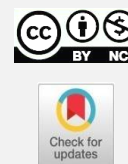




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REVIEW ARTICLE

A REVIEW ON MEDICINAL USES OF DIFFERENT PLANTS OF EUPHORBACEAE FAMILY

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Abstract

Euphorbiaceae is an important family which contains numerous medicinal plants. Most of the people in developing countries still today, relies on traditional medicine based largely on species of plants in human being and animals for their primary healthcare. The family Euphorbiaceae is one of the largest family of flowering plants comprising of plants with over 300 genera and 8,000 species. *Acalypha indica* L, *Euphorbia hirta* L, *Euphorbia thymifolia* L, *Croton bonplandianum*baill, *Jatropha gossypifolia* L, *Ricinus communis* L are important plants of this family because these plants have different compounds like alkaloids, flavonoids, steroids, saponin, phenolic compounds, fatty acid, esters, minerals etc that have showed different activities in human being and animal. This study provides important data for identification of different plants in Euphorbiaceae family. Species of Euphorbiaceae are extensively used as remedies against several diseases and complaints such as cancer, diabetes, diarrhoea, heart diseases, hemorrhages, hepatitis, jaundice, malaria, ophthalmic diseases, rheumatism and scabies etc.

Keywords: Activity, Euphorbiaceae, medicinal plants, uses.

INTRODUCTION

Plants for human healthcare still remain the most widely used medication system in developing and least developed nation. Population rise, insufficient supply of drugs, unaffordable cost of treatments, side effects of several allopathic drugs and development of resistance to currently used drugs for diseases have led to increased emphasis on the use of plant materials as a source of medicines for wide variety of human ailments¹. Different types of plants used to treat various types of diseases that reveals the most up to date findings in understanding of biological significance of their bioactive compounds used². Recently, dramatic changes have taken place in the health care system of world population through the development of science, technology and medical science but till to day 400 crores of people of the world are totally dependent on herbal medicines. Despite all the progress in synthetic chemistry and biotechnology, plants are still in an indispensable source of medicinal preparations both preventive and curative. WHO consultative body of medicinal plants has formulated a definition of

medicinal plants in the following way, "a medicinal plant is any plant which in one or more of its organ, contains substances that can be used for therapeutic purposes or which is a precursor for synthesis of useful drugs"². Medicinal plants, also called medicinal herbs, include a various types of plants used in herbalism and some of these plants have a medicinal activities. These medicinal plants are considered as a rich resources of ingredients which can be used in drug development and synthesis³. Besides that these plants play a critical role in the development of human cultures around the whole world⁴. The uses of plants in the indigenous cultures particularly of developing countries, are numerous and diverse, forming an important socio-economic base⁵. Phytochemistry is the study of photochemical produced in plants, describing the isolation, purification, identification, and structure of the large number of secondary metabolic compounds found in plants⁶. The Euphorbiaceae, the spurge family, is a large family of flowering plants. In common English, they are sometimes called euphorbias, which is also the name of a genus in the family. The Euphorbiaceae are mostly monoecious herbs, shrubs,

and trees, sometimes succulent and cactus-like, comprising one of the largest families of plants with about 300 genera and 7,500 species⁷.

The main aim of this review study was to investigate the secret behind the medicinal uses of the plants of Euphorbiaceae family, to find out other medicinal uses which could be present in the plant to establish a scientific data on its medicinal value. Therefore, taking into consideration the traditional uses of the plant and facilities available for conducting the study, this research work was performed on the Euphorbiaceae plants family. The principle aim of the present study was to investigate the scientific basis of the traditional uses of the plants. Euphorbiaceae family of plants was studied for other medicinal uses possible and to find out the chemical groups present in the active plant parts to get preliminary idea about the active constituents.

The Euphorbiaceae has 65 genera and 577 species accepted taxa overall. But *Acalypha indica* L, *Euphorbia hirta* L, *Euphorbia thymifolia* L, *Croton bonplandianum* baill, *Jatropha gossypifolia* L, *Ricinus communis* L are important of this family because these plants shown different activity for different diseases. Plants have remarkable medicinal and traditional uses.

