WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 13, Issue 21, 172-187. Review Article ISSN 2277–7105

A REVIEW ON TAGETES ERECTA LINN. (MARIGOLD)

Avhad Pallavi Eknath[1]*, Suryavanshi Gayatri Ramesh[2] and Bankar Ashwini[3]

[1,2]Student, ACS, S College of Pharmaceutical Science & Research Ashti, Maharashtra, India.

[3]Assistant Professor, Department of Pharmacoganocy College of Pharmaceutical Science & Research Ashti, Maharashtra, India.

Article Received on
06 September 2024,

Revised on 26 Sept. 2024,
Accepted on 16 October 2024

DOI: 10.20959/wjpr202421-34327

***Corresponding Author**
Avhad Pallavi Eknath
Student, ACS, S College of Pharmaceutical Science & Research Ashti, Maharashtra, India.

❖ ABSTRACT

This study covers the research conducted by different researchers on chemical components, pharmacological activity, Phytochemical investigations. In both the traditional and allopathic medical system, medical plant extract and secondary metabolite are used as natural substitute for artificially created chemicals. The medical benefits of Tagetes erecta (Compositae), commonly referred to as Genda Phul (Marigold), are covered in this review. The benefits were observed Astringent, carminative, Blood purification; Rheumatism, colds and bronchitis are among the condition for which different plant parts are beneficial. Several significant phytochemical elements from the various parts of Tagetes erecta are present in plant. It exhibits a variety of pharmacological properties include Antibacterial, Wound healing, Antifungal, anti-inflammatory, Antioxidant, Hepatoprotective, Antiepileptic, Insecticidal effects, blood coagulation. Herbal medicine`s therapeutic effects are usually attributed to the interaction of secondary metabolites such as Glycosides, alkaloids, flavonoids, tannins, gums, and others that are formed by the plants.

❖ **KEYWORDS:** Tagetes erecta Linn, Cultivation, Pharmacological activity, Medicinal plant, Phytochemicals.

❖ INTRODUCTION

A medicinal plant (Tagetes erecta) are thought to be abundant sources of ingredient that can utilize to create synthetic, non-pharmacopeial, pharmacopeial drug.[1] They are uses for every part of the plant to treat various illness. Its various varieties have been discovered to exhibit a variety of properties, including Antimicrobial, antidepressant, anti-inflammatory, anti-mycotic, insecticidal, larvicidal action. It has been discovered that the plant contains a variety of secondary metabolites with wide range of pharmacological properties.[4] Historically, plants have been utilized in traditional medicine and great source of phytochemical substance, which have useful antioxidant qualities. An essential component of plants, flower containing a wide range of naturally occurring antioxidants, phenolic and flavonoid chemicals. The primary phenolic compounds with anti-oxidant activity are known to include flavonoids and phenolic acids, and they can be quite helpful in neutralizing free radicals.[14] Tagetes genus, which has roughly 50 species, and the Asteraceae family, their height ranges from 50 to 80 cm, and their lanceolate, green leaves are 5 to17 cm in length.[8] The flowers bloom for a brief period of time, from midsummer to frost, pompon like double flowers that can reach a diameter of up to 5 inches. Plant that yields an essential oil (Tagetes Oil) with strong aroma that contain main chemical compounds of oil are lagetone, valeric acid, ocimene and limonene. Its high concentration of carotenoids, which have numerous uses in pharmaceutical industries, as well as its aesthetical appeal.[3] Plant separated compounds include methyl-3,5- dihydroxy-4- methoxybenzoate, thienyl and ethyl gallate, quercentagetin, quercetin, phenols, synergic acid, numerous compounds with considerable therapeutic significance in the commercial drug sectors are found in tagetes erecta`s leaves and flowers.[4] Tagetes erecta is very abundant carotenoids, which are responsible for the orange and bright yellow colors of blooms. Zeaxanthin and lutein have been found to be the principal carotenoids in the plant.[3]

➢ **Cultivation**

The plant is widely grown throughout Asia, India, China, and other tropical nations, reaching heights of one to five feet. For the marigold plant to flourish, it requires temperatures between 20°C and 30°C as well as a significant quantity of annual rainfall and winter. India contributes roughly 75–80% of the 600000 tons of marigold produced worldwide. Approximately 80% of domestic production is consumed in India.[10]

➢ **Botanical study[23]**

1) Kingdom	Plantae
2) Order	Asterales
3) Family	Asteraceae
4) Genus	Tagetes
5) Species	Tagetes erecta

➢ **Identifiable information[19,2,25]**

- **Name in science:** Tagetes erecta

Common name(s): American Marigold; African Marigold.

