

A treasure of medicinal herb - *Anacyclus pyrethrum*

A review

R. Annalakshmi^{1*}, R.Uma², G. Subash chandran³, A. Muneeswaran³

¹Department of chemistry, SRM University, Ramapuram, Chennai, Tamilnadu, India.

²Department of chemistry, Pachiyappas college, Chennai, Tamilnadu, India.

³Govt siddha medical college, Palayamkottai, Tirunelveli, India.

anuram79@yahoo.co.in*

Abstract

Anacyclus pyrethrum (Linn) De Candolle, commonly referred to as 'Akarkara' is widely recognized in ayurvedic system of Indian medicine as tonic and rejuvenator. It is a hard, compact, fusiform root, about the size of the little finger, with sometimes leaf -remnants at the top, and beset with few or no hair-like rootlets; externally brownish, deeply fissured longitudinally. Various phytochemical and biological evaluations have been reported in the literature for the importance of *A.pyrethrum*. So, it have been used in ethno medicine to exploit its medicinal properties including antimicrobial effect, local anesthetic effect, insecticidal & mollusidal effect also showing anti-inflammatory activity. This review summarizes the botany, ethnopharmacology query, phytochemistry, biological activity of *A. pyrethrum* plant.

Keywords: *Anacyclus pyrethrum*, Phytochemical, Biological, Ethnopharmacology, Evaluations

Introduction

Anacyclus pyrethrum DC roots which are commonly known as pellitory root (Fig. 1.) (Akarkara in Indian trade), is one such herb

Fig.1. *Anacyclus pyrethrum*- Root



which has been widely acclaimed in ayurvedic system of medicine for its rejuvenative properties it is generally designated as a

vajikaran rasayana herb and is known to improve sexual function especially in male (Puri, 2003). Powder of this herb when consumed, has been known to arouse sexual desire & improve ejaculatory time (Mukherjee & Singh, 1998). Variety of plants has been used as sex stimulants in traditional medicines of various countries. *Punica granatum* was a symbol of immortality & love in oriental regions (Ageel *et al.*,1991) similarly a number of plants like - *Aracemosus*, *C.borivilianum*, *D.hatagirea*, *C.orchiodies*, *O.latifolia* have been traditionally employed among different cultures in order to improve sexual performances (Vikas Sharma *et al.*, 2009;Thakur & Dixit, 2008 ,2006 & 2007;Chauhan *et al.*, 2007;Chauhan & Sharma, 2010).

Pellitory or Spanish chamomile (*Anacyclus pyrethrum*), is a widely distributed plant known in different countries under different names. According to reviews, it was the herb

used by the magians under the name parthenium against intermittent fevers, pyrethrum-root has temperate and somewhat dry warmth, and because of this good temperament, it is pure and has a good powerful action. However, this medical herb is used, dry or cooked with the food, when a person uses pyrethrum-root regularly it banishes sickness and prevents him from becoming sick. It produces saliva in the mouth as a result it extracts the bad fluids and gives you your health back. Different workers have reported a number of chemical constituents. The roots were considered as aphrodisiac and sexual stimulant. Extensive investigations have been carried out at different parts of *A. pyrethrum* and its consequences, crystalline constituents of the roots contain a mixture of isobutyl amides of unsaturated acids with decadiene as the principal constituents.

Apart from being used as an aphrodisiac as herb *A. Pyrethrum*, is widely used in folk remedies for stimulating salivary glands, curing chronic catarrh of the head or nostrils & when applied to the skin, it acts as a rubefacient. As a masticatory, it has been found useful in toothache, apnea, paralysis of the tongue & muscles of the throat & neuralgic affections of the teeth. Pellitory root have been frequently analysed and its activity proved to residue in an acrid matter, known as pyrethrin. However, this so-called pyrethrin, is in reality, a mixed substance; consisting of a brown acrid resin. The root also contains a little Volatile oil, gum & traces of tannic acid (Bentley, 2004). Phyto constituents mainly reported from the plant are N-isobutyldienedynamide (Crombie, 1954) & hot water soluble polysaccharides (Bendjeddou *et al.*, 2003). The roots also contain anacyclin traditionally it is regarded as a tonic to the nervous system. The antibacterial & anti-inflammatory activities of the AP root are reported (Bauer *et al.*, 1994; Kulkarni, 1999). The root of *Anacyclus pyrethrum* (Linne) De Candolle. Preserve in tightly closed containers, adding a few drops of chloroform or carbon tetrachloride, to prevent attack by insects. (Lucius & Sayre, 1917).