ACALYPHA INDICA L.

The total description and the medicinal uses of the plants of the Apocynaceae family are given below:

- **Botanical Name:** *A. indica* .
- **Binomial Name:** *Acalypha indica* L
- **Local Name:** Muktajhuri.
- **Family:** Euphorbiaceae.

Habit: Small herb, rarely sub-shrub.

Habitat: Waste, moist and shady places and river banks

Flower color: Olive green.

Flowering season: December-April.



Figure 1: *Acalypha indica* L.

Parts utilized

Leaves, stem, flowers, roots and seeds

Medicinal uses

- Plants are emetic, expectorant, laxative and diuretic; useful in bronchitis, pneumonia, asthma and pulmonary tuberculosis. Leaves are laxative and antiparasitic; ground with common salt or quicklime or lime juice applied externally in scabies⁸.

- Leaf paste with lime juice prescribed for ringworm. Leaf juice is emetic for children.
- Powder of the dry leaves is given to children to expel worms; also given in the form of decoction with little garlic.
- In homeopathy, the plant is used in severe cough associated with bleeding from lungs, haemoptysis and incipient phthisis.
- The plant is expectorant, diuretic, emetic and laxative. Fresh leaf juice is useful in arthritis and scabies. Dry leaf powder is used in bed sores.

EUPHORBIA HIRTA L.

- **Botanical Name:** *E. hirta* L.
- **Binomial Name:** *Euphorbia hirta* L.
- **Local Name:** Dudhia.
- **Family:** Euphorbiaceae.

Habit: Shrub.

Habitat: Gardens where it is cultivated as an ornamental plant.

Flower colour: Red.

Flowering season: December-February.



Figure 2: *Euphorbia hirta* L.

Parts utilized

Leaves, stem and roots and flower

Medicinal uses

- The plant is astringent and haemostatic; as poultice applied to abscesses, inflamed glands, ulcers, oedema and phlegmon and also used in affections of childhood, in worms, bowel complaints and cough⁹.
- The juice is considered tonic, narcotic, antiasthmatic and febrifuge; effective against dysentery, diarrhoea and colic; especially in amoebiasis. Decoction is useful in asthma and chronic bronchial affections.
- The extract of this plant has sedative effect on the mucous membrane of the respiratory and genito-urinary tract and on cardiovascular system.
- The plant has as an analgesic to treat severe headache, toothache, rheumatism, colic, and pains during pregnancy.

EUPHORBIA THYMIFOLIA L.

- **Binomial Name :** *Euphorbia thymifolia* L.
- **Local Name:** Dudhiya.
- **Family:** Euphorbiaceae.

Habit: Herb.

Habitat: Open sunny places.

Flower color: Reddish-purple.

Flowering season: April-August.



Figure 3: *Euphorbia thymifolia* L.

Parts utilized

Leaves, roots, flowers and whole plant.

Medicinal Uses

- The fresh plant is used in ophthalmia and other eye troubles, ardor, sores, atrophy, dysentery and breast pain.
- It is an effective drug for bronchial asthma.
- Juice of the plant is used for ringworm, diarrhea and dysentery; mixed with fresh goat milk is given to cure blood dysentery.
- Leaves and seeds are astringent, stimulant, anthelmintic and laxative; given to children in bowel complaints. Root is used in amenorrhea.
- *Euphorbia thymifolia* L is widely used in decoction or infusion against dysentery, enteritis, diarrhoea and venereal diseases. The dried leaves are used as a stimulant, astringent, antihelmintic and laxative.

CROTON BONPLANDIANUMBAILL

- **Botanical Name :** *C. bonplandianumbail.*
- **Binomial Name :** *Croton bonplandianumbail.*
- **Local Name :** Bondhone.
- **Family:** Euphorbiaceae.



Figure 4: *Croton bonplandianumbail*

Habit: herb.

