

A PANOROMIC REVIEW OF PLANT *EUPHORBIA HIRTA* LINN.,

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Abstract: Medicinal herbs are a local tradition that has global relevance. Euphorbia, also called ASTHMA PLANT, is a plant that grows in open grassland, along roadsides and on sidewalks. Medicinal herbs are characterized by a variety of complex chemical compounds with different compositions that have been found as secondary plant metabolic products in one or more parts of the plant. These plant metabolites are classified as alkaloids, glycosides, corticosteroids, essential oils and other types based on their chemical makeup. Euphorbia is a plant that is found all over the world; its Sanskrit name means "Dugadhika." The Doctrine of Signatures states that Euphorbia is known for its creamy latex, which is used to increase milk flow in women. The herb has been demonstrated to enhance urine output, be antidiarrheal, antispasmodic, anti-inflammatory, anti-fungal, antibacterial, analgesic, antioxidant, anti-asthmatic, cancer-fighting, antimalarial and larvicidal in nature. The review attempts to describe the botanical and phytochemical characteristics of plants. Key terms: phytochemistry, pharmacological points of view, *Euphorbia Hirta* Linn.

Keywords: *Euphorbia hirta*, Asthma plant, Phytochemistry, Pharmacological properties, Medicinal herbs, Traditional medicine, Herbal remedies.

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Introduction

Introduction The plant family Euphorbiaceae includes *Euphorbia Hirta*.

This medicinal plant is used to treat a wide range of illnesses, including respiratory system disorders like asthma, bronchitis, hay fever, laryngeal spasms and emphysema; gastrointestinal disorders like intestinal parasites, diarrhea, peptic ulcers, heartburn, vomiting, and amoebic dysentery and inflammations of the skin and mucous membranes like warts, scabies, tinea, thrush, aphthae, fungal afflictions and measles. [1, 2] Plants' phytochemical components, which have particular physiological effects on humans are what give them their therapeutic and nutritional value. [3] China, India, Philippines, Australia, Africa and Malaysia are all home to large populations of the plant. According to an epidemiological analysis, leading an active lifestyle might result in major health concerns, including liver and renal disorders.

Which extracts from plants and weeds can be used to treat. [4] Modern medicine relies heavily on plants as basic ingredients. Even though synthetic medications are efficient at managing a variety of conditions, many individuals do not have access to them. About 70,000 different plant species are said to have been used medicinally. Conventional drug manufacturing uses herbs as raw ingredients. Complex chemical compounds found in medicinal plants have therapeutic qualities. More than 2500 plant species are recognized as medicinal in India, 1400 in Sri Lanka and 700 in Nepal. [5]

Vernacular Name

English	Asthma plant, garden spurge, snake weed
Hindi	Dudhi
Sanskrit	Dugdhika, Kshirini,
Telugu	Reddinanab rolu
Tamil	Amampatcharishi
Gujarat	Dudeli
Malayalam	Nelapalai
Bengali	Barokheruic
Marathi	Dudhi,
Malaysia	Ambin Jantin

Botanical Description

Euphorbia hirta Linn has a slender, upright stem and may grow up to 80 cm in height. The leaves of this plant are oblong, elliptical and placed oppositely on a thick, hairy stalk. It features tiny blooms and a small serrated edge. The plant grows well in areas with plenty of water, roadsides, footpaths and meadows. The golden fruits have a diameter of 1-2 mm. They contain hairy capsules and wrinkled seeds. [6]

Taxonomical Classification [7,8]

Kingdom: Plantae

Division: Tracheophytes

Sub-division: Spermatophyte

Infra Division: Angiosperms

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Class: Magnoliopsida
Super Order: Rosanae
Order: Malpighiales.
Genus: Euphorbia
Family: Euphorbiaceae.
Species: *Euphorbia hirta* Linn

Synonyms

Chamaesyce gemella (Lag.) is little, as is *Chamaesyce hirta* (L.), among other equivalents. *Chamaesyce hirta* f. *glaberrima* is a

variation of *Chamaesyce hirta* Hurus, Hara, H. Croizat Makino, and Nemoto identify *Chamaesyce hirta* f. *litoralis* Hurus. *Chamaesyce pekinensis* variation known as *Glaberrima Glacierrima* is a variant of *Chamaesyce pilulifera* HARA, H. *Euphorbia hirta* var. is seen beside *Euphorbia bancana* Miq., *Euphorbia capitata* Lam., *Euphorbia chrysochaeta* W. Fitzg., and *Euphorbia gemella* Lag. *destituta*, *Ditritea hirta* (L.) Raf., *Chamaesyce rosei* Millsp., and *Desmonema hirta* (L.) Raf. Wheeler, L. C. *Ph. hirta* var. *glaberrima* Koidz., *Ph. karwinskyi* Boiss., *Ph. nodiflora* Steud., *Ph. obliterated* Jacq., *Ph. pilulifera* Jacq., *Ph. pilulifera* var. *arechavaletae* Herter, *Ph. pilulifera* var. *discolor* Engelm., *Ph. pilulifera* var. *glabrescens* Thell.^[9]