Family: Compositae

- **Leaf**

Green is the color of leaves. Leaf arrangement in foliage: opposing or subopposite Type of leaf: Irregularly complex leaves not applicable to branches, barks or trunk Length of leaf blade: Less than 2 inches.

Fig. No. 1: Leaf.

- **Flower**

Color of flower: Orange; golden; yellow.

Characteristic: A bisexual, tubular ray floret that is female, measuring 1.5–2.5 cm in length; five stamens are present. Anther linear, hairy stigma.

Fig. No. 2

- **Roots**

The revolving, cylindrical root has a structure of superficial, fibrous branching and branches. Slightly woody to herbaceous, the stem is elliptical, cylindrical, and striated; it is also ridged and smooth at times. Squeezed resin channels in the bark release a pleasant scent.[2]

Fig. No. 3

- **Seed**

Seed: dark brown, 8–10 mm in length, rough at the edges; pappus: joined, 4-4.5 mm in length, uneven.

Fig. No. 4

- **Vernicular name**[10]

Language	Name
1) Marathi	Zendu
2) Gujarati	Guliharo
3) Manipur	Sanarei
4) Sanskrit	Sandu
5) Panjabi	Tangla
6) Malayalam	Chendumalli
7) Urdu	Genda

- **Microscopic characteristics**

- **Flower:** The bloom of T. erecta has a vivid color, a strong bitter flavor, and a fragrant scent. Its dimensions are 3 – 5.5 mm in thickness and 2 – 3 cm in length. The calyx is an oval, dark green calyx, and the corolla is vivid orange.[5]

Peduncles:- T. S. and L.S. from the young flower have an almost circular outline; the epidermis is made up of a single layer of parenchyma cells with thick walls and many trichomes; the cortical parenchyma is made up of a few layers of parenchyma, chlorenchyma, and collenchyma cells; the vascular bundles are arranged in a ring shape, with many collateral vascular bundles that have xylem on the inner side and phloem on the outside; and the sclerenchyma fibers pith is located in the center and is present above the phloem.

Involucre:-The young flower T. S. exhibits a deeply convex abaxial side and a slightly concave adaxial side; the epidermis is made up of a single layer of thick-walled cells on the lower side and thin-walled cells on the upper side; the mesophyll is made up of a few layers of parenchyma cells; and there is a vascular bundle in the center, surrounded by sclerenchyma cap on the outer side.[27]

Fig. No. 5: T. S. of flower tagetes erecta.

- **Leaf:** A single layer of ovate and oblong ovate ordinary cells with mean thicknesses of

17.68 m abaxially and 16.32 m adaxially comprised the upper and lower epidermis of the leaf. With palisade 1-2 rows measuring 108.8 m adaxially and spongy 5-7 rows measuring 115.5 m abaxially, the mesophyll was not homogenous. The midrib is composed of a single circular elliptic collateral vascular bundle that has seven to nine rows of tracheary elements.[27]