Habitat: Dry and sandy exposed areas.

Flower color: White.

Flowering season: April-September

Parts utilized:

Leaves, fruits and flowers.

Medicinal uses

- The plant is used as antiseptic.

- The leaves, stems and seeds contain alkaloid.
- The paste of root with decoction of stem bark of *Terminalia arjuna* (3:2) used to treat cholera¹¹.
- The plant *Croton bonplandianum* (Euphorbiaceae) is treat liver disorders, skin diseases including ring worm infection, to cure the swelling of body, bronchitis and asthma.

JATROPHA GOSSYPIFOLIA L.

- **Botanical Name :** *J. gossypifolia* L
- **Binomial Name :** *Jatropha gossypifolia* L
- **Local Name :** Lal bherenda.
- **Family:** Euphorbiaceae.

Habit: Shrub.

Habitat: Open sunny places.

Flower colour: Reddish-purple.

Flowering season: April-August.

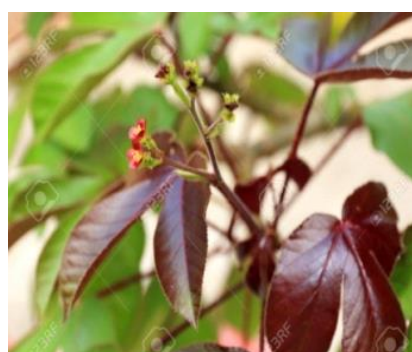


Figure 5: *Jatropha gossypifolia* L.

Parts utilized

Leaves, flowers and root

Medicinal uses

- The leaves are used on boils and carbuncles, eczema and itches¹².
- The Seeds cause insanity and act as an emetic.
- It is also grown as an ornamental plant. The leaves and the seeds are used as purgative.
- The stem-juice in nostrils to cure headache
- The leaves and bark have the same purgative effect.
- The oil is applied to treat rheumatic conditions and a variety of skin infections, although its use on the skin may also cause an irritative rash.
- The sap has a widespread reputation for healing wounds, as a haemostatic and for curing
- Skin problems; it is applied externally to treat infected wounds, ulcers, cuts, abrasions, ringworm, eczema, dermatomycosis, scabies and venereal diseases.

RICINUS COMMUNIS L.

- **Botanical Name :** *R. comanis* L.
- **Binomial Name:** *Ricinus communis* L.
- **Local Name :** Bherenda.
- **Family:** Euphorbiaceae.

Habit: Small tree.

Habitat: Dry and sandy expose areas.

Flower color: Red.

Flowering season: April-September.

Parts Utilized: Whole plants, leaves, flowers, fruits and seeds.

Medicinal uses

- Seed oil is a strong purgative; used externally as a massage for rheumatic pains, joint pain, paralysis and internally for the treatment of constipation¹³.



