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A Review on Ethnobotany, Morphology Phytochemistry and Pharmacological Study of Galinsoga Parviflora

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Abstract

G.parviflora belonging to the Asteraceae family. It has used for the treatment of various ailments like malaria, flu, cold, liver problems, colorectal cancer and inflammation. The G.parviflora has medicinal properties because the presence of secondary metabolites which includes flavonoids, saponins, terpenoids and tannins. It has several pharmacological properties like antibacterial, antidiabetic, antioxidant and antifungal. The plant is non toxic and is used as vegetable for preparing soups and salad. They exhibit ureases, alpha glucosidase activites and also shown exert cytotoxic , hepato-protective and hypoglycemic effects . Over thirty-eight compounds from which Galinsoga parviflora have been isolated.

Keywords: Galinsoga Parviflora, Wound Healing, Blood Coagulations, Ethnomedicinal, Anti-inflammatory, Gallant Soldier.

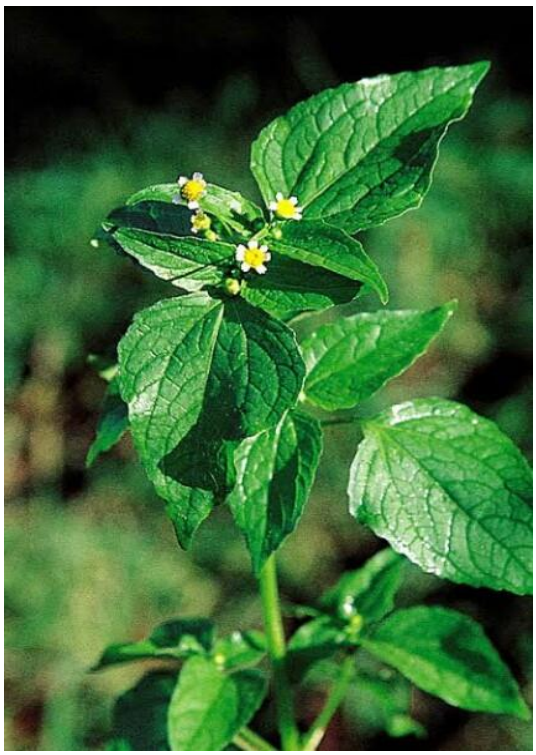
1. Introduction

Garinthoga parviflora was brought to kew gardens from peru in 1976 , before escaping into the wilds of England and Ireland , where it was briefly known as " Kew weed " (Sravanthi et al., 2019). It is also known as Adventina parviflora (gallant soldiers) originates from Central America. Galinsoga parviflora is a latin word (in which parva means small and flor means flower)(Harshitha et al., n.d.). The Physician Ignacio Mariano Martinez de Galinsoga and Spanish Botanist named the plant as Galinsoga parviflora(Harshitha et al., n.d.). Galinsoga parviflora Cav. has been recently introduced and naturalized as a weed in Nile Delta of Egypt (Mostafa et al., 2013). The species '' parviflora '' means ''having small flower ''. In UK ,

Garinthoga name is commonly known as ‘ Brave Soldier ‘ or ‘ Queen Soldier ‘. In Malawi , this plant is naturalised and it is also known as ‘ Mwamna Arrigone ‘ , which means ‘ My husband is sleeping ‘ . It was introduced at the end of the eighteenth century and eventually spread to many European countries . This weed is also recorded in the territories for former USSR . The Galinsoga parviflora is genus which belonging to family Asterceae , and which is widely distributed in South and North America(Ali et al., 2017).Gallant soldier (G.parviflora) is a spring annual weed commonly found in worldwide(Haliniarz et al., 2020). Gallant soldier grows in moderate and subtropical regions of the world (Haliniarz et al., 2020). In India , Galinsoga parviflora are distributed in most of Indian hill stations . It is located in North and South America , Asia , West indies , Europe , Africa , Australia , and Mexico(Harshitha et al., n.d.). It is also commonaly found in South West china like Yunnan , Guizhou , and Sichuan provinces(Zhang et al., 2019). It is common disturbed habitats and agricultural areas across various temperate and sub tropical regions of the world(Riemens, M.M et Van den weide, 2008). It grows readily on sandy , loamy and clay soils , uncultivated areas , wastelands and roadsides(Ali et al., 2017). The plant is Herbaceous with an erect and multi branched stem , and normally grows to a height of about 0.6 cm . In Pakistan , it can be found in Balochistan , Hunzo , Dir , Swat , Gilgit , Muree and Kashmir (Ali et al., 2017). The plant produce small headed flowers comprising yellow disk florets centally bounded by red or pink tipped ray florets(Ali et al., 2017). In Britain , its namr Galinsoga s popularly rendered as “ Gallant soldiers”. The period of the flowering plant is from May to September . The Galinsoga species in which the aerial portions is used as antiinflammatory in traditional medicines for treatment of dermatological problems like eczema and lichens(Ali et al., 2017). G. parviflora features are very prominently in the folk medicine history of Africa , Asia , and Europe . The plant is used as an anti scurvy agent because of its high level of vitamin C . The plant is used to stop bleeding and for treating cold sores, common cold and flu(Ali et al., 2017).The flowers