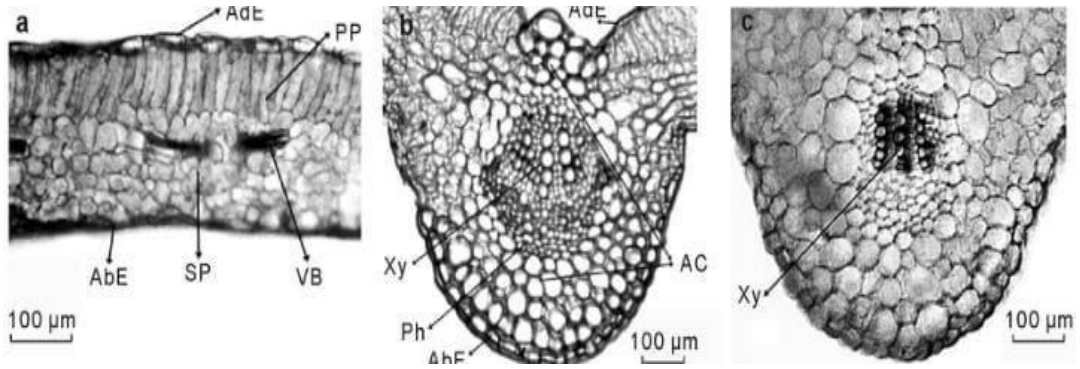

Fig. No. 6: Photomicrographs of cross sections of leaves of tagetes erecta.

- **Chemical composition**

Numerous chemical components, including thiophenes, flavonoids, carotenoids, and triterpenoids, have been isolated as a consequence of phytochemical investigations conducted on its various portions. It has been demonstrated that Tagetes erecta contains phenolics, syringic acid, quercetin, thienyl and ethyl gallant, methyl-3, 5-dihydroxy-4-methoxy benzoate, and quercentagetin, along with a glucoside of quercentagetin.[16] Leaves are steam-distilled to yield 0.3% of an essential oil that has a powerful, sweet aftertaste and contains lutein, d-limonene, ocimene, linalyl acetate, l-li-nalool tagetone, and n-nonyl aldehyde. Tagetes erecta fresh ground roots include bithienyls and α-terthienyl.[8] phytochemical analysis of 22 components from T. erecta flowers using silica gel column chromatography to separate different ethanol extract fractions. They included 1-[5-(1-propyn-1-yl)-[2, 2-bithiophen], β-sitosterol, daucosterol, 7β-hydroxy sitosterol, erythrodiol-3-palmitate, lupeol, and erythrodiol.-5-yl]-ethenone, α-terthienyl, gallic acid, syringic acid, quercentagetin, quercetagetin-7-methylether, quercetagetin-7-O-glucoside, kaempferol, oplodiol, 6-ethoxy-2, 4-dimethylquinoline, 3-α-galactosyl Di syringic acid, and 3-galactosyl disyringic acid (3S, 6R, 7E)-hydroxy 4,7-megastigmadien-9-one, n-hexadecane, palmitic, and ethylene glycolinoleate. The following are the chemical structures of lutein, quercetagetin, and syringic acid.[10]

The main ingredients found are limonene, piperidone, terpinolene, and ß-ocimene. Tagetes

erecta (flowers and foliage) methanolic extract includes both tagin and quercetagin monoglucoside (0.1%). Quercetagin (0.4%) is also present in flower extract, whilst quercetagetin and quercentagetin are discovered in seeds. The plant contains 64–80% lutein and lower levels of zeaxanthin, antheraxanthin, cryptoxanthin, β-carotene, and roughly fourteen additional carotenoids. The main constituents of volatile oil extracted from Tagetes erecta flower heads include tagetone, dihydrotagetone, cis-tagetone, trans-ocimenone, limonene, valeric acid, and ocimene.[10]

Fresh leaves are steam-distilled to produce 0.3 percent essential oil, which has a powerful, lingering scent and contains d-limonene, linalyl acetate, n-nonyl aldehyde, and lutein. Tagetes erecta stem and leaves were found to contain 4-methoxy-eupatolytin-3-O-glycoside, kaempferitrin, βsitosterol, daucosterole, and gallic acid.[20]

- **Phytochemical test**
- **Test for alkaloids[7]**

Take 50 mg of solvent-free extracts mixed with a little amount of diluted hydrochloric acid and then filtered separately. The filtrate underwent meticulous testing using the following alkaloid reagents:

1) Mayers test

Take 0.5 ml of Mayer's reagent (potassium mercuric iodide) added in the test tube's and 1 ml of the extract filtrate. The white, creamy, or yellow in color, which show the presence of alkaloids.

