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AGERATUM CONYZOIDES LINN.: A REVIEW

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ABSTRACT: The traditional Indian medicine - Ayurveda, describes various herbs, fats, oils and minerals with anti-aging as well as wound healing, anti-inflammatory, antifungal, antimicrobial properties. Wounds are the result of injuries to the skin that disrupt the soft tissue. Wound healing can be defined as a complex dynamic process results in the restoration of anatomic continuity and function. Various plant products have been used in the treatment of wounds, fungal, microbial over the years. Herbal extracts promote blood clotting, fight infection, and accelerate the healing of wounds. Hence in the current review, a list of the plants used in traditional medicine for the treatment of wounds was screened. It is a beneficial work for researchers to provide many details about the *Ageratum conyzoides* Linn. and development of safe and effective and globally accepted herbal drugs to treat fungal infections.

INTRODUCTION: *Ageratum conyzoides* Linn. (Asteraceae) is commonly known as Appa grass and goat weed in English, Pumpillu in Tamil and Visadodi in Hindi. It is a polymorphic, aromatic, annual herb native to tropical America [1, 2]. It is a naturalized as a weed throughout India and also found in the middle Andaman. The genus ageratum is derived from the Greek words 'a geras' meaning non-aging which refers to a long lifetime of the plant and the species epithet 'konyz' is the Greek name of *Inula helenium* which resembles the plant [3, 4]. The plant can be identified by its pale green and flowers are pale blue or white, malodorous 50 - 80 flowered in corymbs. It flowers during Oct - Nov [5]. Ageratum is derived from the Greek words 'a geras,' meaning non-aging, referring to the longevity of the whole plant.

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Conyzoides, on the other hand, is derived from 'konyz' the Greek name of *Inula helenium* which the plant resembles [1]. *Ageratum conyzoides* **Fig. 1** belongs to the family Asteraceae tribe Eupatoriae. This family is well marked in their characteristics and cannot be confused with any other. A large majority of the plants in the family are herbaceous while trees and shrubs are comparatively rare. The genus ageratum consists of approximately 30 species, but only a few species have been phytochemically investigated.

Ageratum conyzoides is a tropical plant that is very common in West Africa and some parts of Asia and South America. It is an annual branching herb which grows to approximately 1 m in height. The stems and leaves are covered with fine white hairs, the leaves are ovate and up to 7.5 cm long. The flowers are purple to white, less than 6 mm across and arranged in close terminal inflorescences. The fruits are achene and are easily dispersed while the seeds are photoblastic and often lost within 12 months. The plant grows commonly in the proximity of habitation, thrives in any garden soil

and is very common in waste places and on ruined sites. It has a peculiar odor likened in Australia to that of a male goat and hence its name 'goat weed' or 'billy goat weed.' The toxicity of this plant has not been well studied; however; the essential oil obtained by steam distillation has been reported to have a powerful nauseating odor.

The plant has also been found to be poisonous to Rabbits due to the presence of HCN and coumarin. *A. conyzoides* is not eaten by humans except when taken for medicinal purposes, but in some cultures, it is a delicacy for domestic guinea-pigs, horses and cattle.

FIG. 1: *AGERATUM CONYZOIDES*

Plant Profile:

Taxonomical Classification: [6]

Kingdom	:	Plantae
Subkingdom	:	Angiosperm
Class	:	Eudicots
Order	:	Asterales
Family	:	Asteraceae
Genus	:	*Ageratum*
Species	:	*conyzoides*

Binomial name: *Ageratum conyzoides* Linn.

Vernacular Names: [7]

Tamil	:	Pumpillu, Sinnapoompillu, Vadaichedi
Sanskrit	:	Visamustih
Malayalam	:	Muryampacha, (Kattappa, Appa, Muriyan Pacca)
Kannada	:	Uralgidda (Nayitulasi)
Hindi	:	Visadodi
English	:	Goa weed, Appa Grass.

Distribution: Throughout India.

Plant Part Used: Whole Plant.