Figure 6: *Ricinus communis L.*

Table 1: Plants chemical components and activities

Plants Name	Parts Used	Chemical components	Shows activity against diseases
<i>Acalypha indica L</i>	Leaves, stem, flowers, roots and seeds.	Alkaloids, catechols, phenolic compounds, flavinoids, saponin, steroids and tannin.	Analgesic, anti-inflammatory activity, antiulcer activity, anti oxidant capacity, antidiabetic activity, post-coital anti-fertility activity, antimicrobial activity, antibacterial, phytochemical activity ⁷ .
<i>Euphorbia hirta L</i>	Leaves, stem and roots and flower.	Quercitrin, myricitrin, quercetin, leucocyanidin, quercitol, friedelin, kaempferol, maleic acid, tartaric acid, rutin, α-amyrin.	Antidiarrheal activity, anti-inflammatory activity, anti-malarial, anti-tumor activity, hypertensive, hepatoprotective, antioxidant, anti-microbial, hypoglycemic, antimutagenic activities, antifungal, antibacterial activities, cytotoxicity, immune regulatory activity protein inhibition against cancer cell, antifungal, photosynthetic activity, healing wound, platelet aggregation, anti hyperglycemic activity as herbicide, fungicide, antiulcer activity, antibiotic in medicines, anticancer, antiparasitic, antiallergenic activity, antispasmodic activity ⁸ .
<i>Euphorbia thymifolia L</i>	Leaves, roots, flowers and whole plant.	Quercetin galactoside, β-amyrin, β-sitosterol, cholesterol, kaempferol, salicylic acidesters, n-alkanes, sterol, glycoside, Taraxerol, sterols, Crudeprotein, fatandfiber, total carbohydrate, starch, amylase, amylopectin, cellulose, acid insoluble and soluble ash, Macro-minerals viz, Na, K, Ca, Li and micro-minerals viz, Fe, Cu, Mn and Co.	Anti-inflammatory and proven to encourage healthy cell growth and function, analgesic, haemostatic, anti-thrombic, antioxidant, vasoprotective actions, antiviral, anti-allergic, anti-tumour properties, antioxidant, anti-helminthic, antibacterial activities, antidiabetic, anti hyperlipidemic activity, antibacterial, antifungal, antimicrobial, anti-anxiety activity, anti-nociceptive activities ⁹ .
<i>Croton bonplandia-num baill</i>	Leaves, fruits and flowers.	1-Dodecene, 1-Dodecanol, 1-Tetradecene, 2, 4-bis (1, 1 dimethylethyl)-phenol Methyl stearate, n-Tetracosanol-1, triterpene e.g. squalene(2,6,10,15,19,23hexamethyltetracosane 2,6,10,14,18,22-hexaene),linoleate e.g.octadeca-9,12-dienoic acidoxo (keto), fatty acid esters e.g. methyl 12 oxooctadec-9-enoate, cardenolides, diterpene e.g. phytol, alkaloids, terpenoids, flavonoids, tannins,steroids.	Wound healing activity, anti-tuberculosis activity, anti-fungal activity, antioxidant, anti-inflammatory activity, antibacterial, anti-tubercular, cytotoxic activities, cancer preventive, immune stimulant, chemo preventive, lipoxygenase-inhibitor, pesticide, hypocholesterolemic, nematocidal, anti-arthritis, hepatoprotective, anti androgenic, hypocholesterolemic 5-alpha reductase inhibitor, antihistaminic, anti coronary, insectifuge, anti-eczemic, anti-acne ¹⁰ .
<i>Jatropha gossypifolia L</i>	Leaves, flowers and root.	Coumarin, lignoids, diterpenes, flavonoids, fatty acid, lignans, saponin, phenol, glycoside, esters.	Anti-inflammatory activity, antimicrobial activity, antibacterial activities, anti-diarrhoeal activity, antifungal activity, phytochemical activity, allelopathic activity, antioxidant activity, analgesic activity.
<i>Ricinus communis L</i>	Wholeplants,leaves,flowers,fruits and seeds.	Palmitic, Stearic, Oleic C _{18:1n9} , Oleic C _{18:1n10} , Linoleic,Ricinoleic,Dihydroxy stearic acid,Unsaturated fatty acid (UFA), Saturated fatty acid (SFA).	Mutagenicity, cytotoxic and antioxidant activities, anti fertility, antibacterial activity, antimicrobial activity, analgesic activity, catalytic activity, larvicidal activity, insecticidal activities, antifungal activities ¹¹ .

CONCLUSIONS

The review given here is to be used for identification of the medicinal and economical plants commercially. Active principles isolated from different plants can be utilized as leads for further drug development by the pharmaceutical industry. This study provides important data for identification of different plants in Euphorbiaceae family. This review will be beneficial for many researchers for their work on plants of Euphorbiaceae family.

AUTHOR'S CONTRIBUTION

Islam MS: writing original draft, methodology. **Ara H:** investigation, formal analysis, conceptualization. **Ahkad K:** writing, review and editing. **Uddin MM:** methodology, formal analysis, conceptualization.

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CONFLICT OF INTEREST

Authors have declared that no conflict of interest is linked with this work.

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