

# REVIEW OF ANACYCLUS PYRETHRUM

<sup>1</sup>Neha R. Jumde, <sup>2</sup>Rohit D. Dongre, <sup>3</sup>Viraj Gawade, <sup>4</sup>Abhijeet A. Bidkar

Sinhgad Institute of Pharmacy,  
Narhe Pune-411041

**Abstract:** The natural products have been the source of most of the active ingredients of medicines and this is widely accepted since olden times even before the advent of high-throughput screening and the post-genomic era. Akarkara roots have a important part in the ancient Ayurvedic and Unani system of holistic health and herbal medicine of the East. Anacyclus pyrethrumDC. (Family - compositae) is the biological name of the Akarkara drug. Especially the roots of the plant Anacyclus pyrethrum DC are reported to have good medicinal value in traditional and modern system of medicine. Pyrethrum has temperate and somewhat dry warmth and because of this good temperament it is a pure and has a good powerful action. A. pyrethrum roots hard, fusiform root, compact, about the size of little finger, with sometimes leaf – remnants at the top and beset with few or no hair-like rootlets, brownish externally and deeply fissured longitudinally. The present review highlights the biological study of Anacyclus pyrethrum including different activity such as antibacterial, antifungal, antidiabetic, antioxidant, anticonvulsant, antidepressant, anxiolytic, inhibit release of acetylcholinesterase enzyme, anabolic, aphrodisiac, and reproductive, immunological active polysaccharides and memory enhancing activity. These studies are conducted using different animal models of each one activity.

**Keywords:** Anacyclus pyrethrum, analgesic, anti-inflammatory and anticonvulsant activity.

## INTRODUCTION:

The scientific world has paid close attention to the traditional usage of medicinal plants as natural treatments for a variety of diseases. Herbal medications have been widely used to treat ailments around the world in recent decades due to its efficacy, low cost, and lack of adverse effects. Plants include a wide range of bioactive compounds that can be used for medicinal, agricultural, and cosmetic applications uses For many years, medicinal plants have been considered a promising source of essential raw material for the discovery of natural compounds that are used as subsequent drugs to fight ailments .Anacyclus pyrethrum (L) is commonly known as African pyrethrum, akarkarha, tigendesste, and igendess. It is a species belonging to the family Asteraceae, which is indigenous to Morocco, Algeria, and Spain. This species includes the two varieties Anacyclus pyrethrum var. pyrethrum (L) and Anacyclus pyrethrum var. depressus (Ball) Maire.

The roots of A. pyrethrum (L) are used to cure toothaches, salivary production, angina, digestive issues, lethargy, female infertility, and even tongue and limb paralysis in traditional medicine. They are used to treat gout and sciatica and to keep disease at bay in the form of cream-based animal fats. Anesthetic, anti-inflammatory, anticonvulsant, antioxidant, antidiabetic, and memory enhancer effects of Anacyclus pyrethrum (L) roots have been documented in the literature.

## PHARMACOGNOSTICAL DESCRIPTION:

### Macroscopic:

External surface rough, brown, shriveled, bark up to 3 mm thick, not easily separable, odor, somewhat aromatic, taste, characteristically astringent and pungent, gives tingling sensation to tongue and lips and causes excessive flow of saliva when chewed

### Microscopic:

Root - Mature root showcases cork consisting of tabular cells, many of which developed as sclerenchyma; a few innercork cells contain rosette crystals of calcium oxalate; secondary cortex consisting of isodiametric or tangentially elongated, thin-walled, parenchymatous cells; a few sclerenchymatous cells also found scattered in secondary cortex; secondary phloem consisting of usual elements, Medullary rays numerous, running straight, bi to tri and multiseriate, uniseriate rays very rare, start from primary xylem and reaching upto secondary cortex; ray cells thickwalled, radially elongated, inulin present in cells of secondary cortex, secondary phloem and medullary rays; oleo-resinous schizogenous glands found scattered in secondary cortex, secondary phloem and medullary rays; calcium oxalate crystals in rosette form present in secondary cortex, secondary phloem, secondary xylem and medullary ray cells. Powder - Ash coloured; shows vessels having scalariform thickening, rosette crystals of calcium oxalate and fragments of sclerenchyma; also gives positive tests for inulin.