possess analgesic properties , and are applied in making preparation for relief of toothache (Ali et al., 2017).properties are due to secondary metabolites present in it . Because of its non toxic nature it is used as feed for cattle . Raw extracts and pure medicinal compounds have strong pharmacological effects , like anti fungal , antibacterial , anti inflammatory , anti tumor , and anti oxidant activites . Blood of wounds or cuts can be coagulated by the juice of plants and applied to treat wounds .The juice of the whole plant is applied to treat wounds(Ferheen et al., 2011). In Saudi Arabia , medicinal plants have been used in traditional medicine since ancient times and local people still use them to cure many disease (Al-Robai et al., 2023).

1.1. Taxonomic Classification



Domain – Eukaryota

Kingdom – Plantae

Subkingdom – Tracheophytes

Phylum – Spermatophyte

Subphylum – Angiospermae

Class – Dicotyledonae

Sub division – Eudicots

Order – Asterales

Family – Asteraceae

Genus – Galinsoga

Species – Galinsoga parviflora

1.2. Vernacular Name

Common name: Quick Weed, potato weed, guasca, gallant soldier.

English: chickweed, French soldier, Peruvian daisy, small-flower galinsoga

Kannada: Kalesoppu

Tamil: Mookuthi Poo

Malayalam: Mukuthipoovu

According to the regions and language , Galinsoga parviflora was known as locally by various vernacular name . Traditonally , socities from various regions are easily accessing this medicinal plant by referring to vernacular name in Table .

Table.1. Vernacular Name

Language / Region	**Vernacular Name**
Australia	Yellow weed , Potato weed
Indonesia	Batakacut , bribil , mondreng and jukut saminggu
Central Java , Indonesia	Loseh , gletang
Oaxaca , Mexico	Piojito , Hierba de piojito
Pindari Valley (India) , North Western Himalaya	Banmara
Japan	Khavu
India	Potato weed
Tripura , India	Gangaful , Garingburani sam
Uttarakhand ,India	Soch
Zulu-Natal , South Africa	Ushukeyana , Isishukelana
Kumaun Himalaya	Khusari
Southern Ethiopia	Ematiya/bizdiya
Northern Ethiopia	Dka-Nequel
Rajouri , Jammu and Kashmir ,India	Piploo
Brazil	Picao-branco

1.3. Geographical Distribution

The species is native to South America and also it is widely naturalized in other countries. There are some records of Galinsoga parviflora in Northern Ireland. It has been nationalization somewhere, including North America and Australia. It grows readily on sunny or shady fertile soil, uncultivated areas, wastelands and roadsides. In India Galinsoga parviflora are distributed in most Indian hill stations(Sravanthi et al., 2019). [4]

2. Phytochemical Constituents

Phytoconstituents from Leaves: Galinsoga parviflora leaves showed significantly presence of glycosides, carbohydrates, terpenoids, saponins, phenols, tannins, quinines, cellulose.

Phytoconstituents From Flowers: Alkaloids, glycosides, carbohydrates, saponins, tannins, cellulose and steroids were found significantly presence in aqueous extract of Galinsoga parviflora flower. Quinines and phenols slightly were presence. Flavonoids, terpenes and terpenoids were absent.

