

**A REVIEW ON TAGETES ERECTA: MEDICINAL HERB****Sheela S. Thorat* and Aishwarya R. Thoke**

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ABSTRACT

Medicinal plants and synthetic medicines are widely used in traditional culture. The *Tagetes erecta* plant belonging to family Asteraceae. the common name of this plant is Genduphul. the *Tagetes erecta* plant commonly found in America and Bagladesh. the main chemical constituent present in plant are thiophene, flavanoids, carotenoids, triterpenoids The plant shows different pharmacological activities such as antibacterial, antioxidant, antihyperlipidemic and antidiabetic, anticancer, hepatoprotective, anti-inflammatory.

KEYWORDS: *Tagetes erecta*, Flavanoids, triterpenoids, Antioxidant.

INTRODUCTION

Medicinal plants and synthetic medicines are widely used in traditional culture.^[1] In last few years there is exponential growth in the use of

medicinal plants as compare to synthetic medicines. It produces fewer side effects than synthetic medicines. The 80% of world population use the herbal medicine as a drug.^[2]

The *Tagetes erecta* plant belonging to family Asteraceae and common name of the plant is Genduphul. These are also known as African Marigold.^[3] The *Tagetes erecta* plant consist of main chemical constituent such as flavanoids, tannin, caratenoids, Lutein is oxycarotenoid. also presence of essential oil which is obtained from leaves and flowers of plant.^[4]

Plant Description

Plant name –*Tagetes erecta*

Synonym-Aztec Marigold

Family-Asteraceae

Common name –Genduphul

Types of Species

Tagetes erecta
Tagetes lucida
Tagetes minuta
Tagetes patula
Tagetes tenuifolia.

Vernacular name

Hindi-Genda
English-Marigold
Bengali-Gaenda
Telgu- Bantichettu
Marathi-Jhenduphul
Gujarati-Guljaro
Sanskrit-Sthlapushpa.

Scientific classification

Kingdom-Plantae
Unranked- Angiosperm
Unranked- Eudicots
Order- Asterales
Family-Asteraceae
Genus- Tagetes.



FigureNo.1 The Plant of Tagetes erecta.

Geographical Indication

The *Tagetes erecta* plant found in Mexico, Africa and other warmer parts of America and also found in India and Bangladesh.

Macroscopical characters

Tagetes is a genus containing 50 species of annual and perennial plant. It is a garden plant which is coarse and erect, branched. It has different varieties short and dwarf. The leaves are deeply incised and sharply toothed. Flower heads are solitary, long stalked and thickening upward. The flowers are bright yellow and orange in colour.

Microscopical characters

The transverse section of leaf shows dorsiventral in nature. There are two main regions, the midrib and lamina. In the region of midrib, Xylem and Phloem. at the lower portion, collenchyma cells are arranged and above that loosely packed parenchyma cells were observed. In the lamina regions the presence of upper and lower epidermis, spongy mesophyll regions which consist of palisade cells and few crystals of calcium oxalate.

Physiochemical Evaluation

The parameter was done to evaluate percentage of total ash, water soluble, and acid insoluble ash was calculated as per Indian pharmacopoeia.

Chemical constituent

The plant consists of various chemical constituents such as thiophene, flavanoids, carotenoids, triterpenoids. It consists of quercetin, methyl-3,5-dihydroxy-4-methoxy biotin, thienyl ethyl gallate. Lutein is an oxycarotenoid containing a C-40 nucleus, the roots of plant containing sterols, glycosides, gums, mucilage, the essential oil hydro distilled from leaves and flowers of plant such as limonene, piperitone, caryophyllene. These also contain tagetone, trans ocimene, cis ocimene, menthol, geraniol, terpenes. The kaempferol is present in stems of *T. erecta*. The flowers consist of Kaempferol, Betasitosterol and Docosterol.

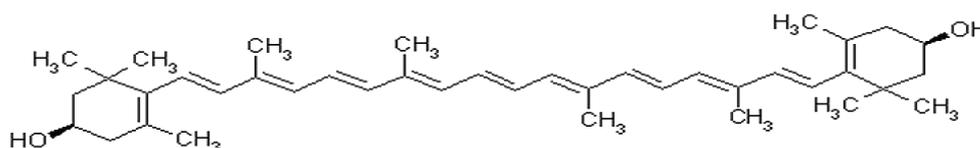


Figure No. 2 Structure of Lutein.