### Identity, Purity And Strength:

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

Table no.1: Identity, purity and strength

**Chemical composition:**

Volatile oil and Alkaloid (Pyrethrin)

- The phytochemical screening of roots, leaves and flowers revealed presence of alkaloids, reducing compounds and catechic tannins.
- Plant contains other chemicals such as gallic tannins, triterpenes, sterols, mucilage, coumarins, saccharids and holosids along with some trace metals like Zn, Fe, Cu, Cd, Cr, Ni and Pb.
- The flavonoid, total phenol and polyphenols contents are highest in flowers compared to leaves and root. The roots are rich in alkaloids while the aerial parts are rich in tannins and flavonoids.

**Physico-chemical standard:**

The physico-chemical standard evaluation, ash values, viz. total ash, acid insoluble ash and water soluble ash, sulphate ash, and extractive values, viz. alcohol soluble extractive value, water soluble extractive and ether calculated and recorded. The ash value, viz. total ash, acid insoluble ash and water soluble ash, sulphate ash were: 9.3, 7.6, 1.7, and 8.6%, respectively. Extractive value, viz. alcohol soluble extractive value, water soluble extractive and ether soluble extractive value were: 20.8, 8.8, and 3.2%, respectively. The moisture content of the drug is not too high, thus it could discourage bacterial, fungi or yeast growth, as the general requirement for moisture content in crude drug is not more than 14% W/W. The moisture content (loss on drying) was 1.6%.

**BIOLOGICAL STUDIES:**

**Anticonvulsant Activity:** The ethanolic root extract of *Anacyclus pyrethrum* was determined for acute toxicity in the female albino mice. The doses of the ethanolic extract was given in 300, 2000, 5000 mg/kg. The evaluation of the anticonvulsant activity was determined by using maximum electroshock-induced seizures. The electric stimulus was applied using a stimulator apparatus. The different phases of convulsions, viz. tonic flexion, extension, clonus and mortality due to convulsions, were timed. The pentylentetrazole (PTZ) method is also used for studying the effect on seizure.

**Antidiabetic Activity:** *Anacyclus pyrethrum* has been effective remedy for the treatment of a variety of diseases. The aqueous root extract of *Anacyclus pyrethrum* DC was evaluated at a different concentration in alloxan induced diabetic rats. The experimental rats kept for 15 days to maintain the diabetic condition. In this the extract useful to treat the diabetic disease without causing hypoglycemic effect. The extract decreases the glucose level in alloxan diabetic rats. So it means the root aqueous extract of the plant *Anacyclus pyrethrum* is useful for the treatment for the diabetes mellitus.

**Antibacterial Activity:** The antibacterial effect of *Anacyclus pyrethrum* root was tested in - vitro. For the screening of medicinal plants and identification of active principles a versatile microplate bioassay method is used for the quick and sensitive determination of antibacterial activity. The pure extract of Akarkara gave the zone of inhibition 20mm, 17mm, 18mm and 17mm 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. The antifungal activity was determined by the disc diffusion method. The agar plates were inoculated and the activity was determined after 72 h of incubation at 28 °C. Diameter of inhibition zone was measured in mm.

**Antioxidant Activity:** In vitro the antioxidant activity, in this determination of DPPH (1,1-Diphenyl 2-Picryl Hydroxyl) is done by the different activity studies like Radical-scavenging, Hydroxyl Radical scavenging, Hydrogen peroxide scavenging, determination of reducing power, nitric oxide scavenging and assay of lipid peroxidation method is done for the Ex vivo study. Antioxidant activity gives the in vitro results. *Anacyclus pyrethrum*'s ethanolic extract was competent of scavenging the hydroxyl radical and hydrogen peroxide in a dose dependent manner. Phenol is the active compound found in the screening of *Anacyclus pyrethrum*. Due to the presence of phenolic compound nitric oxide has scavenging effect and the scavenging activity of EEAP increases in dose dependent manner. The result of reducing power it found that it increases with the increased concentration of the test compound.