2) Wagner`s test

Take Wagner's reagent (0.5 ml) added in test test tube's and 1 ml of the extract filtrate. The reddish-brown precipitate show the presence of alkaloids.

3) Hager`s test

Take 0.5 ml of saturated picric acid solution, also known as Hager's reagent and 1 ml of extract filtrate in test tube's. Alkaloids present show the formation of a yellowish precipitate.

4) Dandruff's test

Take Bismuth nitrate, Dandruff's reagent, in test tube's and 1 ml of the extract filtrate. Alkaloids present when notice yellow or orange-brown precipitate generated.

- **Test for glycoside**[18]

Take 2 ml of chloroform and 10% ammonia solution add in 1 ml of oil sample. When development of a pink colour show the presence of glycosides.

- **Test for phenol**[18]

Add a few drops of 10% ferric chloride and 1 ml of the sample, add 2 ml of distilled water. Phenols detected when the formation of a blue or green tint.

- **Test for tannin**[18]

Take 1ml of 5% ferric chloride add in 0.5 ml of sample. The development of greenish black or dark blue revealed the presence of tannins.

- **Test for protein**[21]

Biuret test: 2 ml of filtrate mixed with one drop of a 2% copper sulfate solution mixed with 1 ml of ethanol and excess of potassium hydroxide pellets. The ethanol layer began to turn pink, indicating the presence of proteins.

- **Test for saponin**[22]

Take 2ml of plant extract combined with 2ml of distilled water, and the mixture then agitated in a graduated cylinder for 15 minutes . The appearance of a 1cm layer of foam suggested the presence of saponins.

- **Steroids and Phyto steroids**[22]

The equal volumes of chloroform and concentrated sulfuric acid are add in 1 ml of plant extract; the presence of steroids indicated the appearance of a brown ring, the presence of Phyto steroids indicated the appearance of a bluish brown ring.

- **Test for quinines**[22]

Take 1ml of concentrated sulfuric acid add in 1 ml of extract. Quinones were present show the formation of red color.

➢ **Pharmacological activity**

- **Anti-bacterial activity**

Tagetes erecta flower solvents have been shown to have antibacterial activity against a variety of bacteria, including Bacillus cereus, Escherichia coli, Campylobacter coli, Klebsiella pneumoniae, Pseudomonas aeruginosa, Proteus vulgaris, Streptococcus mutans,

and Streptococcus pyogenes, according to Rhama and Madhavan's study. The flavonoid exhibits greatest zone of inhibition (29.50 mm) for Klebsiella pneumoniae and has antibacterial activity against all tested strains. One of the possible components of its antibacterial action is the flavonoid.[9]

Demonstrate by Preeti Verma et al.(2012) the ethanolic extract's antimicrobial activity from the extracts' produced zone of inhibition. The results showed that the most sensitive bacteria to the ethenolic extract were S. lutea, B. circululence, and B. subtilis, while the least susceptible bacteria were E. coli and S. aureous. Significant antibacterial action was demonstrated by flower extract against S. lutea, E. coli, and B. circulence. Minimal inhibitory zones are displayed by root ethenolic extract against the test organism. Because it exhibits a strong antibacterial action against test microorganisms, it is being further investigated for the principles behind its active components.[12]

- **Anti-oxidant activity**

An in vitro antioxidant investigation on the ethanolic extract of Tagetes erecta flowers was conducted by Chivde et al. (2011). Alkaloids, flavonoids, proteins, steroids, and tannins were discovered in the ethanolic extract of Tagetes erecta flowers during the study's initial phytochemical investigation. Three distinct assays, including DPPH, reducing power, and super oxide radical scavenging activity at varying doses, were utilized to measure in vitro antioxidant activity. Tagetes erecta shown higher reducing power than the standard (ascorbic acid) in each of the three assays, although super oxide anion scavenging activity and DPPH antioxidant activity demonstrated lower than standard. Nonetheless, in every in vitro model, the ethanolic extract of Tagetes erecta showed antioxidant properties.[17]