Uses

The leaves are used against piles, kidney troubles, ulcer wounds, earache, muscular pain, also used in external application such as boils and carbuncles, antimalarial, antioxidant, antimycotic, analgesic.

The flowers are used in fever, epileptic fits, astringent, carminative, stomachic, scabies, liver complaints, disease of eyes, purify blood, in bleeding of piles rheumatism, cold, bronchitis, vermifuge, diuretic, larvicidal, anthelmintic, stimulant, it also used as antibacterial, antimicrobial, hepatoprotective, mosquitocidal, insecticidal, analgesic, wound healing.

The essential oil are used as nematocidal and larvicidal anti-inflammatory, antiseptic and astringent. The thiophene is main active constituent responsible for nematocidal activity.

Pharmacological activity**Antimicrobial activity**

Kiranmai M. et al. were studied to investigate the antimicrobial effect of different extract of leaves and flowers of *Tagetes erecta*. The antimicrobial activity was evaluated by agar diffusion method by using gram positive *B. cereus*, *S. aureus*. This study shows that the pet ether extract of leaves and ethyl acetate extract of flowers of *Tagetes erecta* inhibit the growth of bacteria.

Hepatoprotective activity

Kumar G. et al. were studied the hepatoprotective activity of ethanolic extract of leaves of *Tagetes erecta* by carbon tetrachloride induced hepatoprotective model. The ethanolic extract of *T. erecta* leaves shows increase in serum ALT, AST bilirubin level. The wistar albino rats was used for activity.

Anticancer activity

Zhang Yu et al. were studied the anticancer activity of two flavanoids in leaf and stems of *T. erecta* are 4-methoxy eupatolitin-3-beta D glucoside and kaemferol the flavanoid 1 and flavanoid 2 are acts on two different cells by MTT assay, which was used for determination of inhibition rate of cells. The 5-flourouracil was used as standard drugs.

Antibacterial activity

Das B. et al. were studied antibacterial analysis of combination of leaves of plants. The methanolic extract of leaves and flowers of *Tagetes erecta* and *Cannabis sativa* against

bacterial strains of skin, mouth, microflora and E-coli bacteria for urinary tract infection by disc diffusion method. The two standard drugs were used such as chloramphenicol and tetracycline. This study was revealed maximum growth of inhibition against combination of drugs.

Antimicrobial activity

Padalia H.et.al were studied antimicrobial activity of different solvent such as hexane, toluene, ethyl acetate, acetone, methanol extract of flowers *T. erecta* by agar diffusion method, against pathogenic organism. The minimum inhibitory concentration and minimum bacterial concentration of acetone extract, the *B. cereus*, and *K.pneumonia* were most sensitive organism to acetone extract and minimum inhibitory concentration was 78 microgram/ml. the synergistic effect of acetone extract and antibiotic chloramphenicol and ceftizidime against pathogenic bacteria was investigated. The best synergistic effect produced against *B.subtilis*,*P. aeruginosa* with FIC indices 0.312 and 0.093 respectively.

Hepatoprotective activity

Karwani G.et.al were studied hepatoprotective activity on methanolic extract of roots of *T.erecta* by ethanol induced hepatoprotective model. The degree of protection was measured by using biochemical parameter like serum transaminase, alkaline phosphatase, total protein, total cholesterol, and bilirubin. The phenolic compound was responsible for hepatoprotective activity.

Cytotoxic activity

Niralikumar A.et.al were studied the cytotoxic activity on flowers of *T.erecta* and rhizomes of *curcuma longa*. Invitro cytotoxic activity of water and methanolic extract of *T. erecta* flower and rhizomes of *curcuma longa* respectively. The lutein and curcumin was isolated from both plant which was responsible for activity. It was separated from each other by thin layer chromatography and purified by high performance liquid chromatography. Hep2 cell lines were evaluated. The maximum viability of Hep2 cell lines were 3.27%(curcumin) and 8.88%(lutein)respectively.