3. Morphology

Leaves: Leaves is simple and opposite, the lower leaves having petioles is about 2-15mm long ,with blade ovate and ovate oblong with 1-6.5cm *0.5-4.5cm, margin shallowly serrate. Leaf blade oval to oblong with sharp apex.

Inflorescence: The inflorescence consists of typical compositae or Asteraceae composite flowers with each 5-8mm across,and borne on long ancillary peduncles. Inflorescence a terminal and axillary head, often in pairs, involucres bracts in 2 rows, glabrous, pales present, scared.

Flowers: Each flower and capitulum bears two types of flowers they are Ligulate female, with white flowers at the margin and tubular hermaphrodite with yellow flowers in the central disc.

These are ray flowers female, usually it has 5 white, with short ligule and marked tube, or disk flowers tubular,with yellow. The dispersal units are achenes bearing pappus (or) parts of flower structures that can easily be transported by wind (or) animals.

Fruits: Fruits is an achene with 1-2mm long, in which it has central achenes ovate, or black, with pappus consisting of white fimbriate scales as long as the fruits, marginal achenes without pappus.

Seeds: Gallant soldiers is also shallow germinator (which is upto 2cm; 0.78 inches).

4. Phytochemicals

The main phytochemicals of G. parviflora has phenolic acids , flavonoids , depsides and corresponding glycosides . The flavonoids present in the G . parviflora are paturithrin , quercimeritrin , luteolin 7- beta - d – glucopyranoside , apigenin , 7- beta – glucoside , quercetagetin , galinthoside A and B , 7,3',4' – trihydroxyflavonones and pentahydoxy flavanone . The phenolic acids and depsides which include vanillic acid , isovanillic acid , p-coumaric acid , chlorogenic acid , p- hydroxyl benzoic acid , caffeoylglucaric acid and hydroxyl phenyl acetic acid . The aqueous extract for investigation of G. parviflora showed that presence of phyto sterols , alkaloids , glycosides , saponins , tannins , and flavonoids [58](Ali et al., 2017) . The chemical structure selected for isolated bioactive compounds are presented in figure. The phytochemical studies yielded 38 compounds which consists of flavonoids , aromatic esters , diterpenoids , caffeic acids derivatives , steroids , phenolic acid derivatives and other compounds . The study of aqueous ethanolic extract isolated 11 compounds they are , namely triacontanol (1) , beta-sitosterol (2) , beta - sitosterol (3) , stigmasterol (4) , 7-hydroxy – beta – sitosterol (5) , 7- hydroxyl stigma sterol (6) , beta-sitosterol – 3 – o – beta – D – glucoside (7) ,3,4- dimethoxy cinnamic acid (8) , proto catehuic acid (9) , fumaric acid (10) , and uracil (11). Galinsoga parviflora reported that leaves contains

a significant amount of flavonoids , quinine and cellulose , while flowers contain flavonoids , tannins , glycosides , celluloses , carbohydrates , quinine , steroids [59] and flavonone glycosides(Ali et al., 2017). Several bioactive compounds have been isolated and identified from different parts of the plant using various experimental approaches . 37 bioactive compounds were identified from the essential oils of G . parviflora , where compounds 29 was the major phyto constituent (Ali et al., 2017).

5. Flavonoids

Flavonoids can be aglycones, glycosides or methylated derivatives. This diverse group is major class of compounds isolated from G. parviflora. They are known to possess numerous biological activities(Ali et al., 2017). In 1977, two flavonoids, apigenin 7-β-D-glucoside (1) and luteolin 7-β-Dglucopyranoside (4) were isolated from dried leaves of G. parviflora (Ali et al., 2017). The plant was extracted with 70% ethanol on a water bath. The compounds were separated on column of polyamide sorbent and identified on the basis of melting points and UV-VIS spectroscopy.Two new flavonoids: galinsoside A (2) and galinsoside B (3); and two known flavanones: 3,5,7,3′,4′- pentahydroxy flavanone (7) and 7,3′,4′-trihydroxy flavonone (10) were isolated from methanol extract of whole plant material at room temperature. The ethyl acetate soluble fraction of the methanol extract was subjected to a series of column chromatographic techniques to obtain compounds 2, 3, 7 and 10 and their structures were established by UV, IR, MS and NMR spectroscopy(Ali et al., 2017). Surywanshi et al isolated two new compounds,3, 5, 7, 8, 4′ - pentahydroxy-3′- methoxyflavone-3-O- α-L-rhamnopyranosyl-7-O- β-D-glucopyranosyl-(1→4)-O-β-Dxylopyranoside (8) and 3,5,3′,5′-tetrahydroxy-7,4′-dimethoxyflavone-3- O-α-L-rhamnopyranosyl-(1→3)-O-α-Larabino-pyranosyl-3′-O-β-Dgalactopyranoside (11), and two known flavonoids, kaempferol (5) and quercetin (9) from air-dried and powdered stems of the plant (Ali et al., 2017). The