The root is a pungent acrid herb that stimulates the salivary glands and irritates the tissues, thereby increasing blood flow to the area. It is used externally to treat toothache, facial neuralgia and chronic catarrh. *A. gargle* is used to soothe sore throats. The root is harvested in the autumn and dried for stored for later use. In ayurvedic medicine, the root is considered as tonic and is used in the treatment of paralysis and epilepsy. The diluted essential oil in the root is used in mouthwashes and to treat toothaches. This oil should not be used internally, except under professional supervision.

History & description of drug

A hard, compact, somewhat fusiform root, about the size of the little finger, with sometimes leaf-remnants at the top, and beset with few or no hair-like rootlets; externally brownish, deeply fissured longitudinally (Fig. 2.). It breaks with a short fracture, showing a

Fig.2. *Anacyclus pyrethrum* - Pellitory



rather thick bark adhering closely to the pale brown wood, from which it is separated by a narrow cambium line. This woody column is transverse by broad, distinct medullary rays, and contains as does also the bark, large scattered resin ducts. The stems are numerous, procumbent, somewhat branched, and pubescent. The radical leaves are spreading,

petiolated, smoothish, and pinnately divided; the segments much cleft into linear, subulate lobes; and the cauline leaves sessile, Branches 1-headed.

Receptacle convex, with oblong-obovate, obtuse paleae; ray sterile, ligulate, and white; of the disk, fertile, with five callous teeth, and yellow (L.). Pellitory of Spain, or Spanish chamomile, inhabits Barbary, Arabia, Syria, etc. The root is the official part and is officially described as from 5 to 10 cm (2 to 4 inches) long, and 1 to 2 cm. (1/4 to 3/5 inch) thick, somewhat fusiform, nearly simple, annulate above, wrinkled below; externally dark grayish-brown; internally brownish-white; fracture short; bark rather thick, containing 2 circles of resin cells, and surrounding the slender wood-bundles and medullary rays, the latter having about 4 circles of shining resin-cells; inodorous, pungent and very acrid" (U.S.P.). The root, when chewed, produces a peculiar sensation of pricking in the lips and tongue, and a glow of heat, with an increase of the salivary discharge. It may be readily distinguished from false pellitory root, identified by (Holmes, 1892) as derived from *Corrigiola telephiifolia* a morocco plant, chiefly by the appearance of its cross-section

Pellitory, or Spanish chamomile (*Anacyclus pyrethrum*), is a widely distributed plant known in different countries under different names (John Uri Lloyd, 1911). According to Pliny it was the herb used by the Magians under the name parthenium against intermittent fevers, and according to Dioscorides it is the plant, under the name anthemis, was used in the same manner. It is mentioned in the "Arabian Nights" under the name ukhowan. It is found throughout European Turkey and according to Forskal southward to the mountains of Yemen, where it is called moeniat. According to De Candolle its introduction into Britain was perhaps before the coming of the Romans. The European colonists carried it, according to Josselyn to Northeast America before 1669, where it is to be found under both cultivation and having escaped there from, as a wild plant.

Traditional uses and other indications

In toothache, mouth diseases, dry mouth and paralysis of the tongue. Internally as a tonic in weak digestion, as an aphrodisiac, in gout, sciatica, epilepsy and lethargy, constipation, malaria, chronic rheumatism, worms; as asternutatory in chronic head and nasal catarrh (Tripathi, 2005). 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 (Mac Donald, 1995).

Taxonomy

Kingdom	:	Plantae,
Division	:	Spermatophyta,
Sub-division	:	Angiosperms,
Class	:	Dicotyledons,
Sub class	:	Metachlamydae,
Order	:	Companulatae,
Family	:	Compositae or Asteraceae,
Genus	:	Anacyclus,
Species	:	Pyrethrum, Sanskrit

Synonyms,

Agragrahi, Akarakarabha

Ayurvedic property

Rasa	:	Tikka, kashaya
Guna	:	Guru, Rooksha
Virya	:	Seeta

Botanical name

Anacyclus pyrethrum DC. Sanskrit: Agragrahi, Akarakarabha English: Pellitory Hindi: Akarakara Malayalam: Akkikaruka, Akkrav. Tamil: Akkalkara, Akkirakkaram, Akirakaram, Akkarakaram, Akarakaram Telugu: Akarakaram, Akkalakara, Akkarakaram

Kannada: Akkalkara, Aakala kaare, Aakala kari, Akkala kara, Akrakara Marathi: Akkirakaram, Akkalkaaraa , Arabi: Aquargarha.