Antihyperlipidemic activity

Rodda R.et.al were investigated the antihyperlipidemic activity of hydroalcoholic extract of *T.erecta* in hyperlipidemic rats at a dose of 200 and 400mg/kg Hyperlipidemia was induced by cholesterol25mg/kg/day. Lovastatin was used as standard. Blood samples was collected

from all the groups on the 30th day and estimated for serum cholesterol, serum triglyceride, serum HDL, serum LDL level using standard procedure. From these studies we were estimated that the alcoholic extract showed decreased in all the hyperlipidemic parameters.

Determination of quercetin

Chakraborty G. *et al.* were carried out the investigation of quercetin in *T. erecta* by using HPTLC. In this plant reported constituents are flavanoids, glycoside and saponin, it is considered to be Quercetin, which was confirmed by qualitative test. It was quantified by HPTLC. The method was carried out by using silica gel 60GF as stationary phase and using solvent system as chloroform:methanol(9:1) with R_f value of 0.43. Quantitative analysis was carried out in the absorbance at 366nm. The linearity regression for the calibration showed $r=0.65$ and 0.99 .

Antiinflammatory activity

Chatterjee S. *et al.* were studied efficacy of anti-inflammatory activity of combination of *Tagetes erecta* and *Centella asiatica*. The hydroalcoholic extract of aerial parts of *Tagetes erecta* and *Centella asiatica* on excision, incision and dead space wound model in albino rats. The flavanoid was main active constituent responsible for activity. Extract of *T. erecta* and *C. asiatica* showed significant increase in rate of contraction, epithelization and formation of scar faster in incision wound model as compared to control group. The alkaloid and flavanoid were other chemical constituents present in plants.

Antinociceptive and Diuretic activity

Hossain N. *et al.* were studied antinociceptive and diuretic activity on methanolic extract of aerial parts and roots of *Tagetes erecta* in Swiss albino mice. The study was performed by acetic acid induced writhing method. Aminopyrine and Furosemide was used as standard drugs. The study shows there is peripheral analgesia produced in mice.

Antioxidant activity

Arulmozhi K. *et al.* were reported *in vitro* antioxidant activity of aqueous and methanolic extract of *Tagetes erecta* and *Moringa oleifera*. The study was evaluated by DPPH free radical and hydrogen peroxide scavenging activity. The flavanoid was main active constituent responsible for activity. From this study it was observed that *Moringa oleifera* shows high DPPH activity than *Tagetes erecta*.

Antidepressant activity

Khulbe A.et.al were carried out Antidepressant activity on hydromethanolic extract of flowers of *T. erecta* by modulation of nitrigic, serotonergic pathway and sigma receptor pathway. Fluoxetine and imipramine was used as standard drug. The forced swim test was performed it showed that higher doses of *T.erecta* was not affect the immobility period. Pentazocin a sigma receptor antagonist, while Progesterone a sigma receptor antagonist it abolished its antidepressant activity. The activity was due to presence of alkaloid, flavanoid, tannin.

Wound Healing activity

Kiranmai M.et.al were carried out the screening of wound healing activity carbopol gels prepared from hydroalcoholic extract of *Gymnema sylvestere* and *Tagetes erecta* in excision wound model and burn wound model, showed significant reduction in period of epithelization and wound contraction and combined gel showed accelerated wound healing activity. The enhanced wound healing activity of hydroalcoholic extract may be due to presence of free radical scavenging action. The flavanoids may be main active constituent responsible for activity.

Antioxidant and Cardioprotective activity

Chandra S.et.al were studied antioxidant and cardioprotective activity on ethanolic extract of aerial parts of *Tagetes erecta*. The activity was studied against ccl_4 and paracetamol induced hepatotoxicity model respectively. The biochemical parameter such as AST, ALT,ALP and antioxidant activity was studied. Cardiprotective activity of ethanolic extract of leaves of *Tagetes erecta* studies against doxorubicin induced cardiotoxicity model was used. The lipid profile parameter TC, HDL and LDL and cardiac biomarker was evaluated. The flavanoid and alkaloids was responsible for activity.

CONCLUSION

From this literature survey it was showed that the Plant *Tagetes erecta* consisting of presence of chemical constituent such as alkaloid tannin, flavanoids, triterpenoids and this chemical constituent may responsible for different pharmacological activities.

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