Different parts of this plant have been used in the folkloric system of medicine to treat wide panel of disease such as boils, sores, tetanus, skin diseases, fever, chronic ulcer, intra-uterine problems, eye ailments, rheumatism, asthma, stomach disorders, *etc* [8 - 10]. Leaves of the plant are traditionally used as a wound healer, anti-inflammatory, analgesic, antipyretic, antispasmodic and gastroprotective, antimicrobial, anti diabetic, anticancer, antiulcer, antioxidant, hematopoietic, larvicidal and mosquito repellants and insecticidal and anthelmintic. The stem is traditionally used as wound-healer, antioxidant, antitumor and antimicrobial and anti-inflammatory. The whole plant is traditionally used as an analgesic and anti-inflammatory, antiulcer, antidiabetic, anti-convulsant, radioprotective, brancodilatator and antimicrobial. It was reported that fresh leaves contain ageconyflavone A, B and C, and flavones - sinensetin, sesquiterpenes, chromenes derivatives. The stem contains an isoflavone glycoside, sterols, and whole plant contain pyrrolizidine alkaloids, terpenoids, sterols polymethoxylated flavonoids and flavones and chromenes. As mentioned earlier several reports have been published regarding chemical constituents and different biological activities *in-vitro* and *in-vivo*. An investigation to explore its pharmacognostic examination is inevitable. The object of the present study is to evaluate various pharmacognostical parameters such as macroscopic, microscopic, quantitative microscopy, powder analysis, histochemical color reaction and physicochemical standards of the whole plant of *A. conyzoides*.

Skin diseases are among the most common health problems Worldwide and are associated with a considerable burden. The burden of skin disease is a multidimensional concept that encompasses psychological, social and financial consequences of the skin disease on the patients, their families and on society. Chronic and incurable skin diseases, such as psoriasis and eczema, are associated with significant morbidity in the form of physical discomfort and impairment of patients' quality of life; whereas malignant diseases, such as malignant melanoma, carry substantial mortality. With the availability of a wide range of health status and quality-of-life measures, the effects of most skin diseases on patients' lives can be measured efficiently.

This review aims to present some of the published data to highlight the magnitude of the burden associated with some common skin diseases and also to suggest ways to quantify this burden of skin disease.

FIG. 2: FLOWER OF *AGERATUM CONYZOIDES*

FIG. 3: LEAVES OF *AGERATUM CONYZOIDES*

Ethnopharmacology: *A. conyzoides* has been used in various parts of Africa, Asia and South America for curing various diseases. Githen, in an earlier review, listed the uses of the plant in folk remedies to include, the use as a purgative, febrifuge, for ophthalmia, colic, treatment of ulcers and wound dressing. The antineuralgic and the antipyretic properties of the plant were also indicated in a review on 'medicinal plants from senegal [16]. In some African countries, the plant has been indicated for the treatment of mental and infectious diseases as well as headaches and dyspnea. In Cameroon, it is a local remedy for craw-craw. The leaves, when crushed in water, is given as an emetic and is also applied intravaginally for uterine troubles. They are used in the treatment of pneumonia by rubbing them on the chest of the patient [17].

In addition to its popular use for skin diseases and wound healing in Nigeria, a decoction of the plant is taken internally to treat diarrhea and to relieve pain associated with navel in children. In central Africa, the plant is used to treat particularly wounds caused by burns. While in Kenya East Africa, it is used in traditional medicine for its antiasthmatic, antispasmodic and hemostatic effects [18]. In India, it is used in the treatment of leprosy and as an oil lotion for purulent ophthalmia. In Brazil folk medicine, medicinal teas of *A. conyzoides* are used as anti-inflammatory, analgesic, and antidiarrheic, and in Vietnam, the plant is particularly used for the treatment of gynecological diseases.

Other folk remedies include anti-itch, treatment of rheumatism and sleeping sickness, mouthwash for toothache, antitussive, vermifuge, and tonic. It is used as a prophylactic and as a cure for trachoma in cattle. The nematocidal activity of the plant has been reported [19].

A. conyzoides also has several magical and superstitious attributes. For example, in Ivory Coast, it has protective fetish properties for followers of Snake-Sect against snakebite. In the western part of Nigeria, it enters into incantations on the strength of its smell to placate witches and to kill 'bad medicine.' In Congo, the leaf sap on the hands of card players is believed to improve their luck. If sap is spread on the accused in a trial and is then pricked with a needle, the pain will be felt only if guilty. The whole plant yields volatile oil with a strong smell. Several biological activities have been attributed to this oil.