**INTERACTION WITH HORMONES (Testosterone):**

Sharma et al., (2010) investigated that supplementation of *A. pyrethrum* ethanolic root extract (50-150mg/kg) over 28 days in rats distinguished dose-dependent increases in testosterone and luteinizing hormone to approximately two-fold of baseline (exact values not given). Sharma et al., (2011) analysed that it is though *Anacyclus* works via stimulating the hypothalamus, as the alkylamide class of molecules (also seen in *Spilanthes acmella*) have been known to work in this manner. It may increase testosterone in otherwise normal rats alongside its fertility enhancing effects.

**TRADITIONS USES:**

- **Aphrodisiac:** The extracts of plant roots increase libido or sexual urges and delays ejaculation.
- **Analgesic:** It reduces or ends pain by causing numbness.
- **Anti-rheumatic & Anti-arthritis:** It gives relief in rheumatic arthritis by increasing circulation.
- **Anti-Bacterial & Anti-viral:** Akarkara has also shown antibacterial and anti-viral properties and thus it keeps you safe from a large number of air-borne & water-borne infectious diseases caused by bacteria and virus.
- **Antibiotic:** It also inhibits microbial or biotic growth in the body.
- **Anti-catarrhal:** Akarkara root also exhibits anticatarrhal properties, i.e. it expels old catarrh. Carminative: It expels gases from intestines.

- **Digestion:** Akarkara roots aid in digestion by stimulating secretion of saliva and other digestive juices as it goes down the digestive system.
- **Diuretic:** The diuretic property of Akarkara root increases frequency and quantity of urination, thereby helping detoxify the body.
- **Emmenagogue:** It gives relief from irregular, delayed and obstructed menstruation. Febrifuge: The alkaloids present in Akarkara makes it a good febrifuge by virtue of its anti-microbial antiviral and anti-bacterial properties.
- **Nervine:** Akarkara is famous for treating nervous or neurotic disorders.
- **Vermifuge:** The anti-biotic and anti-microbial properties of the alkaloids present in Akarkara roots makes it a good vermifuge too and help in destroying the worms in our intestine.

#### CONCLUSION:

Anacyclus pyrethrum contains a number of Phytoconstituents, which reveals its uses for different therapeutic purposes. The roots can be used for the treatment of various disorders in human being such as antidiabetic, immunostimulating effect, inhibitory effects, antidepressant activity and anticonvulsant activity memory-enhancing activity, aphrodisiacs, antimicrobial activity, antioxidant, local anaesthetic effect, insecticidal effect, action on COX and LOX, interactions with testosterone, interaction with libido, and its interaction with testicles. Still more work is required with the Anacyclus pyrethrum to investigate the mechanism of actions with other therapeutic activity.

#### REFERENCES:

1. Mathew A, Frankline R, Karen B, Michael N, George M, Dwight J, National committee for clinical laboratory standards. Methods for dilution antimicrobial susceptibility tests for bacteria that grow aerobically in: Maryjane F, Jana M, editors. 6th ed. Newyork wayne PA, 2003, 124-127.
2. Mahesh B, Satish S, Antimicrobial activity of some important medicinal plants against plant and human pathogens, World J agricultural sci. 2008, 4(s), 839-843.
3. Tripathi KD (2005) Essential of medical pharmacology, 5th ed, Newdelhi, India: Medical Publishers Pvt Ltd. pp:168-172.
4. Sharma V, Thakur M, Chauhan NS and Dixit VK. Effects of petroleum ether extract of Anacyclus pyrethrum DC. on sexual behavior in male rats. Phytotherapeutic Research, 2010; 8(8): 767-73.
5. The Wealth of India: A Dictionary of Indian raw materials and Industrials products-revised Ser, Volume 1 A, Publication and information Directorate CSIR, New Delhi, 1985: 248.
6. Jalayer NN, Niakan M., Khodadadi E, Determination of antimicrobial activity of anacyclus pyrethrum extract against some of the oral bacteria: An In Vitro Study, J dentistry (shiraz univ med scien.). 2012, 13(2), 59-60.
7. Bentley R, Trimen H, medicinal plants, Prashant gahlot allied book centre, Dehraduun, 1992, 16
8. The Indian pharmaceutical codex. Council of scientific and industrial research, Mukerji B, New Delhi, 1953, 64-65.