FIGURE 01



FIGURE 02



Plant of *Euphorbia Hirta* Linn (Asthma Plant)

Description of the Plant

Flowers: Flowers are unisexual and open throughout the year. Proximal, lineate, fringed bracteoles, default periapt and free stamens are in male flowers.

Fruits: The plant has allomorphic pistillate fruits. The fruit of the plant was a capsule, having three lobes and three seeds, and covered by small hairs. Green fruit with fleshy prickles. 1-2 mm in diameter.

Seed: Noda et al. (1984) characterized seeds as small, foursided, rectangular, pinkish-brown, and faintly wrinkled. They are 0.065 mg/seed in content and 0.57–0.70 mm in length.

Stem: The stems are long and hairy with a monopodial mode of branching. The plant's internodes measure 2.5–3 cm and are stipuled.

Leaves: Pairs of leaves that oppose each other are placed on the stem. The simple, elliptical to slightly rhombic leaves are hairy and have a curved base and a jauntily dentate margin.^[10,11]

Medicinal Uses:

The entire plant is used as a poultice for swelling, glandular swelling, and ulcers, as well as in the treatment of worms, coughs, and infant diseases. It is hemostatic (stops bleeding) and astringent.

The herb is employed to cure all acute complaints, including rheumatism, colic, toothache, headaches and pregnancy cramps. The plant juice calms and softens the mucous membranes of the respiratory and urinary tracts. The herb is used as a poison antidote and painkiller for scorpion stings and snake bites. Tannins, phenols, flavonoids, terpenoids, acids and essential oils are present in the *Euphorbia Hirta* plant. Flavonoids are leucocyanidin, euphorbianin, camphol, quercetin and quercitol. Among the polyphenols are 1,2,3,4,6-penta-O-galloyl-βD-glucose, gallic acid, myricitrin, 3-4-di-ogalloylquinic acid and 2,4,6-tri-O-galloyl D-glucose.^[1,12]

Geographical Distribution:

The plant is commonly found in roadside garbage sites and is widely distributed in the hottest regions of Australia and India. In India, it can be found in West Bengal, Madhya Pradesh, Uttar Pradesh, Gujarat, Bihar and Himachal Pradesh.^[7]

Ethnopharmacy

Conjunctivitis, gastroenteritis (dysentery, diarrhea, intestinal parasitism, etc.), and bronchial and respiratory infections (bronchitis, hay fever, asthma, etc.) are all cured with *Euphorbia Hirta* Linn. Tonic as well as hypotensive activity is exhibited by *E. Hirta*. Analgesic, antipyretic, anxiolytic and anti-inflammatory activity is present in aqueous extract. Eyelid stye is cured using stem sap, while boils and edema are cured using a leaf poultice. [13]

Euphorbia Hirta or Australian asthma herb, is one of the widely utilized herbs with several potential medicinal uses. The plant has been used to treat numerous diseases such as bronchitis, asthma, cough and skin diseases. *E. hirta* extracts are anticancer. *E. hirta* water extract exhibited extensive inhibition of secretion of prostaglandins I₂, E₂ and D₂. [13] [14] The aqueous extract will inhibit aflatoxin from penetrating crops like mustard, rice, wheat, or maize. Antifungal and antibacterial activities are shown by methanol leaf extracts. Coconut oil, which is hot and turmeric leaves are employed to cure chafed soles. *E. Hirta* latex and surma are employed to cure lower eyelid ulcers. Root exudate shows nematocidal killing of juveniles. *Meloidogyne invisible*.^[13]

