

BIOLOGICAL FUNCTIONS OF THE METABOLITES FROM *Euphorbia hirta* L.

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ABSTRACT

Euphorbia hirta L. contains various biologically active compounds that can be beneficial to human health. It has been known for its antibacterial, antioxidant, and anti-inflammatory effects. In addition, recent findings have shown that it has anti-venom, wound healing property, anti-cancer, anti-diabetic, and even molluscicidal effects. Although it has folkloric use against dengue fever and oral herpes, further study should be done to confirm its antiviral properties. However, it may have histopathologic adverse effects which are dose dependent.

Keywords: *Euphorbia hirta*, biological functions, dengue, oral herpes

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INTRODUCTION

Since ancient times, medicinal plants have been known to cure various ailments. The healing powers of these herbs are attributed to their chemical constituents. These compounds can be used to synthesize new conventional drugs. One of the promising plants which is less studied is *Euphorbia hirta* L, belonging to family Euphorbiaceae, which is characterized by its milky latex containing potent compounds with biological functions.



Figure 1: *Euphorbia hirta* L.

Biological compounds:

- scopoletin, scoparone, isoscopoletin, quercetin, isorhamnetin, pinocembrin, kaempferol, luteolin, gallic acid, and butanol rhamnosides.
- Afzelin (I), quercitrin (II), and myricitrin (III)
- rutin (IV), quercetin (V), euphorbin-A (VI), euphorbin-B (VII), euphorbin-C (VIII), euphorbin-D (IX), 2, 4, 6-tri-O-galloyl- β -d-glucose, 1, 3, 4, 6-tetra-O-galloyl- β -d-glucose, kaempferol, gallic acid, and protocatechuic acid.
- β -amyrin, 24-methylenecycloartenol, β -sitosterol, heptacosane, n-nonacosane, shikimic acid, tinyatoxin, choline, camphol, and quercitol derivatives containing rhamnose and chtolphenolic acid

Taxonomy:

- Kingdom: Plantae
- (unranked): Angiosperms
- (unranked): Eudicots
- (unranked): Rosids
- Order: Malpighiales
- Family: Euphorbiaceae
- Genus: *Euphorbia*
- Species: *E. hirta*
- Common names: English: pill-bearing spurge, asthma plant, hairy spurge, garden spurge,

pillpodsandman; Bengali: boro-keruie, barokhervi; Chinese: 飞扬草 fei yang cao; Gujarati: dudeli; Hawaiian: Koko kahiki; Hindi: baridhudi, dudhghas, dudhi; Luganda: kasandanda; Sanskrit: chara, amampatchairasi, barokheruie; Filipino/Tagalog: tawa-tawa, gatas-gatas; Twi: Kaka wieadwie; Kinaraya: tawa-tawa; Tamil: amampatchairisi; Telugu: reddivarinanabalu, reddinananbrolu, bidarie; Urdu: laldodhak

Distribution:

Philippines, India, Australia, Hong Kong, Southern China, Central America, Africa, South Africa

Description:

Annual herb

Length: 40-60 cm long

Stem: solid hairy stem, reddish, or purplish in color, with stipules, erect, or prostrate

Leaves: simple, opposite, elliptical, hairy on both surfaces, oblong to oblong-lanceolate, acute or subacute, dark green above, pale beneath, 1- 2.5 cm long, blotched with purple in the middle, and dentate margin.

Flowers: unisexual and found in axillary cymes at each leaf node, lack petals and are generally on a stalk

Fruits: yellow, capsules with three valves and produces tiny, oblong, four-sided red seeds, hairy, keeled capsules, 1-2 mm in diameter, containing three brown, four-sided, angular, wrinkled seeds.

Taproot: white or brown

Folkloric use:

➤ In the Philippines, it is known to have healing effects for dengue fever and oral herpes but no evidence to support such claims

Biological Functions:

1. Anti-snake venom

Metabolite: pyrogallol

2. Anti-inflammatory

Metabolite: fractionated aqueous extract

3. Bactericidal

Metabolites: caffeic acid and epicatechin 3-gallate; methanolic extract

4. Wound healing

Metabolites: triterpenes

5. Anti-cancer

Metabolites: triterpenes

6. Antioxidant

Metabolites: hirtionosides A-C, 3-hydroxyoctanoic acid glucosides and a phenylpropanoid glucoside; phenolic compounds

7. Molluscicidal

Metabolites: latex compounds

8. Antidiabetic

Metabolites: found in ethanolic and petroleum ether extracts

9. Anti-allergy

Metabolites: found in ethanolic extract

10. Antiplasmodial

Metabolite: terpenes, steroids, coumarins, flavonoids, phenolic acids, lignans, xanthenes and anthraquinones.

11. Anti-diarrhea

Metabolite: Quercitrin

Histopathological adverse effects:

➤ Dose dependent renal and hepatic tissue injury

CONCLUSION

Euphorbia hirta L. is a promising herb with potential healing properties. The various chemical components in the latex of this plant deserve thorough studies for further isolation of novel compounds. The discovery of its healing wonders for various ailments that have no known cure like cancer and other emerging and re-emerging infections is therefore warranted. Its probable antiviral properties for dengue virus, herpes, HIV among others should be investigated as well. Further studies on its histopathological adverse effects and cytotoxicity are also warranted.

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