compounds 5, 8, 9 and 11 were purified using TLC and column chromatography from acetone soluble fraction and the structures assigned using melting points, FTIR, NMR and FABMS spectroscopic data(Ali et al., 2017). In 2014, Afza et al isolated and characterized a new flavonoid glucoside, parviside A (6) from nbutanol fraction and determined its structure on the basis of spectral data from 1D and 2D NMR techniques(Ali et al., 2017).

6. Aromatic esters

Three new aromatic esters galinosoate A (12), galinosoate B (13) and galinosoate C (14) were successfully isolated form n-hexane soluble fraction of methanol extract of G. parviflora through repeated column chromatography. The structures of the compounds were established on the basis of optical rotations, IR, UV, EI-MS, HREI-MS, 1D and 2D NMR spectral data (Ali et al., 2017).

7. Diterpenoids

The presence of ent-15-angeloyoxy-16-kauren19-oic acid (15), ent-15- angeloyoxy-16,17-epoxy19-kauranoic acid (16), ent-kaur-16-en-19-oic acid (17) and phytol (18) in G. parviflora has been discovered by column chromatography using silica gel and sephadex LH-20 [26](Ali et al., 2017). The structures of these compounds, were determined by spectral data analysis(Ali et al., 2017).

8. Steroids

Steroids constitute a distinct class of the compounds in G. parviflora. In 2013, Mostafa et al isolated 7-hydroxy-β-sitosterol (24), 7-hydroxy stigmasterol (25), stigmasterol (29), β-sitosterol (26) and β-sitosterol-3- O-β-D-glucopyranoside (27) from light petroleum extract of G. parviflora (Ali et al., 2017). These compounds were purified using silica gel column

chromatography, and their structures were established by melting point determination, IR, UV as well as Mass, 1H and 13C-NMR spectroscopic techniques(Ali et al., 2017). In another study, Pan et al purified α-spinasterol (28) from G. parviflora using silica gel column chromatography, and determined its structure by spectral data from analysis (Ali et al., 2017).

9. Caffeic acid derivatives

Using preparative HPLC method Galinsoga parviflora aerial parts and its hydrophilic extract four new caffeic acid derivatives have been isolated they are,2,3(4,5)-dicaffeoylaltraric acid , 2,3,4,5- tetracaffeoylglucaric acid, 2,4,5-tricaffeoylglucaric acid and 2,3,4- or 3,4,5-tricaffeoylaltraric acid(Harshitha et al., n.d.). Parviside was isolated from n-butanol fraction of methanolic extract is a new caffeic acid derivative (Harshitha et al., n.d.). Since Caffeic acid (3, 4- dihydroxycinnamic), which is a secondary byproducts with polyphenols possess a number of pharmacological and biological activities. The structure of the compound was established by Mass, NMR techniques(Harshitha et al., n.d.).

10. Phenolic acid derivatives

In health, polyphenols are essential phytochemicals and are found in the form of alcohols, sterols,and hydroxyl fatty acids(Harshitha et al., n.d.). Derivatives of benzoic acid was isolated from G. parviflora using column chromatography on silica gel: 4-hydroxy benzoic acid (32), gallic acid (31) and 3,4-dihydroxy benzoic acid (30), and to determine the structures of these compounds 1H-NMR, UV, IR, melting point, mass spectroscopic data are used. Gallic acid, 3,4-dihydroxy benzoic acid and 4-hydroxy benzoic acid are well known benzoic acid derivatives. These compounds were isolated from Galinsoga parviflora using silica gel in column chromatography(Harshitha et al., n.d.) .