Pharmacological Activity

Antibacterial Activity

Bacillus subtilis, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, and *Escherichia coli* are all inhibited in their growth by the ethanolic extract of *E. hirta*. *E. hirta* leaf extracts in aqueous and chloroform form exhibit antibacterial activity against *Klebsiella pneumoniae*. The extract has antibacterial and non-cytotoxic properties. Antimicrobial action A main active chromatographic fraction with 90% growth inhibition at a concentration of 5 µg/ml was produced by the bioassay-guided fractionation of the methanolic extract of aerial parts of *E. hirta*, which was evaluated against *P. falciparum* parasites. action against inflammation. An nhexane extract of aerial parts of *E. hirta* showed anti-inflammatory effects in a mouse model of ear inflammation caused by phorbol acetate. It displayed an effect that was dose-dependent.^[15,16]

Activity of Galactogenesis

In guinea pigs prior to puberty, the powdered *E. hirta* showed a galactogenic effect by stimulating secretion and encouraging the formation of the mammary glands.^[17]

Activity against Asthma

E. hirta is considered to have anti-asthmatic qualities due to its depressant effect on breathing and bronchial tube relaxing.^[18]

Effect on Urine Production and Electrolytes

E. hirta leaf ethanolic and aqueous extracts significantly increased diuresis in rats. At 6 and 24 hours, ethanol extract showed significant decrease in urine volume at 100 and 50 mg/kg, respectively. Water extract resulted in significant increase in loss of urine Na⁺, K and HCO₃. Ethanol extract (100 mg/ml) greatly reduced K⁺ loss, but water extract elevated K⁺ excretion. The production of HCO₃⁻ urine considerably increased following the injection of both extracts.^[19]

Anti-Diarrheal Properties

The anti-diarrheal activity of the plant decoction was evaluated on mice. It exhibited activity in prostaglandin E₂-, arachidonic acid-, and castor oil-induced diarrhea models. A flavonoid glycoside, named quercitrin, found from *E. hirta*, exhibited anti-diarrheal efficacy in mice's diarrhea induced by castor oil and prostaglandin E₂ at the dose of 50 mg/kg.^[20]

Activities to Prevent Allergies

Strong anti-anaphylactic effects were demonstrated by the ethanolic extract of *E. Hirta*.

E. Hirta keeps rats from developing passive cutaneous anaphylaxis and mice from developing active-paw anaphylaxis. *E. Hirta* extracts inhibited the release of tumor necrosis factor-alpha (TNF-α) and interleukin-6 (IL-6) from anti-DNP-HAS-activated rat peritoneal mast cells. As a result, it is said that *E. hirta* has long been used as a natural treatment for Type I allergies. Furthermore, it was demonstrated that the aqueous extract of the plant considerably decreased the activation of prostaglandin E₂ from HIG-82 cells, which are activated rabbit synovial fluid cells. An important concentration of bioactive compounds with anti-inflammatory qualities was found in the plant's aqueous extract. [21, 22]

Anti-Tumor Actions

The anti-tumor effects of the *E. Hirta* extract on EL-4 cell lines were tested in Swiss Albino mice. The mass of the cell tumor significantly increased after treatment with the plant extract. 25 Human laryngeal epithelioma Hep-2 cells responded to the methanol extract of *E. Hirta* leaves with anti-proliferative action. 26 Furthermore, the methanolic extract and quercetin were found to possess both mutagenic and anti-mutagenic qualities.^[23, 24, 25]

Anti-Acne Activity

Evaluating *Euphorbia Hirta*'s antibacterial qualities against *Propionibacterium acnes* was the aim of the study. The antibacterial activity of the ethanolic extract of *Euphorbia Hirta* (roots) was investigated using the broth dilution and disc diffusion procedures. It is well known that the disc diffusion *Propionibacterium acnes* causes irritation and pus production. The results of the method suggest that *Euphorbia hirta* may inhibit the growth of *Propionibacterium acnes*.^[26]

Sedative and Anxiolytic Exercises

E. Hirta's hydroalcoholic extract was used to study its anxiolytic qualities in rats under long-term stress. The mechanism behind the drug's anxiolytic effect was evaluated by combining *E. Hirta* with antagonists of the GABA A receptor-benzodiazepine receptor-Cl channel complex, which showed a strong anti-anxiety effect in prolonged immobilization stress.^[27]

Venom-Fight Activity

The mice's edema ratio dropped as a result of the venom enzymes being inhibited *in vitro* by the methanolic extract of *E. Hirta*. The plant was found to have a very high concentration of phenolic components and to be exceptionally rich in gallic, quinic, and ellagic acids. These compounds are known to inhibit venom proteases.^[28]