- **Wound healing activity**

The effects of marigold extract on albino Wister rats' wound healing have been assessed. Thirty-six male and female rats, weighing between 150 and 200 grams, were split into four groups (A, B, C, and D) at random. In addition to receiving 1.0 milliliter of marigold petal extract orally, the test rats were given regular rat food and unlimited water. Through heart puncture, blood samples from the animals were collected and placed into EDTA vials for examination. Prior to the extracts being given to the test rats, the animals' first blood picture was collected. According to (Oguwike et al. 2013), the Tagetes erecta extract improved white blood cell and platelet counts ($p>0.05$) and decreased bleeding and clotting times.[10]

To test the ability of carbopol gels made from hydroalcoholic extracts of Tagetes erecta and Gymnema sylvestere to cure wounds in albino mice burn and excision wound models. Extract formulations were completed as gels of carbopol both singly and in equal amounts when combined. In models of burn and excision wounds, animals treated in this way demonstrated a marked decrease in the duration of wound contraction and epithelization. Additionally, animals treated with combined gel had rapid wound healing activity, which may have resulted from synergism (Ibrahim et al., 2011).[10]

- **Antidiabetic activity**

Antidiabetic activity of Tagetes erecta was employed. Alloxan was utilized by Kusmiati et al. in an experiment to cure diabetes induction in White Sparague Dawley rats. Group I served as the normal control, Group II as the negative control, Group V as the lutein extract experiment (at doses of 40, 80, and 160 mg/kg bw, respectively), and Group VII as the positive control for diabetics (Glibenclamide 5 mg/kg bw) and the antioxidants (Vitamin E 10 mg/kg bw). The results showed that lutein extract from marigold flowers could have a hypoglycemic effect. Kusmiati and associates, 2019 Tagetes erecta hydro-alcoholic extract's possible anti-diabetic effects were studied by Rodda et al. To induce diabetes, a single intraperitoneal injection of streptozotocin (60 mg/kg b.w.) was administered. After taking the standard drug glibenclamide for 30 minutes, blood glucose levels increased, and then they decreased during the next 120 minutes. After 30 minutes of consuming extracts from Tagetes erecta, it was discovered that the hypoglycemic effect did not manifest itself for another 120 minutes.(Sharma and colleagues, 2019).[3]

- **Hepatoprotective activity**

In a hepatopathy model caused by carbon tetra chloride, (Bose et al.) reported the hepatoprotective effect in Tagetes erecta flowers. Serum ALT, AST, ALP, and bilirubin levels increased, as demonstrated by the ethanolic extract. The oral administration of 400 mg/kg of Tagetes erecta (EATE) fraction resulted in a considerable reduction in raised serum marker enzymes and bilirubin level, nearly returning to normal when compared to the CCl4-intoxicated group.

Rats given 400 mg/kg of EATE extract and CCl4 demonstrated a noteworthy recovery in terms of histological abnormalities in the liver, with the exception of moderate inflammation, foci of lobular inflammation, and cytoplasmic vascular degenerations around portal tracts.

The evidence of hepatoprotective effect is attributed to phytoconstituents like steroids, terpenoids, and flavonoids.[10]

- **Anti-Inflammatory**

Anti-inflammatory Activity in which Meurer et al. investigated the intestinal anti-inflammatory properties of Tagetes erecta dry hydroalcoholic extract (DHETE), which is high in the carotenoid lutein, in an animal model of ulcerative colitis. DHETE was reported to decrease the severity of colitis in mice with UC caused by DSS by improving the body's natural antioxidant defense and decreasing the release of pro-inflammatory cytokines (Meureret al., 2019).

The Tagetes erecta chloroform, methanol, and ether fraction were demonstrated using acetic acid-induced writhing in mice and carrageenan-induced paw oedema in rats. (Shinde and others, 2009).[10]

- **Anti-Epileptic activity**

In Anti-epileptic activity Ethanolic extract of Tagetes erecta flowers was shown by (Shetty et al.) to stimulate the central nervous system (CNS) in rats. According to the results, ethanolic extract may lower an epileptic patient's seizure threshold.[17]