11. Miscellaneous compounds

The presence of other compounds like fumaric acid, triacontanol, uracil and 3,4-dimethoxy cinnamic acid were characterized and isolated using Galinsoga parviflora's ethyl acetate and light petroleum fractions by silica gel column chromatography. Structures of these compounds are established by spectroscopic data(Harshitha et al., n.d.). octacosanoic acid and ursolic acid were isolated by Ferheen et al by silica gel column chromatography and structurally characterized by UV, IR, Mass, and 1H-NMR to get data of spectroscopy (Harshitha et al., n.d.).

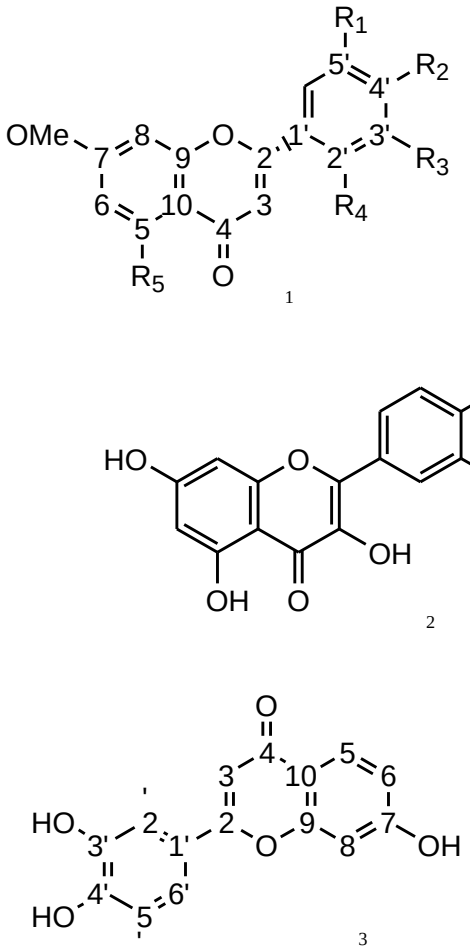
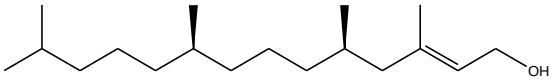


Figure 1 : Structure of flavonoids derived from Galinsoga parviflora



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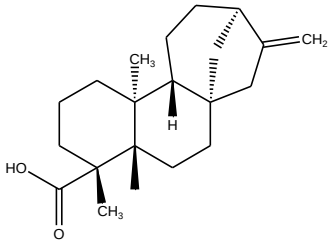

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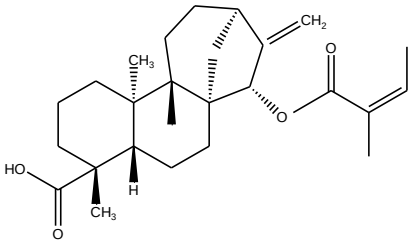

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Figure 2 : Structure of Diterpenoids Compounds Derived from Galinsoga Parviflora

