

Review on traditional medicinal uses of the euphorbia hirta plant

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ABSTRACT

EUPHORBIA HIRTA is a plant used in the traditional medicine for a variety of diseases, such as a cough as well as asthma, colic dysentery & genito-urinary infection. This plant, belonging to the family is Euphorbiaceae, is also known as the Australian asthma herb. and is not toxic when taken in typical dosa ges. In South Africa, it is commonly used for asthma, which is one of the most common used in respiratory complaints. Although corticosteroids are considered the best means of defence against this debilitating illness, many people especially in poor countries, rely on herbal remedies for its treatment. .

I. INTRODUCTION

Euphorbia hirta also known as asthma-plant is a pantropical weed, originating from the tropical regions of the Americas. It is a hairy herb that grows in open grasslands as well as roadsides and pathways. It is highly used in traditional herbal medicine across many cultures, particularly for the asthma, skin ailments, and hypertension. It is also consumed in herbal tea form as folk medicine for fevers in the Philippines particularly for dengue fever and malaria .

Taxonomy

- 1) Kingdom – Plantae
- 2) Subkingdom – Viridaplantae
- 3) Infrakingdom – Straptophyta
- 4) Division – Tracheophyta
- 5) Subdivision – Spermatophytina
- 6) Infradivision – Angiosperms
- 7) Class – Magnoliopsida
- 8) Superorder – Rosana
- 9) Order – Malpighiales
- 10) Family – Euphorbiaceae
- 11) Genus – Euphorbia
- 12) Species – hirta

Morphology

The plant Dudhia/ Euphorbia hirta is a small annual herb, frequently seen occupying open waste spaces as well as roadsides, grasslands & pathways, rice field and as a weed of cultivation. The plant is a common herb, found

in pan-tropic , partly subtropic areas and worldwide including Australia and Western Australia, Northern Australia, Northern territory, Queensland, New south wales, Central America, Africa, Indomalaysia, China and India. It is native to Central America. It is usually erect, grows upto a height of 40cm tall and it can also be seen lying down. The stem is slender, reddish in colour, covered with yellowish bristly hairs especially in young parts. Leaves – simple, arranged oppositely and leaf blades are lanceolate, unequal base, cuneate one side, round otherside, acute apex, finally toothed margins, dark green above, pale beneath, purple blotch in middle, measures about 1-2.5 cm long.

Flower sunisexual, male flowers are sessile, linear bracteoles, fringed, single stamen, with absent perianth. Female flowers are short pedicel, rimmed perianth, superior ovary, three-celled, three styles, minute, covered with short hairs, two-fid apex. Inflorescence – cluster of flowers called cyathium at terminal or auxillary. Several cyathia densely clustered into a cyme. Fruits – yellow, three lobed, three – seeded, keeled capsules, containing three brown, four- sided, angular, wrinkled seeds, base truncate, hairy, 1-2mm in diameter Seeds- oblong, four sided, slightly wrinkled, pinkish brown, caruncle absent.

Euphorbia hirta

E. hirta is a small annual, branched herb that can grow to 70 cm in height, purple or reddish in color with copious amounts of latex, and covered with sprout hairs.



Leaves: The leaves are opposite, biculate and simple, the stipules are linear, the leaf blade is lanceolate, oblong serrate, long elliptic, tapering, 3 – 4 cm long and 1 – 1.4 cm wide, and its margin is smoothly serrated.

Flowers: The monoecious inflorescence, an axillary or terminal cluster of flowers, is known as a cyathium. The male and female flowers are in a pod and both appellation. The flowers are unisexual, the ovary is covered with tiny hairs above, 3-celled, has 3 - Styles, small and the tip is double. The flowering period is usually year round.

Fruit: The fruit is allomorphic, pistillate, elongated, 3-lobed, obtuse base covered with shoot hairs.

Seeds: Seeds are oblong, 4-sided prismatic, wrinkled and brownish pink in color, capsule 3-seeded, green and covered with fleshy spines, seeds smooth, hard mottled crustal skin with a white caruncle at the top enclosing oily endosperm [13, 14, 15, 16, 17, 18, 19]

Roots: The root is a distinct and developed primary root (taproot system).

Classification: *E. hirta* belongs to the Euphorbiaceae family, known as the Spurge family. It is the largest family, consisting of almost 300 genera and 5000 species. *Euphorbia* is the largest genus of the Euphorbiaceae family and includes approximately 1600 species.

Pharmacological activities of *E. hirta*

Anti-inflammatory activity

It is studied anti-inflammatory effect of ethanol extract of *Euphorbia hirta* (Eh) and active component β -amyryn against lipopolysaccharide (LPS) activated macrophage cells. The extract and active component inhibited nitric oxide production and gene expression. Therefore, *Euphorbia hirta* and β -amyryn had potential arthritis inflammation treatment. Mariano Martinez-Vazquez et al. (1999) isolated and identified triterpenes like β -amyryn, 24-methyl encycloartenol and β -sitosterol from n-hexane extract of *Euphorbia hirta*. The n-hexane extract and triterpenes were evaluated for anti-inflammatory effects in mice. Both extracts and triterpenes exerted significant anti-inflammatory effects in TPA-induced ear model. The result also showed that dual and triplet combinations exerted higher activity than triterpene alone.