Tagetes erecta ethanolic extract has antiepileptic properties. This extract lessens epilepsy by lowering the seizure threshold in epileptic patients. Additionally, in vivo tests like the forced swim test, helplessness test, spontaneous locomotor activity, convulsions, and pentobarbitone-induced sleep duration are employed with this ethanolic extract.[8]

- **Blood coagulation activity**

Studies on diabetes have revealed abnormalities in hemostatic and fibrinolytic processes, including platelet hyperaggregation (Winocour 1994), hypofibrinolysis (Ceriello et al. 1994), and stimulation of blood circulation (Ceriello et al. 1994). It is widely known that in individuals with diabetes, these anomalies are linked to the emergence of complications from the disease as well as an elevated risk of cardiovascular events. Thus, it is imperative to look for a natural coagulant that can shorten the coagulation time. Hyperglycemia may be connected to the hypercoagulable condition in diabetes (Kwaan 1992). Thus, we concentrated on how marigold leaf extract affected blood coagulation in both hyperglycemic and healthy blood.[15]

- **Insecticidal activity**

In Insecticidal activity the third stage mosquito larvae of Culex fatigues were poisonous to the petroleum ether extract of Tagetes erecta roots (Singh and Kataria, 1985). Tagetes erecta leaves, stem, and buds were extracted in both aqueous and methanolic forms, and the results showed insecticidal action against Tylenchulus semipenetrans and Anguina tritici second stage larvae (Kumari et al., 1986).

According to Hadjia khoondi et al. (2008), the essential oil from the fresh and dried plants of Tagetes erecta was found to be extremely efficient against the larvae of Anopheles Stephens, with LC50 values of 1.0532 and 1.0314 mg/L. With an ED50 value of 3.16 mg/mL, the essential oils of Tagetes erecta's aerial portions demonstrated significant cytotoxicity against Artemia salina (De Feo et al., 2005). While it was observed that the Argentine plant's aerial portions contained substantial insecticidal activity against Sitophilus oryzae in both the dichloromethane and methanolic extracts (Broussalis et al., 1999).[1]

- **Synergistic activity**

According to Hemali Padalia et al.(2015) The T. erecta flower acetone extract exhibits synergistic efficacy against bacteria when used with various conventional antibiotics, such as ceftazidime and chloramphenicol. With FIC values of 0.312 and 0.093, respectively, the combination of acetone extract with ceftazidime had a synergistic effect on the growth of B. subtilis and P. aeruginosa. This shows that the flower's acetone extract may be able to enhance the effectiveness of antibiotics. With a FIC value of 0.6, a partially synergistic effect was noted against S. albus. When combined, the mixture had an additive or neutral effect on the remaining bacterial strains. However, acetone extract and chloramphenicol together showed antagonistic effects against P. aerogenosa and indifferent effects against all other types of bacteria.[13]

❖ CONCLUSION

Tagetes erecta is used as medicinal plan tant its numerous benefits is a true miracle of the nature. Various Studies have been conducted on different parts of plant is precious as a medicine.

Tagetes erecta primary and secondary metabolides isolated from whole plant which use as Antibacterial, Wound healing, anti-inflammatory, Antioxidant, Hepatoprotective, Antiepileptic, Insecticidal effects, blood coagulation etc. The chemical constituent from this

plant used to cure various diseases.