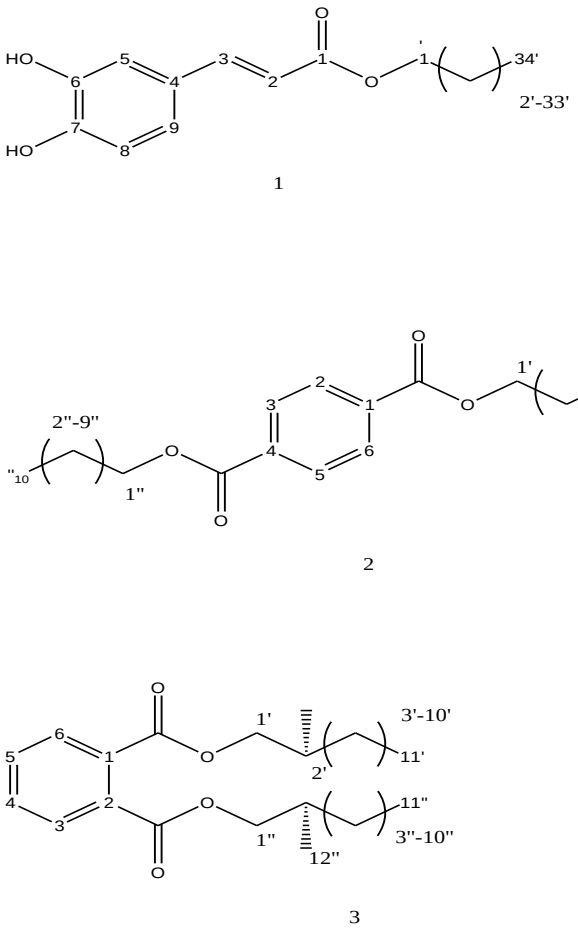

Figure 3 : Structure of aromatic esters derived form Galinsoga parviflora

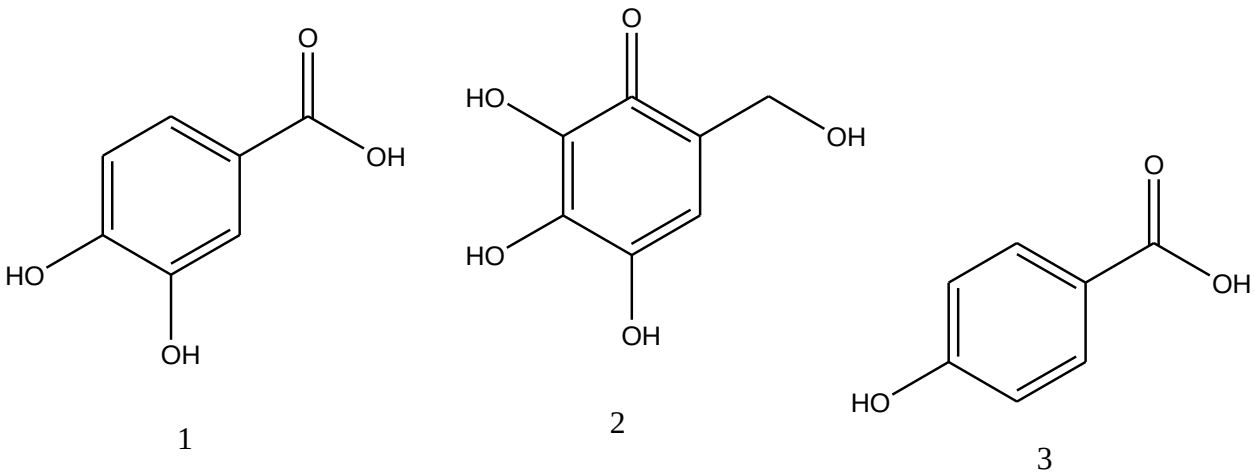

Figure 4 : Structure of phenolic derivative derived from Galinsoga parviflora

12. Pharmacological Activities of Isolated Compounds and Extracts

The isolated compounds and various extracts of G. parviflora manifest a variety of pharmacological properties such as antibacterial, antifungal, antioxidant, nematicidal, antiinflammatory, cytotoxic, urease, α- glucosidase, lipoxygenase, hepatoprotective and hypoglycemic activities .

Figure.5. Block Diagram

12.1. Antibacterial activity

Hexane, methanol and water extracts of aerial parts of G. parviflora have been evaluated for antibacterial activity against Bacillus subtilis, Micrococcus luteus and Staphylococcus aureus. The hexane extract (100 mg/mL) showed antibacterial activity against B. subtilis, M. luteus and S.aureus, whereas the methanol and aqueous extracts did not produce any antibacterial effects . Compounds have been screened for antibacterial effects against various gram (+ve) and gram (-ve) bacteria . It showed very good activity against E. coli at the highest concentration used, but it exhibited less activity against P. aeruginosa, and S. aureus at minimum concentration. The compound exhibited the highest activity against S. aureus at the

highest concentration but showed less activity against E. coli, and B. subtilis at minimum concentration . Light petroleum and ethyl acetate fractions of ethanol extract of G. parviflora showed weak antibacterial effect against all tested grampositive bacteria, except B. Subtilis. All the extracts exhibited weak antibacterial effects against the tested gram-negative bacteria, K. pneumoniae and S. typhimurium, but produced significant activity against E. coli and P. aeruginosa, relative to the standard drug cefotaxin . Studies have also revealed that the leaf oil of G. parviflora exhibited specific antibacterial properties against gram positive S. aureus and B. cereus(Ali et al., 2017).