Anti-oxidation activity

It carried out antidiabetic and antioxidant effect in mice. The flower extracts, ethanol (250mg/kg) and petroleum ether (500mg/kg) of *Euphorbia hirta* were orally tested for 21 days alloxan induced diabetic mice. The serum cholesterol, triglycerides, creatinine, urea, alkaline phosphatase levels were reduced significantly. High density lipoprotein and total proteins were increased after treatments. The antioxidant assays of all extracts showed antioxidant activity. *Euphorbia hirta* flower extract possesses both antidiabetic and antioxidant activity reported antioxidant

Anti-tumour activity

It is isolated a new cyclopentanone derivative 3Z-pentenyl acetate from *Euphorbia hirta*. Based on spectroscopic analysis 1D and 2D NMR the structure was elucidated. The cytotoxicity of ethanol extract was evaluated against K562 (human leukemia) and A549 (lung cancer) cell lines. From the data, the ethanol extract exhibited a weak activity against A549 cells (inhibition ratio $15.02 \pm 11.60\%$) and inactive against K562 cells [21]

Anti-diabetic and free radical scavenging activity

The ethanol extract of *Euphorbia hirta* Linn was tested using animal screening models. Alloxan administered for 21 days, to induce diabetics. The ethanol extract showed a significant decreased blood glucose level on alloxan-induced diabetic rats. In vivo and in vitro study of antidiabetic activity was done by Widharna et al., 2010. From the in vitro experiment, ethanol extract and ethylacetate fractions had α -glucosidase inhibition activity, while n-hexane, chloroform, butanol and water fractions had no α -glucosidase inhibitory effect. In vivo test, also had the same result. Based on in vitro and in vivo test, *Euphorbia hirta* L. ethanolic extract and ethylacetate extract exerted anti-diabetic mechanism and α -glucosidase inhibitory property.

Anti allergic activity

In the described anti-allergic reactions. 95% ethanolic extract prepared from whole aerial parts of *Euphorbia hirta* (EH A001). EH A001 significantly inhibited rat peritoneal mast cell degranulation triggered by compound 48/80, dextran-induced rat paw edema. It prevented eosinophil accumulation and eosinophil

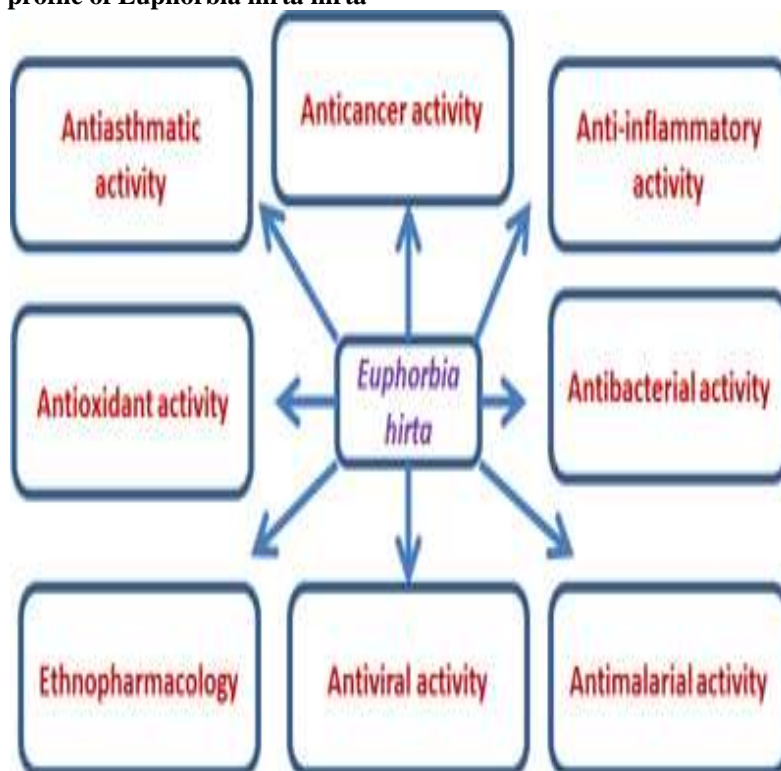
peroxidase activity and reduced the protein content in bronchoalveolar lavage fluid Extract suppressed the ratio in peripheral blood. It also attenuated interleukin-4(IL-4) release and augmented interleukin in ovalbumin-sensitized mouse splenocytes. The results of these findings compared with ketotifen, cetirizine and cyclophosphamide, known compounds and it proved that *Euphorbia hirta* possessed significant activity to prevent early and late phase allergic reactions