Activity for Healing Wounds

Studies have shown that the methanol extract of *E. Hirta* has the capacity to promote wound healing because it has the potential to proliferate fibroblasts and may have potent antibacterial action against *Klebsiella pneumoniae* and *Escherichia coli*. They concluded that in wounded tissues, collagen synthesis and wound healing activity are regulated by Smad-mediated proteins. Triterpenes, which are commonly used to treat boils and encourage wound healing, were extracted from the stems, roots and leaves of *E. hirta* and showed antibacterial activity.^[29, 30]

Activities Aimed at Preventing Inflammation

Ahmad et al. (35) conducted an experiment with a plant extract whose potential anti-inflammatory qualities intrigued them due to its historical use in the treatment of various ailments.^[31]

Antidiabetic Activity

Using an ethanolic extract, *Euphorbia Hirta*'s antidiabetic effects on Wistar rats. The results show that rats with diabetes induced by alloxan had reduced blood glucose levels. In streptozotocin-induced diabetic mice, examined the anti-diabetic properties of an ethanolic extract from the leaves, flowers, and stems of *Euphorbia Hirta*. On the fifteenth day of the study, oral administration of the extract caused a significant decrease in blood sugar levels. The antidiabetic and alpha-glucosidase activity-blocking capabilities of *Euphorbia Hirta*'s hydroalcoholic extract were evaluated. With IC₅₀ values of 1.295±0.035 and 2.188±0.204 µg/ml, respectively, AcoET and BuOH considerably reduce α-glucosidase activity, suggesting their potential as anti-diabetic agents.^[32,33,34]

Serum Biochemistry:

To evaluate the effects, rats were administered oral doses of 400 mg/kg, 800 mg/kg and 1600 mg/kg of chromatographic fractions of *E. Hirta* Linn for 14 days. Rats exhibit a considerable increase in serum biochemical indicators after 14 days, including total protein, globulin, albumin, ALT, ALP, AST, total bilirubin, creatinine and BUN levels.^[35]

Diuretic Activity

In rats, *E. hirta* leaf extracts in both ethanol and water caused diuresis. The extract increased electrolytes and urine production. The plant's diuretic capability has been demonstrated by experiments that reveal the active ingredients in *E. hirta* leaf water extract have diuretic qualities comparable to acetazolamide.^[36]

Immunostimulatory Activity

Using a treated fish infected with the *Aeromonas hydrophila* pathogen, patients investigated the immunostimulatory effects of *E. Hirta* leaf extract. Higher dosages of the plant leaf extract increased red and white blood cell counts and triggered an antibody immunological response, according to the study.^[37]

Anti-Oxidant Activity

The antioxidant activity of the methanolic extract of the plant was comparable to that of black and green tea.

An antioxidant activity was shown by the phenolic acids isolated from the aqueous leaf extract. FRAP and DPPH assays were employed to determine the activity of phenolic extracts. Phenolic acid of *E. Hirta* efficiently scavenges free radicals and protects against protein oxidation. Enzymatic and non-enzymatic antioxidants, hydroperoxides and lipid peroxides all indicate the antioxidant capability of the leaf extract. [38, 39]

Toxicity Studies

E.hirta is utilized extensively in ethnomedicine owing to its numerous advantages.

Yuet Ping et al. conducted the toxicity test because some researchers thought it was needed. The research assessed acute and subchronic toxicity in Sprague Dawley rats. Dosage of the extract

did not induce acute toxicity or death in any animal. Body weight, biochemical and hematological parameters, food or beverage intake, etc., were not changed when the plant extract was administered orally for a long duration. Due to this, the group concluded. The plant extract is not acutely or subchronically toxic

[40]

Conclusion

Euphorbia Hirta Linn is also an extremely long-established existence where it was used in traditional medicine, so its application made it well-known in medicinal herbs. The drug ability due to the pharmacological features including antibacterial, anti-inflammatory, antidiabetic, antitumor, and antioxidant activity demonstrated by the plant certifies its medicinal use. Due to the richness in bioactive compounds such as flavonoids, tannins, and essential oils, the plant has been used to treat a myriad of diseases, such as those in the respiratory, gastrointestinal, dermatological, and infectious systems. To establish its safety and efficacy in clinical use for drug administration, further preclinical studies and extensive research utilizing well-designed clinical trials are necessary. Standardization of bioactive components, mode of action, longitudinal toxicity and active compounds will enhance their use in modern medicine. *Euphorbia hirta* may serve as a natural source of medicine for researchers and scientists and be utilized in combined medication and further study as promising opportunities for treatment of the species.

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