12.2. Antifungal activity

It has been reported that light petroleum, ethyl acetate fractions and ethanolic extract of G. parviflora exhibited significant antifungal activities against A. niger and C. albicans, when compared to the standard antifungal drug nystatin(Ali et al., 2017).

12.3. Anti-inflammatory activity

The aerial part extracts of G. parviflora have been tested for antiinflammatory activity using the cyclooxygenase (COX-1) assay. The methanol, hexane and water extracts (500 µg/mL) showed 90.0±1.5, 68.0±4.5 and 54.0±2.5% inhibitions, respectively against cyclooxygenase (Ali et al., 2017). Methanolic extract of G. parviflora (IC50 30.7 µg/mL) showed high level of anti-inflammatory activity against 5-lipoxygenase (5-LOX)(Ali et al., 2017).

12.4. Antioxidant activity

The ethyl acetate fraction showed strong antioxidant activity at a concentration of 150 mg/mL, relative to 0.1 M ascorbic acid (Ali et al., 2017). Studies using methanol extracts showed that the 20 % methanol fraction produced the strongest antioxidant activity against DPPH radicals

with SC50 value 6.78 ± 0.98 μg/mL, while the 50 % methanol fraction produced maximum scavenging capacity against superoxide, with SC50 value of 30.6 ± 3.1 μg/mL (Ali et al., 2017). However, the H2O fraction of the methanol extract exhibited the highest activity, with IC50 value of 6.86 ± 1.31 μg/mL against linoleic acid peroxidation. Studies by Ferheen et al revealed that compound exhibited strong antioxidant activity (Ali et al., 2017).

12.5. Nematicidal Activity

Hexane, chloroform, ethyl acetate and methanol fractions of the crude extract, and seven isolated pure compounds of G. parviflora were assessed for nematicidal activity against Meloidgyne incognita and Cephalobus litoralis for 24 and 48 h . The ethyl acetate fraction exhibited the highest mortality against Meloidgyne incognita. While compounds showed significant activity against Cephalobus litoralis, the compound was found to be highly active against both species (Ali et al., 2017).

12.6. Cytotoxic activity

Two fractions of G. parviflora extract were subjected to cytotoxicity screening on HL60 (human promyelocytic leukemia) cells. The chloroform and ethyl acetate fractions showed anticancer activities, with IC50 values of 8.5 and 10.5 μg/mL, respectively . At low concentrations (down to 100 μg/mL), the ethanol extract displayed weak cytotoxic activity against MCF-7 breast cancer cell line(Ali et al., 2017).

12.7. Urease activity

Strong and moderate inhibitory activities on urease have been exhibited by compound 2 and compound 3, respectively (Ali et al., 2017).

12.8. α-Glucosidase activity

It has been reported that compound 3 showed strong inhibition against α–glucosidase activity (Ali et al., 2017). Hepatoprotective activity The ethanolic extract of G. parviflora (400 mg/kg BW) and the standard silymarin (150 mg/kg BW) significantly decreased the levels of serum alanine aminotransferase (ALT) activity comparing with CCl4 induced cirrhotic rats group (Ali et al., 2017).

12.9. Hypoglycemic activity

It has been demonstrated that ethanol extract of G. parviflora (400 mg/kg) exerted hypoglycemic properties nearly equal to those of the standard drug glibenclamide (5 mg/kg BW) (Ali et al., 2017). The pharmacological properties of crude extracts, fractions and isolated pure compounds of G. parviflora are summarised(Ali et al., 2017).