❖ REFERENCE

1. T., Venkata Sowjanya, Mallela Malathi, Gurugula Mohana Lakshmi Gayathri, Kalakonda Harsha Priya, World Journal of Pharmaceutical Research, 12, 9: 431-436, ISSN 2277-7103, Review on A comparative invitro studies of phytochemical analysis and antimicrobial activity of methanolic extracts of Tagetes erecta and Tagetes patula; Accepted on 04 May 2023.
2. Nayan Talukdar, Bhargav Kashyap, Indrani Barman, Indrani Barman, Jyotchna Gogol and Partha Pratim Kalita; Indian Journal of Natural Sciences, 2023; 14: 78, ISSN: 0976-0997; A Review on Tagetes erecta (Marigold) with Reference to Its Pharmacological Importance; Accepted: 12 May 2023.
3. Niti Siddhu, Jyoti Saxena; Phytochemistry and Therapeutic Relevance of Tagetes erecta: A Review; Inventi Journals (P) Ltd, 2015; 1 [ISSN 2278-411X]; Published on Web 26/11/2014.
4. Lokesh J Shetty, Farouk M Sakr, Kais Al-Obaidy, Mohammed J Patel, Hidayatullah Shareef, Department of Pharmacy and Pharmacology; Journal of Applied Pharmaceutical Science, 5(3), ISSN 2231-3354; Accepted on: 17/08/2015.
5. Samantha Nelson, A Review on The antibacterial activity of essential oils from Tagetes erecta and Thuja occidentalis, 2019; 27: 29-33.
6. Sumaiya Akhtar, Md. Towhindul Islam and Md. Tanvir Hossain; World Journal of Pharmaceutical Research, 4, 5, 1856-1866, ISSN 2277-7105; Proximate analysis, Phytochemical Screening And Atioxidant Activity of tagetes erecta leaves; Accepted on 19 april 2015.
7. Sukhendu kar* and Soumen Patra*, Department of Chemistry and Chemical Technology, A Review on Merigold (Tagetes erecta Linn): theb Phytochemicals Present and its Biological activity, Accepted: December, 2022; 20. Published online: December 31, 2022; Article in prayogik Rasayan, January 2022.
8. G.Gopi, A.Elumalai and P. jayasri; Department of Pharmacogancy, Pharmaceutics; International Journal of Phytopharmacy Research, e-ISSN 2249-7544, Print ISSN 2229-7464, 2012; 3: 1.
9. Yogendra singh*, Amit Gupta and Pushpendra Kanojiya, Department Of Pharmacology, Current Medical and drug Research; Recive: February, 2020; 12. Acccepted: February24, 2020.

10. Smara Bashir, Aga Khan University; And Anwar Gilani, Aga Khan University ; Department of Biological and Biomedical Science Medical College Pakistan; Phototherapy Research, Studies on the antioxidant and analgesic activity of Azetic marigold (Tagetes erecta) flowers, Pubalishd Online, 2008; 23. In Wiley Inter Science; DOI:10.1002/ptr.
11. Preeti Verma and Archana Verma, Department of Botany, International Journal of Pharmacy And Life Science, Research Article, 2012; 3, 6: 1766 -1768, ISSN:0976-7126 Evaluvation of Antibacterial Activity Of Different Parts Of Tagetes erecta, [Verma and verma, 2012; 3(6).
12. Hemali Padalia and Sumitra Chanda*; Phytochemical, Phamaological and Microbiological Laboratory Department of biosciences ; Corresponding author: Sumitra Chanda, Phytochemical and Pharmacological and Microbiological Laboratory, Department of Biosciences; Applied Microbiolog: Open Access, Antimicrobial Efficacy of Different Solvent Extract of Tagetes erecta L. Flawer, Alone and in Combination With Antibiotics; Received date: November 15,2015;Accepted Date:December10,2015; Published Date: December 17, 2025.
13. Hanim A. Youssef*, Saffa M. Ali, MostafaI. Sanad, Dawood H. Dawood, Department of Ariculture Chemistry, Faculty of Agriculture, Mansoura University, Egyptian Journal Of Chemisry, Egypt. J. Chem, 2020; 63, 7: 2665-2615 Chemical Investigation of Flavonoids, Phenolic Acid Composition and Antioxident Activity of Mexican marigold (Tagetes erecta L.) Flowers, Received 19/11/2019; Accepted 15/12/2019.
14. Nandita Dasgupta, Shivendu Ranjan, Madhu Shree, M.A ArbaSaleh, Chidambaram Ramalingam; Orient Pharma Exp med, Online ISSN 2211-1069, Print ISSN 1598- 2386; Blood Coagulating effect of marigold (Tagetes erecta L.) Leaf and its Bioactive Compounds, Received, 2015; 9: 1.
15. Aarti Khulbe, Assistance Professor, Department of Pharmacy; World Journal of Pharmaceutical Science, ISSN(Print)2321-3310; ISSN(Online) 2321-3086, Received:06-02-2015/ Accepted: 02-03-2015.
16. Gauri Karwani and Siddhraj S.Sisodia, Bhupal Nobels, College of Pharmacy; World Journal of pharmaceutical science, ISSN(Print):2321-3310; ISSN(Online)2321-3086, Tagetes erects Plant: Review With Significant Pharmacology Activities, Received:14- 03-2015; Accepted 29-05-2015.
17. Sandeep Kumar Rajvanshi and Deepa H. Dwivedi, Department Of applied Plant Science; Journal of Pharmacogancy and Phaytochemistry, E-ISSN: 2278-4136, P- ISSN:2349-