Anti-bacterial / Anti-fungal activity

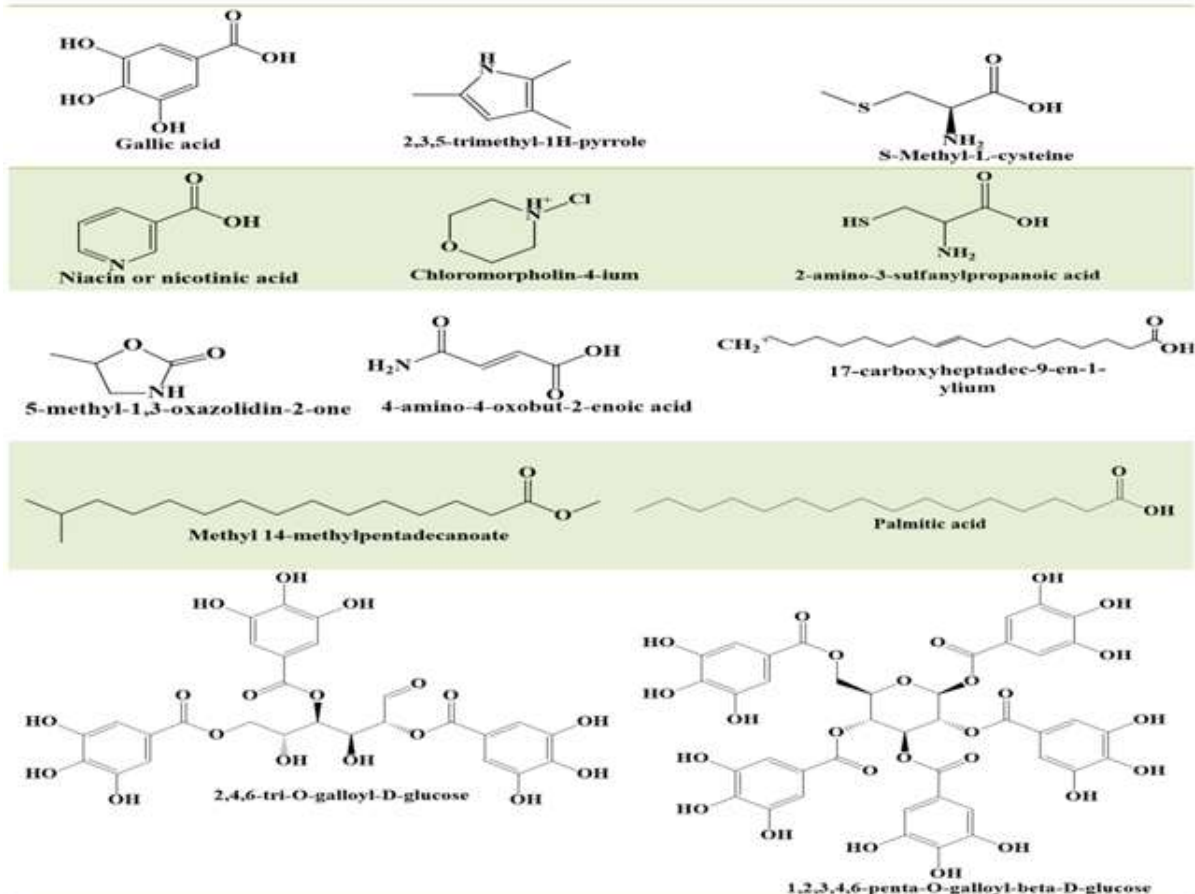
it was isolated Gram-positive staphylococcus aureus, and Gram negative *Escherichia coli*, *Salmonella typhi*, from degenerated wound, stool and a high vaginal swab. Total dehydrogenase activity assayed using 2,3,5-triphenyl tetrazolium chloride. ethanolic *Euphorbia hyssopifolia* and *Euphorbia hirta* inhibitory activity compared with standard

antibiotics ciprofloxacin and gentamycin. A dose -depended inhibition was observed. *Euphorbia hyssopifolia* effective against gram-positive staphylococcus aureus, than gram-negative salmonella typhi and *Escherichia coli*. *Euphorbia hirta* effective against Gram-negative salmonella typhi and *Escherichia coli*, but not effective against staphylococcus aureus. Hence, *Euphorbia hirta* can be implicated against typhoid fever and urinary tract infections Kareem Kehinde Titilope et al., 2012 reported the antibacterial activity of dry and fresh leaf extracts against some pathogens, *Escherichia coli*, *Haemophilus influenzae*, *Klebsiella pneumoniae*, , *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Slamonella typhi* and *Shigella dysenteriae*. Antibacterial sensitivity test indicated that *Euphorbia hirta* extracts had little or no zone of inhibition against *Haemophilus influenzae*. Hence, dry extract produced highest zone

Biological activity profile of *Euphorbia hirta*



Structure of some of the phytochemical constituents from *E.hirta*



II. CONCLUSIONS

Euphorbia hirta is a valuable medicinal plant used globally in different traditional systems of medicines. It has been reported to have various bio-activities against a wide array of human disorders. Most importantly, the plant as a whole bears a huge variety of chemical entities that enhance its therapeutic potential. , etc. and enhancing immune responses against pathogens. It has great potency for free radical scavenging and ACE inhibition. Therefore, these features of *Euphorbia hirta* may play an advantageous role throughout the management of highly infectious and deadly viral diseases such as COVID-19.

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