12.10. Anti-diarrheal activity

Diarrhea was caused by ingesting castor oil 0.5ml by p.o. to mice. 800, 400, 200 and 100 mg/kg were administered to groups II-IX, p.o. Galinsoga parviflora's methanolic extract. Group X receives the loperamide, standard drug (0.5 mg/kg, b.w). The animals were given castor oil 0.5 ml/mouse, p.o., after 1 hour of administration of drug and put individually in cages on filter paper. The cumulative number of episodes of diarrhea was counted group-wise. Group III-X receives G. Parviflora extracts at 800,400, 200, and 100 mg/kg p.o. Group X, receives loperamide. Diarrhea was caused by 0.5 ml of 100 µg/kg, i.p. PGE2 dosage immediately. The inhibition in the intestinal fluid percentage was measured after 30 min by comparing the values with the regulation of the vehicle. Significant inhibitor efficacy at higher dose of plant extracts against PGE2-induced intra fluid deposition and castor oil-induced

diarrhea was seen. In the charcoal meal examination the plant extract demonstrated a significant decrease in gastrointestinal motility(Ali et al., 2017).

12.11. Anti-microbial activity

Seltsamia galinsogisoli sp. isolated from the rhizospheric soil, described as strain SYPF 7336. Seltsamia galinsogisoli sp.nov., through molecular and morphological studies, demonstrating high antibacterial activity. The secondary metabolites for the analysis of Seltsamia galinsogisoli sp. seven known compounds and two novel compounds totally Nine compounds, were effectively isolated from the broth of strain fermentation. The separated compounds were tested for their antimicrobial operations. The compounds Galinsogisoliyu (2), 1H-2-Benzopyran-1- one,6,8-dihydroxy-3-(2-hydroxypropyl)(5) and Seltsamiayu(1) demonstrated antimicrobial activity with MIC values of 25, 32, and 75 µg/mL against Staphylococcus aureus(Ali et al., 2017).

12.12. Anti-hyperglycemic activity

A decrease in blood glucose level with Galinsoga parviflora ethanolic extract (400 mg/kg) in comparison with glibenclamide, standard drug (5 mg/kg b.w.) was found. Therefore, the ethanol extract showed significant hypoglycemic activity(Ali et al., 2017).

13. Medicinal and Therapeutic Uses

- Galinsoga parviflora also has some medicinal uses as a tropical treatment for nettle stings.
- It also helps to prevent hypertension and cardiovascular diseases.
- The herb Galinsoga parviflora or guascas exhibit ACE inhibitors and help improve blood flow.

- The juice of the whole plant is applied to treat wounds. It helps to coagulate the blood of fresh cuts and wounds.
- The dried leaves are an essential flavoring for certain dishes.
- Used in the treatment of cold sores, common cold and flu, toothache, and eye diseases.
- Used as fodder for cattle.
- Humans also use it as a vegetable for preparing soups and salads.
- The roots provide effective remedy against beetle bites.
- In traditional medicine it is used in treatment of dermatological problems such as eczema and lichens.

Table.2. Plant Parts, Country and Uses

Plant part	Country	Uses
Whole plant	India, Java, America, Equador	Treatment of wounds, cold, flu, cold sores, halt bleeding, as fodder for cattle, body injuries, yellow fever, hepatic pain, painful joints, fever and internal inflammation, potherb, earache, skin diseases, and scorpion bite.
Leaves	India, South Brazil, Java, Africa	Treatment of diarrhoea, fever, snake bite, haemorrhages, eaten as a vegetable, malaria, anaemia-with jaundice, to detach fetal placenta, colorectal cancer, analgesic, liver problem, toothache, inflammation, colds and sores.
Stem	Africa	Treatment of colds and sores
Roots	Pakistan	Treatment of beetle bites,
Flowers	Africa	Treatment of toothache, and enhanced memory,
Aerial part	America, Java, Asia	Mitigation of lichens, acne, wounds, eye problems, eczema, and rosacea, protect against UV irradiation-induced damage, fever, toothache, inflammation, liver problem, and insect bite.

14. Conclusion

The Galinsoga parviflora is an important genus which belongs to Asteraceae family and exhibits a variety of pharmacological activities. It is an important member of this genus. G.parviflora is underutilized vegetable categorized as a weed , which has potential medicinal and nutritional value that can be utilized to attain a healthier community . It is employed by various socities globally to manage both communicable and non communicable diseases. Therefore future study should continue to isolate and identify bioactive compounds evaluating mechanism of action and their effectiveness against various diseases.

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