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 molluscidal 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

**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.

**Biological compounds:**

- scopoletin, scoparone, isoscopoletin, quercetin, isorhamnetin, pinocembrin, kaempferol, luteolin, gallic acid, and butanol rhamnosides.\(^1\)
- Afzelin (I), quercitrin (II), and myricitrin (III)\(^2-3\)
- rutin (IV), quercitin (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.\(^4-5\)
- β-amyrin, 24-methylene-cycloartenol, β-sitosterol, heptacosane, n-nonacosane, shikimic acid, tinyatoxin, choline, camphol, and quercitol derivatives containing rhamnose and chlorphenolic acid\(^6-8\)

**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,

*Figure 1: Euphorbia hirta* L.
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; Kinaray-a: tawa-tawa; Tamil: amampatchaiarisi; Telugu: reddivarinanabalu, reddinanbanbrolu, bidarie; Urdu: laldodhak(2,6)

**Distribution:**
Philippines, India, Australia, Hong Kong, Southern China, Central America, Africa, South Africa(2,6)

**Description:**
Annual herb(2,6)

**Length:** 40-60 cm long(2,6)

**Stem:** solid hairy stem, reddish, or purplish in color, with stipules, erect, or prostrate(2,6)

**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.(2,6)

**Flowers:** unisexual and found in axillary cymes at each leaf node, lack petals and are generally on a stalk(2,6)

**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. (2,6)

**Taproot:** white or brown (2,6)

**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(9)
   Metabolite: pyrogallol
2. Anti-inflammatory(10)
   Metabolite: fractionated aqueous extract
3. Bactericidal(11-12)
   Metabolites: caffeic acid and epicatechin 3-gallate; methanolic extract
4. Wound healing(13)
   Metabolites: triterpenes
5. Anti-cancer(13)
   Metabolites: triterpenes
6. Antioxidant(14-15)
   Metabolites: hirtionosides A-C, 3-hydroxyoctanoic acid glucosides and a phenylpropanoid glucoside; phenolic compounds
7. Molluscidial(16)
   Metabolites: latex compounds
8. Antidiabetic(17)
   Metabolites: found in ethanolic and petroleum ether extracts
9. Anti-allergy(18)
   Metabolites: found in ethanolic extract
10. Antiplasmodial(19)
    Metabolites: terpenes, steroids, coumarins, flavonoids, phenolic acids, lignans, xanthones and anthraquinones.
11. Anti-diarrhea(20)
    Metabolite: Quercitrin

**Histopathological adverse effects:**
➢ Dose dependent renal and hepatic tissue injury(21)

**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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