

Aspect of *Euphorbia Hirta* in the Intendance of Obesity: A Review

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Abstract:- Herbal plants have been used for their medicinal properties from ancient times. India is home over worldwide for its herbs and spices along with that the ayurvedic treatment of any disease with natural herbs. *Euphorbia hirta* is frequently used conventionally for disorder related to female, lung disorder (asthma, wheezing, inflammation of bronchial tubes), worm invasions in children, dysentery, jaundice, pimples, gonorrhoea, gastrointestinal difficulty, and tumors. *E. hirta* accommodates polyphenols, triterpene, alkanes, tannins, flavanoids. This review outlines the therapeutic properties, chemical constituents, and other important aspects of *Euphorbia hirta* in the management of obesity.

Keywords:- *Euphorbia hirta*., Medicinal properties, traditionally, management.

I. INTRODUCTION

Plants have been used for their medicinal properties from ancient times, herbal plants vital role in treatment of many diseases and ailments. Many plants have been researched for their valuable medicinal effects. Medicinal plants are used for the treatment of various diseases because herbs are safe and not have any side effect like synthetic agents and products. Herbs contain a huge variety of secondary metabolites like flavonoids, tannins, alkaloids, terpenoids, which are responsible for the therapeutic potency. Researchers have shown that bioactive compounds are always present in different concentrations in different plants. The greater the concentration of the important phytochemical in medicinal plants, the higher therapeutic potency or therapeutic importance of the plants.^[1]

Obesity is defined as persistent disorder characterized by unrestricted accumulation of fat in adipose tissue in the body^[2]. Obesity is induced by due to variance between energy intake and energy disbursement^[3]. Obesity may lead to other risk factors such as: cardiovascular diseases, insulin resistance, type-2 diabetes, cancer, osteoarthritis, hepatomegaly (liver enlargement) and obstructive sleep apnea^[4]. Obesity may develop due to dysfunction of lipid and carbohydrate metabolism^[5]. Other factors such as age, gender, environment and genetic factors may also contribute in obesity. Obesity can be deliberate by body mass index (BMI)^[6]. A person is said to be obese when BMI is 30 or more.

II. MEDICINAL PLANTS USED AS ANTI-OBESITY AGENTS

A. *Achyranthes aspera*

It belongs to family amaranthaceae. It is commonly known as devil's horse whip, chaff-flower. Plant is used as astringent, purgative, diuretic and antiasthmatic^[7]. It shows antiobesity activity by decreasing total cholesterol, triglycerides, cholesterol-LDL and by increasing cholesterol-HDL level in High-fat diet induced obesity in male Swiss albino mice^[8].

B. *Argyrea nervosa*

It is a woody climber belonging to family Convolvulaceae, which is distributed throughout India. *A. nervosa* contains flavonoids such as quercetin and kaempferol which shows antiobesity action by lowering total triglyceride, LDL, total cholesterol and leptin in serum in diet induced obesity rats^[9].

C. *Boerhaavia diffusa*

It is the plant of Nyctaginaceae family commonly known as Punarnava. *B. diffusa* has been reported for antidiabetic, antibacterial, hepatoprotective, analgesic activity^[10]. It contains sitosterol which shows antiobesity activity by reducing cholesterol and LDL levels in High fat diet induced obesity in Sprague-Dawley female rats^[11].

D. *Gymnema sylvestre*

It is commonly known as Gurmar, belonging to family apocynaceae. It is reported for anti-diabetic, antiviral, anti-inflammatory and antiobesity activity. It shows antiobesity activity by reducing serum lipids, insulin, leptin, glucose, LDH and apolipoprotein B-100 (apoB) levels when it increases the apolipoprotein A1, cholesterol-HDL and level of antioxidant enzymes in High fat diet-induced obesity in wistar rats^[12].

E. *Hibiscus cannabinus*

It is an annual shrub belonging to family malvaceae. It is domestic to east India and Africa. *H. cannabinus* has been reported for antiviral, anticancer, antidiabetic and antioxidant activity. It reduces serum triglycerides, cholesterol, SGPT, -100, SGOT and LDL-cholesterol levels in High fat diet induced obesity in albino female rats^[13].

F. *Morinda citrifolia*

It is commonly known as great morinda, noni beach mulberry and cheese fruit in India belonging to family rubiaceae. It contains flavonoids which are responsible for antiobesity activity^[14]. It decreases fat mass and body weight. It reduces plasma glycerides and increase glucose

tolerance level in cholesterol diet-induced obesity in mice^[15].

G. *Zingiber officinale*

The common name is as ginger and it belongs to family zingiberaceae. It has been reported for antibacterial, antifungal, antitussive, antipyretic and analgesic activity^[16]. Ginger is also reported for its beneficial antiobesity activity.