8234; Phaytochemical screening studies of bioactive compound of African Marigold (Tagetes erecta L.), Accepted: 12-06-2017.

18. Edward F. Gilman, Teresa Howe; University of Florida, Cooperative Extension Service instate of Food and Agricultural sciences, Tagetes erecta, October, 1999. 2021; ISSN(E):2277-7695, A Review of marigold`s Beneficial aspects; Accepted 21- 08-2021.
19. S N Deshpande and D G Kadam, Department of Microbiologyinternational journal of pharmacy and biological sciences ISSN: 2321-3272, UPBS, 9, Special issue 2-ICESMT-2019; Phytochemical Analysis of Flower Extracts of TagetesErecta L. and their Antibacterial efficacy Against Streptococcus Mutans; Accepted-20-02-2019.
20. R. Devika and Justin Koilpillai, International Journal of Pharma and Bio Sciences ISSN:0975-6299; Phytochemical Screening Studies of Bioactive compound of Tagetes Erecta, 2012.
21. Dhanashri Chaudhari, Malati Salunke, Vaibhav Shinde; Department of Pharmacognosy, Amol Muthal; Department of Pharmacology, Ashwin Mali; Department of Pharmaceutics, International Journal of Herbal Medicine. Phytochemical and Pharmacological activities of Tagetes Erecta, Accepted-16-11- 2023.
22. Arshu Patel, Akash Indrekar, Manish Ahire, and Adesh Agle World Journal of Pharmaceutical Research, 13, 6: 188-195 Effects, Pharmacological Actions, Phytochemical Components and Therapeutic Applications of Tagetes Erecta, Article accepted-06-02-2024.
23. Priyambada Singh, Alok Krishna, Vinod Kumar, Swadhinta Krishna, Kuldip Singh, Madhuri Gupta and Sohan Singh: Journal of Essential oil Research, Chemistry and Biology of Industrial Crop Tagetes Species: A Review, 2015.
24. Pankaj Gupta Department of Pharmacogancy and Phytochemistry, Alka Gupta Division of Pharmacology and Toxicology, Kratiagarwal Department of clinical Research and Regulatory affairs, Priti Tomar Department of Pharmaceutical Sciences and Saurabh satija Department of Pharmaceutical science, Antioxident and Cytotoxic Potential of a new thienly derivative from Tagetes erecta Root, Pharmaceutical Biology, 2012.
25. Priyambada Singh, Alok Krishna, Vinod Kumar, Swadhinta Krishna, Kuldip Singh, Madhuri Gupta & Sohan Singh, acsir-central institute of Medicinal and aromatic crops, lucknow, india; bDr. ram Manohar lohia avadh university, faizabad, lucknow, india (2015): Chemistry and biology of industrial crop Tagetes, Species: a review, Journal of Essential Oil Research, accepted, 2015; 21.
26. Pankaj H. Chaudhary Assistant Professor, Department of Pharmacognosy, Journal of

Ayurveda and Integrated Medical Sciences, 2023; 8: 7. Pharmacognostica and phytochemical studies on leaves of Tagetes erecta Linn. Accepted Date: 22/06/2023.

27. Pawan Kumar Sagar Drug Standardization Research Institute, AS Khan Drug Standardization Research Institute, Sonali Drug Standardization Research Institute International Journal of Pharmacy and Pharmaceutical Science Pharmacognosy, Pharmacognosy, Physicochemical, Toxicity Quality evolution studies of Marigold - Tagetes erecta L. flower of plant, 2022, Accepted: 27-09-2022.