Source

Mediterranean basin, coming solely from Algeria, thence to Mediterranean points.

Cultivation

Planting can be done in autumn, but the best time is about the end of April. Any ordinary good soil is suitable, but better results are obtained when it is well drained, and of a stiff loamy character, enriched with good manure. Propagation can be done in three ways: by seed, by division of roots and by cuttings. If grown by seed, sow in February or March; thin out to 2 to 3 inches between the plants, and plant out early in June to permanent quarters, allowing a foot or more between the plants and 2 feet between the rows, selecting, if possible, a showery day for the operation. The seedlings will quickly establish themselves. Weeding can be carried out by hand, the plants when first put out being small, might be injured by hoeing. To propagate by division, lift the plants in March, or whenever the roots are hard, compact, somewhat fusiform root, about the size of the little finger, with sometimes leaf -remnants at the top, and beset with few or no hair-like rootlets; externally brownish, deeply fissured longitudinally. Pellitory, or Spanish chamomile (*Anacyclus pyrethrum*), is a widely distributed plant known in different countries under different names. Active condition and with a sharp spade, divide them into three or five large pieces. Cuttings should be made from the young shoots that start from the base of the plant, should be taken with a heel of the old plant attached, which will greatly assist their rooting. They can be inserted at any time from October to May. The foliage should be shortened to about 3 inches, when the cuttings will be ready for insertion in a bed of light, sandy soil. Plant very firmly, surface the bed with sand, and water in well. Shade is necessary while the cuttings are rooting.

Chemical constituents

It is found to contain a brown acrid resin, insoluble in caustic potash; also soluble in some solvents; a trace of tannic acid, gum, inulin, various salts, and lignin (Koene, 1835). It can be dissolved in alcohol or ether to yield active compound. Buchheim (1876) reported to be an alkaloid, pyrethrine, a body splitting into piperdine and an acid, resembling piperic acid, called pyrethric acid, when treated with alcoholic solution of caustic potash. The pyrethrin of (Thompson, 1887) is an ether-extract, composed of acrid fat and resin. This author found the cortical portion of the root to contain 5per cent of pyrethrin. Volatile oil is likewise present. (Dunstan & Garnett, 1895) isolated from the resin crystallizable pellitorin, insoluble in water, diluted acids, and alkalis, soluble in alcohol. It resembles piperovatin ($C_{16}H_{21}NO_2$), the nonbasic, active principle isolated by the same authors from the resin obtained from the leaves of *Piperovatum*. Both are pyridine derivatives.

n-isobutyldienedynamide

The roots of the North African plant *Anacyclus pyrethrum* DC. (Pellitory) have been used in medicine since the time of discords and mention of the drug is made in the B.P.C. 1934 (*Pyrethri radix*). It induces copious salivation when chewed and gives rise to an intense burning taste. In a recent investigation it has been found that the crystalline sialogogue isolated by (Gulland & Hopton 1930) from this material, and named pellitorine (melting point $72^{\circ}C$), is in fact a mixture of isobutyl amides (Crombie, 1952; Crombie, 1955) of the general type. Hydrogenation and acidic hydrolysis yield a mixture of decanoic, dodecanoic and tetradecanoic acids, which can be separated by reversed-phase partition chromatography. During the isolation of pellitorine, a new crystalline substance of melting point $121^{\circ}C$ has been obtained, which crystallizes from chloroform-petrol in white needles. Unlike pellitorine, it is but sparingly soluble in petrol, has no sialogogue effect and only low insecticidal activity towards the grain insect *Tenebrio molitor* L.