H. *Holoptelea integrifolia*

this plant have been reported including anti-inflammatory, anthelmintic, antibacterial, anti-diarrheal, antitumor, adaptogenic, antidiabetic and antioxidant activity and wound healing potential this plant have been reported including anti-inflammatory, anthelmintic, antibacterial, anti-diarrheal, antitumor, adaptogenic, antidiabetic and antioxidant activity and wound healing potential.

Holoptelea integrifolia is a plant of ulmaceae. It has been potent as antibacterial, antidiabetic, anti-inflammatory and anti-oxidant activity. It shows anti-obesity action by reducing cholesterol biosynthesis and HMG-CoA reductase activity and increase in cholesteroacyltransferase activity in diet induced obese rats^[17].

III. REVIEW OF EUPHORBIA HIRTA

A. Introduction

Euphorbia hirta is yearly small herb belongs to Euphorbiaceae, commonly found in hotter areas of India and other countries. It is commonly used for therapeutic action towards of the many diseases like inflammation, heartburn, ulcer, diarrhea, asthma, bronchitis, fungal infections, cold, cough and vomiting [18] [19]. *E. hirta* contains phytoconstituents like flavonoids, tannin, polyphenols, alkaloids, sterols, triterpenoids and glycosides which are chargeable for medicinal or pharmacological action. [20] [21]

B. Scientific Classification

The scientific classification of *Euphorbia hirta* is as following:

- Kingdom: Plantae
- Phylum: Magnoliophyta
- Class: Angiospermae
- Order: Malpighiales
- Family: Euphorbiaceae
- Genus: Euphorbia
- Species: hirta

C. Description:

- **Botanical name:** *Euphorbia hirta* L.
- **Family:** Euphorbiaceae
- **Parts used:** Leaves, stem, flowers
- **English name:** Snake weed
- **Vernacular names:** Dudhi, dudhani

D. Distribution

It is native to India but it is most commonly available in hotter areas of India, Australia and Bangladesh. Generally, found in dump area, waysides, pathways and grasslands in whole over the world.^{[20][22][23]}

E. Morphology

Euphorbia hirta is a straight annual herb which is usually 15-50 cm in length. Stems slender which are reddish or purplish in color and covered with bristly hairs of yellow color. It has spread from root to top but sometimes it can also be seen recline down. Leaves are elliptic-oval to oval-oblongate, opposite, around 1-2.5 cm long, dark green colour, pallid subordinate, blemish with purple in the middle, and notched at the edge. Fruits are hairy, three-celled, keeled capsules, yellow, around 1-2 mm in diameter, containing three brown, four-sided, angular, crinkled seeds.^{[24][25]}



Fig. 1: *Euphorbia hirta* (whole plant)

F. Chemical Constituents:

It contains flavonoids, terpenoids, essential oil, essential oil, phenols and other compounds.

- **Flavonoids:** Quercetin, quercitrin and derivatives containing rhamnose, rutin, leucocyanidin, leucocyanidol, myricitrin, camphol.
- **Tannins:** Dimeric hydrolysable dehydro ellagic tannins, euphorbins A, B, C, E and terchebin, esters 5-O-caffeoyl quinic acid (neo chlorogenic acid), 3,4-di-o-galloyl quinic acid and benzyl gallate.
- **Terpenoids:** Triterpenoids, α -amyrin, β -amyrin, teraxerol, and its esters-taraxerone, 11 α , 12 α -oxidoteraxerol, euphorbol hexacosonate. Other isolated terpenoids are sterols, including β -sitosterol, campesterol and stigmasterol.
- **Acids:** Tannins, Ellagic, gallic, maleic and tartaric acids.
- **Essential oil:** Hexaecanal, phytol and n-hexadecanoic acid. Minor constituents include tetradecane, phthalic acid, oleic acid and butyl tetradecyl ester.
- **Other compounds:** Alkaloids, saponins, minerals and amino acid.^[26]

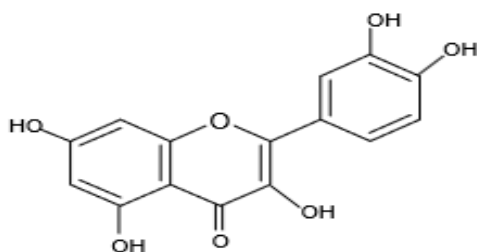
IV. ROLE OF PHYTOCONSTITUENTS IN OBESITY

The various chemical constituents that have been found in *E. hirta* and seems to possess anti-obesity properties are flavonoids, alkaloids, terpenoids, phenols, phytosterols. A phytomolecule can exert its anti-obesity action by several approaches. Some possible mechanisms of action of certain phytomolecules include:^[27]

- Preventing fat cell differentiation
- Enhancing lipid metabolism
- Inhibiting pancreatic lipase activity
- Decreasing appetite

