the mouth and throat. The decoction may be used as a gargle to soothe sore throat. It is a good general diuretic, which is used to relieve water retention where it is due to kidney-based causes. It has an especially valuable role to play in the treatment of kidney stone or gravel ^[9].

Conclusion

Finally, it is concluded that *Anacyclus pyrethrum* is a herb which has great medicinal value. From the biological study of *Anacyclus pyrethrum* it is found that the root extract of this drug is very useful. Akarkara is pharmacologically active and rich in many constituents. This plant is safe and applicable for various diseases.

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