N-Alkyl amides

Depending on the extraction method & solvent, different yields of N-Alkyl amides can be found, possibly resulting in alterations in biological effects. Analytical profiling of the bioactive N-Alkyl amide with HPLC/ESI-MS is the recommended technique for comprehensive characterization of N-Alkylamides in plant extracts (Boonen, 2010). N-Alkylamides profiling of an *Anacyclus pyrethrum* extract, using HPLC/UV/ESI-MS. in which ethanolic extract from the dry roots of *Anacyclus pyrethrum* was performed, 13 compounds are detected. Among this seven was reported earlier by (Jente, 1972, Burden, 1969) & 5 new compounds were reported by (Bart De Spiegeleer *et al.*, 2011).

Various proved therapeutic values of anacyclus pyrethrum

Immunostimulating effect

Hot water polysaccharide extracts of *Anacyclus pyrethrum* (L.) Link. (Family Compositae) *Citrullus colocynthis* (L.) Schrad. (Family: Cucurbitaceae) and *Alpinia galanga* (L.) Willd. (Family Zingiberaceae) were tested for their immune stimulating activity in mice. The fractions from *Anacyclus pyrethrum* and *Alpinia galanga* showed a marked stimulating effect on the reticulo-endothelial system (RES) and increased the number of peritoneal exudate cells (PEC), and spleen cells of mice. In this case, the optimum doses were 50 and 25 mg/kg for the 2 fractions, respectively. On the other hand, the polysaccharide extracts of both *Anacyclus pyrethrum* and *Alpinia galanga* markedly enhanced the proliferation of the murine spleen cells in vitro using two tests (in vitro and in vivo effect). The results of the in vivo effect at a doses of 50 and 25 mg/kg, showed a stimulation index better than obtained with the in vitro effect at 50 and 25 mg/ml for *Anacyclus pyrethrum* and *Alpinia galanga*, respectively. While the extract of *Citrullus colocynthis* showed much weaker and variable immunostimulating activity (Bendjeddou *et al.*, 2003).

Inhibitory effects

Inhibitory effects of eugenol, a compound present in many spices such as cloves, cardamom etc. and the extracts of *Anacyclus pyrethrum* and *Spilanthes calva*, which are traditionally used in India during the preparation of chewable tobacco, on tobacco-induced mutagenesis, were evaluated using Ames Salmonella/microsome assay. Eugenol significantly inhibited ($P < 0.001$) tobacco-induced mutagenicity at concentrations of 0.5 and 1 mg/plate. *Anacyclus pyrethrum* extract (1 mg/plate) produced 74.33% inhibition while the extract of *Spilanthes calva* at 2 mg/plate inhibited tobacco-induced mutagenesis by 86.4%. Eugenol and the plant extracts also inhibited the nitrosation of methylurea in a dose-dependent manner (Sukumaran & Kuttan, 1995).

Antidepressant activity

Badhe *et al.* (2010) previously determined antidepressant activity. Suicidal tendency remains one of the common outcomes of depression, with depressive illness being responsible for 60% of the death toll (Stahl, 1998, Rechelson, 1990 & 2001). Ayurveda the ancient traditional system of medicine, mentions a number of single and compound drug formulations of plant origin that are used for the treatment of psychiatric disorders (Nadkarni *et al.*, 2000). Patients with major depression has been found to exhibit evidence of an activated innate immune response as reflected by increased biomarkers of inflammation, including innate immune cytokines, acute-phase proteins, chemokines & adhesion molecules (Dantzer, 2008). An experiment was designed by different method such as locomotor activity, haloperidol-induced catalepsy, forced swim test (FST) Tail suspension test (TST), clonidine-induced hypothermia & Reserpine -induced hypothermia on Swiss male albino mice. Standard root extract of *Anacyclus pyrethrum* (AP root extract) showed an increase in ambulatory behavior indicating a stimulant effect of the photoactometer. AP root extract produces a significant antidepressant effect in both FST and TST as they reduced the

immobility. AP root extract was found to be effective in reversing hypothermia produced by clonidine and reserpine. The AP root extract inhibited haloperidol-induced catalepsy. It suggests that, AP root extract might produce antidepressant effect by interaction with adrenergic and dopamine receptor thereby increasing the level of noradrenaline and dopamine in brains of mice.

Anticonvulsant activity

Electro-convulsive shock, inducing Hind limb tonic Extension (HLTE) in 99% of the animals, was previously determined (kamalinejad *et al.*, 2000) corneal electrodes were used for bilateral delivery of electrical stimulus. Electro-convulsive shock (50mA for 0.2 sec) was delivered through corneal electrode to induce HLTE phase in mice. The electrical stimulus was applied using a stimulator apparatus for five groups of six each (Gautam, 2011).