Phytochemistry: A large percentage of the publications on the photochemistry has to do with the essential oil of this plant. The oil content varies randomly from 0.11 to 0.58% for leaves and from 0.03 to 0.18% for the roots depending on times of the year. From water distillation of the fresh flowers, the oil content was found to be 0.2%. The yield of oil from the petroleum ether extract of the seed was 26% [18].

Mono and Sesquiterpenes: A large number of constituents have been identified from the GC-MS analysis of the essential oil of *A. conyzoides*. The

largest so far, a total of 51 constituents have been reported from the analysis of an oil sample of the plant collected from a University environment in Nigeria. The constituents identified include [20]. Monoterpenes 6.4% and 20 sesquiterpenes 5.1%.

The mono- and the sesquiterpenes are obtained in minute quantities trace 0.1%. The monoterpenes obtained in approximately 1% of the oil include sabinene and -pinene, 1.6%, -phellandrene, 1,8-cineole and limonene, 2.9%, terpinen-4-ol, 0.6% and terpineol, 0.5%. Ocimene which is found in trace amount in the oil from the Nigerian plant is found to be 5.3% of the oil from the plant collected in India [20].

Pinene 6.6%, eugenol 4.4% and methyleugenol 1.8% are also obtained from the Indian plant oil. The major sesquiterpenes are -caryophyllene, 1.9% 19, 10.5% from the oil obtained from Cameroon 21 and 14 17% in Pakistani oil [22]. Cadinene is another sesquiterpene which has been reported to occur in approximately 4.3% of the oil from Indian plants. Ses-quiphellandrene and caryophyllene epoxide have also been obtained in 1.2 and 0.5 percentages, respectively.

Phytochemical Analysis: The crude extracts were screened for the presence of alkaloids, tannins, terpenoids, saponins, and flavonoids according to the methods described with slight modifications. Briefly, the methods were as follows;

Terpenoids: One milliliter of absolute chloroform was added to 10 mg of each extract and standard, ursolic acid, and 1 ml of 0.1M sulphuric acid was subsequently added. A reddish brown color at the interface was indicative of the presence of terpenoids.

Saponins: One milliliter of distilled water was added to 10 mg of each plant extract and shaken vigorously for 1 minute. A stable, persistent froth indicated the presence of saponins.

Tannins: Ten milligrams of each extract and standard, gallic acid, was boiled with 2 ml of distilled water. The boiled extracts were centrifuged to obtain supernatant to which three drops of 0.1 % $FeCl_3$ was added to each supernatant. A blue-black coloration indicated the presence of tannins.

Alkaloids: Ten milligrams of standard, quinidine, and crude plant extracts were dissolved in 2 ml of acid alcohol (v/v). The solution was boiled for three minutes and centrifuged to obtain a supernatant. One milliliter of dilute ammonia was added to the supernatant. Subsequently, 2 ml of absolute chloroform was added and shaken gently to extract the alkaloidal base. The chloroform fraction was then extracted with 2 ml of acetic acid. After adding four drops of Draggendorf's reagent to each extract and standard, a reddish brown precipitate indicated the presence of tannins.

Flavonoids: Two milliliters of dilute ammonia was added to 2 ml portions of aqueous supernatant of each plant extracts and standard, quercetin. Subsequently, 1 ml of 0.1M sulphuric acid was added to the mixture. A yellow coloration disappeared on standing for 5 min indicates the presence of flavonoids.

Medicinal Uses and Pharmacological Studies: *A. conyzoides* is widely utilized in traditional medicine by various cultures worldwide, although applications vary by region. In central Africa, it is used to treat pneumonia, but the most common use is to cure wounds and burns (Durodola. Traditional communities in India use this species as a bacteriocide, antidysenteric, and antilithic (Borthakur and Baruah, and in Asia, South America, and Africa, aqueous extract of this plant is used as a bacteriocide (Almagboul; Ekundayo *et al*., In Cameroon and Congo, traditional use is to treat fever, rheumatism, headache, and colic. In Reunion, the whole plant is used as an anti-dysenteric. The use of this species in traditional medicine is extensive in Brazil. Aqueous extracts of leaves or whole plants have been used to treat colic, colds and fevers, diarrhea, rheumatism, spasms, or as a tonic.