A. Quercetin mechanism in obesity

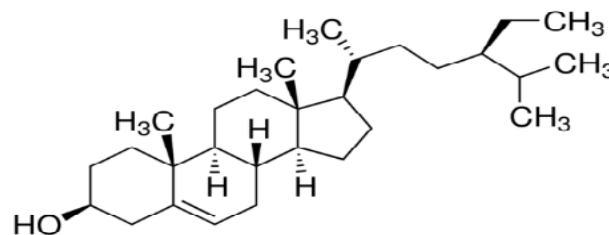
Quercetin is a plant pigment from flavonoid group of polyphenols. Quercetin shows its action in obesity by Activating signal pathway (AMPK) in preadipocyte i.e. fat cell precursors as a result reduce adipogenesis inside the body.^[28]



Quercetin

B. Role of β -Sitosterol in obesity

β -Sitosterol is a phytosterol which have similar chemical structure to cholesterol. It has been used to lower cholesterol levels and shows its action in obesity by Decreases absorption of lipids by lowering the level of low-density lipoprotein-cholesterol (LDL) and inhibits pancreatic lipase enzyme.^{[29][30]}



Beta-Sitosterol

V. TRADITIONAL USES

Euphorbia hirta is traditionally used for:

- **Respiratory disorders** like bronchitis, asthma, hay fever, cold and cough.
- **Gastrointestinal disorders** like dysentery, bowel problems, digestive problems, diarrhea.
- **Skin and mucus membrane problems** like scabies, aphtha, thrush, guinea worm.
- **Genital problems** like gonorrhea, metrorrhagia, urethritis.
- **Urinary problems** like kidney stones, diuretic.^[26]

VI. PHARMACOLOGICAL ACTIVITIES

A. Antibacterial activity

Ethanol extract of *E. hirta* inhibited the growth of *Staphylococcus aureus*, *Bacillus subtilis*, *Pseudomonas aeruginosa* and *Escherichia coli*. While chloroform and aqueous extracts of leaf shows potent antibacterial activity opposed to *Klebsiella pneumoniae*.^{[31][32]}

B. Anti-inflammatory activity

E. hirta n-hexane extract showed anti-inflammatory activity in phorbol acetate-induced ear inflammation in mice. The effects revealed that are depend on dose.^{[33][34]}

C. Antimalarial activity

The methanolic extract of aerial parts of *E. hirta* observed against *P. falciparum* parasites, 90% inhibition of parasite that is *P. falciparum* was observed at a concentration of 5 μ g/ml.^[35]

D. Anti-asthmatic activity

hirta have an anti-asthmatic property because it relaxes bronchial tubes during the contraction and it also depress the respiration.^[36]

E. Galactogenic activity

Powder form of plant showed galactogenic activity when it given before puberty period to female guinea pigs it induced various secretions and increase the development of mammary glands.^[37]

F. Antioxidant activity

An antioxidant effect was showed in aqueous extract of plant and a free radical scavenging activity in various in vitro models (outside). It showed maximum antioxidants and free radical scavenging activities, at 0.25 mg/ml. The free radical scavenging effect on DPPH that is 2,2-diphenyl-1-picrylhydrazyl and hydroxyl was found as 68.80 ± 5.21 and $73.36 \pm 5.21\%$, respectively. This results showed that plant have strong antioxidant potential.^[38]

G. Antidiarrheal activity

The decoction of plant was studied for antidiarrheal effect in mice. It showed antidiarrheal activity in various screening models like castor oil, arachidonic acid, and prostaglandin E2 induced diarrhea. Quercitrin showed antidiarrheal effect at a given dose that is 50 mg/kg, against prostaglandin E2 and castor oil induced -diarrhea in mice (Quercitrin is a glycoside which is isolated from *E. hirta*).^[39]

H. Antifertility activity

Antifertility activity of *E. hirta* showed in which it reduced the sperm motility and density of cauda epididymal and testis sperm suspension and leading to 100% infertility.^[40]

I. Antifungal activity

An antifungal activity against plant pathogens *Botryodiplodia theobromae*, *Colletotrichum capsici*, *Fusarium pallidoroseum*, *Phomopsis caricae-papayae*, and *Aspergillus niger* is reported by paper disc diffusion technique.^[41]

J. Antiamoebic activity

The polyphenolic extract of *E. hirta* inhibited the growth of parasite *Entamoeba histolytica* with a minimum active concentration (less than 10 µg/ml).^[42]

VII. DISCUSSION

Euphorbia hirta is a very common herbal plant and it is used in the treatment of many disorders such as gastrointestinal discomfort, respiratory diseases, skin diseases etc. It contains various phytoconstituents which are mainly responsible for therapeutic action. The sight of the present study investigation was executed to collate the anti-obesity action of *Euphorbia hirta*. This study also includes the traditional as well as pharmacological uses of *Euphorbia hirta* with scientific evidences.

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