Group I served as control (vehicle treated) (*i.p.*); Group II served as standard (received phenytoin sodium 25 mg/kg body weight, *i.p.*) Group III, IV, V were treated with ethanolic extract as 200, 400, and 600mg/kg body weight, *i.p.* respectively. The current was delivered after 30 min of intraperitoneal administration of control and standard. The incidence and duration of HLTE was noted. It shows that the extract significantly decreased the duration of HLTE phase in maximum electroshock induced seizures. The MES test is considered to be a predictor of likely therapeutic efficacy generalized tonic-clonic seizures (Loscher & Schmidt, 1998), 1988). MES induced tonic seizures can be prevented either by drugs that inhibit voltage dependent Na ion channels, such as phenytoin, valproate and lamotrigine (Porter & Rogawski, 1990) or by drugs that block glutamatergic excitation mediated by the N-Methyl -D-aspartate (NMDA) receptor such as felbamate (Fielding *et al.*, 1995). The ethanolic extract from roots of AP can inhibit voltage dependent sodium ion channels as phenytoin in MES induced tonic seizures.

Myorelaxation Activity (Rota rod performance)

The effect on motor co-ordination was assessed using rota rod apparatus. Pre selected mice were placed on the horizontal rotating bar. The test was conducted on five groups of 6 mice each, 30 min after the administration of ethanolic extract (200, 400, 600mg/kg *i.p.*) and diazepam (1mg/kg *i.p.*) and normal saline (10ml/kg *i.p.*) (Mandgery & Sayyah, 2003). A significant dose dependent muscle relaxant effect of AP was observed in rota rod apparatus compared to that produced by diazepam. The data was analyzed by one-way analysis of variance (ANOVA) followed by turkey multiple comparisons test (Bolton & Bon, 2004).

Memory-enhancing activity

Ronald Darwin *et al.* (2012) studied on memory enhancing activity of *Anacyclus pyrethrum*. Memory is the process by which experiences were recorded and can be used to adapt their responses to the environment and it is vital for survival (Goel *et al.*, 2010). Central cholinergic system is considered as the most important neurotransmitter involved in regulation of cognitive functions (Levander *et al.*, 2009). Impaired cognitive functions are the major features of Alzheimer diseases (AD) (Iriti *et al.*, 2010). Loss of cholinergic neurons in nucleus *basalis magno* cellular is of cortex is one of the most prominent features of AD, primarily accounting for memory loss (Patel *et al.*, 2011). Scopolamine is a centrally acting cholinergic agent, which causes impairment in learning (Chilakwad *et al.*, 2010). The treatment with drugs, which increase cholinergic neurotransmission, causes an improvement in cognitive deficits in AD (Pattewar *et al.*, 2011).

Aphrodisiacs

The roots were believed to have aphrodisiac action. The investigation was undertaken to evaluate their effects on sexual behavior in male rats (Vikas Sharma *et al.*, 2009). 32 male wistar rats were divided into control group, testosterone group, low dose (50mg/kg) petroleum ether extract (PEE) group & high dose (100mg/kg) PEE group, PEE obtained from the roots of

anacyclus pyrethrum was administered orally to albino rats once daily & 0.5 mg/kg (body weight) of testosterone was given intramuscularly twice weekly and served as positive control. The course of treatment was 28 days. The effects of PEE and testosterone changes in body and accessory sexual organ weights, sexual behavior, penile erection and sexual performance were studied before treatment after 15 and 28 days of treatment and 7 and 15 days after treatment. Unlike testosterone, the PEE of *Anacyclus pyrethrum* shows efficacy in rats tested after the lapse of 7 and 15 days of discontinuation of treatment. This suggests that the drug has prolonged effect and capacitate the treated rats for improved sexual potential.

Effects on prostaglandin metabolism

In vitro at a concentration of 50 mg/ml, the alkyl amide deca-2E,4E-dienoic acid tyramide from the roots of *Anacyclus pyrethrum* has a 25% inhibitory effect on microsomal cyclooxygenase (sheep seminal fluid) and a 34% inhibitory effect on 5-lipoxygenase (pig leucocytes).