A. conyzoides has quick and effective action in burn wounds and is recommended by Brazilian drugs central as an anti-rheumatic. Several pharmacological investigations have been conducted to determine efficacy. Duradola verified inhibitory activities of ether and chloroform extracts against in vitro development of *Staphylococcus aureus*, using methanolic extract of the whole plant, verified inhibitory action in the development of *Staphylococcus aureus*, *B. subtilis*,

Escherichia coli, and *Pseudomonas aeruginosa*, reported effective analgesic action in rats using aqueous extract of *A. conyzoides* leaves (100 to 400 mg/kg).

Assays realized in Kenia, with aqueous extract of the whole plant, demonstrated muscle relaxing activities, confirming its popular use as an antispasmodic. In Brazil, assays conducted by the State University of Campinas and Paraiba Federal University,) showed promising results. In clinic trials with patients with arthrosis, administered aqueous extract of the whole plant, and reported analgesic effect in 66% of patients and improvement in articulation mobility in 24%, without side effect, using aqueous extract of the whole plant, verified effective clinical control of arthrosis, reporting a decrease in pain and inflammation or improvement in articulation mobility, after a week of treatment.

Bioactivity: *Ageratum conyzoides* has a bioactive activity that may have agricultural use, as shown by several research investigations in different countries. Reported use of the leaves as an insect (moth) repellent. The insecticide activity may be the most important biological activity of this species. The terpenic compounds, mainly precocious, with their antijuvenile hormonal activity, are probably responsible for the insecticide effects. Assays conducted in showed the activity of this species against *Musca domestica* larvae, using whole plant hexane extract. Reported the action of cromenes (precocenes I and II), isolated from Ageratum plants, which accelerate larval metamorphosis, resulted in juvenile forms or weak and small adults. Demonstrated the juvenilizing hormonal action of precocene I and II in insects, the most common effect being a precocious metamorphosis, producing sterile or dying adults. Using *A. conyzoides* methanolic extract from fresh leaves (250 and 500 ppm) in the fourth in the star of *Chilo partellus* (Lepidoptera, Pyralidae), a sorghum pest, observed the presence of a dark stain in the insects' cuticle and immature pupae formation, both symptoms of deficiency of the juvenile hormone.

A. conyzoides also induces morphogenetic abnormalities in the formation of mosquitoes larvae (*Aedes aegypt*, *Culex quinquefasciatus*, and *Anopheles stephensi*). This has been verified using petroleum ether extracts (5 and 10 mg/L) of the whole plants. The larvae showed intermediary stages between larvae-pupae, discolored and longer pupae, as well as incompletely developed adults.

Future Scope: There are some small pharmaceutical companies in Brazil using *A. conyzoides* as a raw material for phytochemicals. The demand is increasing year by year and this situation warrants further scientific research to develop both agricultural and medical uses. Research on medicinal plants should be focused primarily on species whose pharmaceutical activities have already been demonstrated. Positive preliminary clinical assays of *A. conyzoides* clearly demonstrate that this species may be an important economic resource in several tropical countries. The use of this species as a natural biocide or agent for pest management particularly requires further investigation.

CONCLUSION: In recent years, ethnomedicinal studies received much attention as this brings to light the numerous little known and unknown medicinal virtues especially of plant origin which needs evaluation on modern scientific lines such as phytochemical analysis, pharmacological screening and clinical trials. In the present review, the literature about botanical, pharmacognostical, phytochemical and pharmacological activities has been given comprehensively. The plant is having, antioxidant, antiviral, anti-inflammatory, anti-microbial activity, wound healing activity, skin infection, antifungal, antiallergic activity, and gastroprotective activity.

A literature survey also pinpoints the fact that although the number of diseases for which *A. conyzoides* finds use as a medicine is fairly large its therapeutic efficacy has been assessed only in few cases with few models. Therefore, it is imperative that more clinical and pharmacological studies should be conducted to investigate the unexploited potential of this plasma.

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CONFLICT OF INTEREST: Nil

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