Antimicrobial effect

The residue from the extraction of the herbal drug with 70% EtOH (herbal drug:extract = 1:2), dissolved in isopropanol, has a weak antimicrobial effect according to the filter disc diffusion method. The inhibition zone for *Bacillus cereus* is 20 mm, for *Staphylococcus albus* 35 mm, and for *Staphylococcus aureus* 32mm. Local irritation. Chewing pyrethrum root provokes a persistent burning and partial desensitization of the tongue and nearby mucous membranes together with a pronounced increase in salivary flow (Athanassiou & Karallieratus, 2005). The effect is described primarily to the pellitorine, less so to the 18 anacyclin. Pellitorine is a rubefacient skin irritant and sialagogue; it causes intense burning and local anaesthesia of mucous membranes. Alkyl amides are characterized by a hot taste, a local anaesthetic effect on mucous membranes and the promotion of salivation.

Local anaesthetic effect

A local anaesthetic effect of *Anacyclus pyrethrum* is investigated in vivo. In a double-blind study in 200 dentistry patients, the local anaesthetic effect of an alcoholic extract of the roots (2%, freshly dissolved in sterile distilled water) was compared with that of 2% Xylocaine hydrochloride solution. The maximum dose of the extract was 0.2 ml, corresponding to 4 mg of the herbal drug (Devasankariah *et al.*, 1992). The study was limited to the extraction of mandibular molars. *Anacyclus pyrethrum* brought about a pterygo mandibular block with infiltration of the long buccal nerve. A good depth of anaesthesia was observed in 90 out of 100 patients (Xylocaine: 80 out of 100 patients); the anaesthetic effects of the two substances are similar, but last longer in the case of *Anacyclus pyrethrum*.

Insecticidal and molluscicidal effect

The alkyl amides from *Anacyclus pyrethrum* have insecticidal and molluscicidal effect. The insecticidal effect is said to parallel the sialagogic effect. The insecticidal effect of pellitorine is particularly pronounced. A solution of pellitorine in Deobase (= purified kerosene, concentration not given) as a spray for houseflies (*Musca domestica L.*) is said to show the same paralysing effect and slightly more than half the lethal effect as the same concentration of pyrethrins (Gnadinger, 2001; Casida, 1980).

Pellitorine is also lethal to adult yellow mealworms (*Tenebrio molitor*). A 3.1% solution of pellitorine in acetone topically applied to mealworms as standardized drops under defined conditions causes immobilization of 45% after 24 hrs. The toxicity of alkyl amides appears to be dependent on the number of double bonds. Anacyclin, as a 3% solution in acetone, caused only 10% mortality in *Tenebrio molitor*. Catalytic partial hydrogenation of the two acetylene bonds greatly increased the effect. The same concentration of tetrahydroanacyclin caused the immobilization of 100%.

Toxicity (Bellakhdar, 1997; Boulos, 1983)

Polyunsaturated alkamides isolated from *Anacyclus pyrethrum*, and other species, were shown to possess inhibitory activity *in vitro* cyclooxygenase (sheep seminal microsomes) and 5-lipoxygenase (porcine's leukocytes) assays. Organic extracts of the roots were shown to have some antibacterial activities but did not have antifungal properties and they are active against yeast. The drug is not completely offensive. Mild to severe toxicological effect were reported, such as inflammation of gastrointestinal mucous membrane and skin. In fact, the roots were reported as a powerful irritant to the skin. The emanations of the plant were reported to cause headache, gastric pain, nausea, and in some cases loss of consciousness. Dermatitis can also occur on the hands of persons who handle the plant material. The root of the plant contains sesamin, which is one of the compounds involved in sesame oil contact dermatitis.

Conclusion

It is quite apparent from this review that *Anacyclus pyrethrum* contains a number of Phyto constituents, which reveals its uses for various therapeutic purposes. The roots can be used for the treatment of various disorders in human being such as immunostimulating effect, inhibitory effects, antidepressant activity, anticonvulsant activity, myorelaxation activity, memory-enhancing activity, aphrodisiacs, antimicrobial activity, and local anaesthetic effect, insecticidal and molluscicidal effect. Still more work is required with the *Anacyclus pyrethrum* to investigate the mechanism of actions with other therapeutic activity.

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