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A REVIEW ON: PARTHENIUM HYSTEROPHORUS

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ABSTRACT

Parthenium hysterophorus, also known as congress weed, gajar ghans, white top, feverfew, or ragweed parthenium, is a plant found in Central America, the West Indies, Africa, Asia, and Oceanic regions. It is recognized as the 7th most dangerous plant due to its secondary metabolites, which have biological effects and are used in traditional medicine. The plant has both positive and negative impacts on humans, with 40-50% of crop production declining worldwide. It also plays a role in spreading diseases such as asthma, cancer, allergies, and stomach diseases. The plant's growth is accelerated during rainy seasons and can spread seeds easily. It is often used as an anti-oxidant, anti-dibieties, anti-cancer, and anti-tumor agent, and as a green manure due to its high concentrations of essential minerals. Some of the most significant chemical compounds in Parthenium plants exhibit allelopathic activity, which describes the beneficial or harmful effects of one plant on another. Allelopathic plants emit chemical compounds into the soil, which can be inhibited or destroyed by nearby plant.

KEYWORDS: Parthenium hysterophorus, Allelopathic activity, Secondary metabolites, Traditional medicine.

INTRODUCTION

Company is rich in mixes containing half of α- methylene- γ- lactone. The factory is generally known as Congress lawn or Gajargaan (carrot lawn) throughout India and also known as ragweed or pigweed. P. hysterophorus is distributed worldwide. Central America and the Caribbean are its regions of origin while Africa, Asia and Oceania are itspan-tropical regions. It's considered the 7th most dangerous country. Secondary metabolites save various natural products that form the scientific base for the use of gravies in traditional drug in numerous ancient communities. Among them, sesquiterpene lactones are the most wide. Parthenium hysterophorus Linnaeus is a species belonging to the Asteraceae family generally known as the “sunflower family.” Seschiterpenes containing an α- methylene- γ-

lactone half have attracted important interest due to their natural active parcels. PARTHENIUM HYSTHPRUS L has a plant that has a positive and negative impact on fatal realities. This plant is first blazoned in Austria and is the ultimate worldwide. Now this plant was present in 45 countries of the world. This plant changed the agrarian script of the world and reduced the global yield by 40- 50 percent. This plant isn't only dangerous to the global frugality but also plays a crucial part in spreading colorful conditions among the dead around the world, some of which include asthma, cancer, health problems, stomach conditions, etc. are well- known conditions each over the world. This factory matures in a month and can grow at any time if the terrain is favorable, but it grows fastest during stormy seasons, spreading its seeds veritably gently from one place to another with the help of colorful agents. The form of this factory is physically veritably beautiful and people use it in bouquets in different forms, indeed though they are n't apprehensive of how important and dangerous it's for health. This plant generally grows near the roadside, slant and colorful crop fields of the world, while the sponger works on them and eats food from useful stores and drops the crop. colorful researchers have linked its benefits.

It's used worldwide as an antioxidant, anti-inflammatory, anti-cancer andanti-growth agent, and the results are ultimately used as pesticides to control colorful conditions around the world, but it has also been used as green ordure for some time. This culture may contain N, Mg, Ca, K, etc. Its larger size gives fresh benefits to the factory product. the most important composites set up in Parthenium stores parade allelopathic exertion. Allelopathy is the means by which phytochemicals produced by one factory increase or drop the germination rate of another factory. Allelopathy explains that the useful or dangerous products of a plant in another plant, for illustration, crops and weeds interact. Alleropathy is caused by the release of biochemicals known as Allelocimical from the plant corridor through both filtration, perforter, volatilization, unpredictable, residual corruption, and natural and agrarian systems.) Allelopathic shops release chemicals from their roots into the soil, and bordering shops absorb these chemicals, causing them to be removed or indeed destroyed. Allelopathic goods are generally considered to be dangerous, but some products may be salutary, depending on the target of the allelochemicals and other factors. Allelochemicals beget cytotoxicity through physiological products. Regular compost crushed by P. hysterophorus can not sufficiently reduce the allelopathic products due to the maximum situation of parthenin and phenol. A new composting procedure was tried, involving extreme manipulation of the nutrient content of P. hysterophorus without persisting phenolic hazards, and via the millipede Harphaphe haydeniana. This millicompost was more effective than conventional ground parthenium compost. Vermicomposted parthenium consumes nutrients, limits unwanted hazards to shops, and also improves the quality of nutrients, making it salutary for organic husbandry and bioremediation.[4]

Common Name: Carrot Grass, Congress Grass, Wild Carrot Weed
Hindi Name: Chatak Chandni, Gajar Gawat
Botanical Name: Parthenium hysterophorus Family: Asteraceae (Sunflower)

HISTORY

Parthenium hysterophorus L. is an invasive weed plant belonging to the family Asteraceae. It is native plant of North-East Mexico and was predominant to America, but nowadays, it is extensively scattered in all over the world. Including Africa, Australia, United States, Central and South America, West Indies, India, Nepal, China, and Vietnam, magnificently. It is acknowledged with diverse names in different countries such as carrot weed, star weed, congress grass, wild feverfew, ragweed, bitter weed, white top, and the “Scourge of India”. Thus, it is now considered as one of

the "100 most invasive species in the world by "International Union for Conservation of Nature (IUCN)". and established It is an annual short-lived (4 to 6 weeks), highly branched, continuous and profuse flowering until senescence, high seed productivity (up to 15,000 to 100,000 per plant), light seed weight, upright (erect) herbaceous plant having height reaches up to 2 m or even more.[4] Parthenium was first reported from Ethiopia in 1988 at Dire dawa and Harerge of the eastern Ethiopia and subsequently near Desse, the north-eastern Ethiopia. Both these are the major food-aid distribution centers and there is a strong evidence that Parthenium seeds were imported from the subtropical North America as a contaminant of food aid during the 1980s famine and got distributed with the grain. Since its introduction, Parthenium has been spreading persistently in the agricultural lands, forests, poorly managed arable crop lands and rangelands, almost throughout Ethiopia. In Alamataalone, about 10,000 hectares of land has been invaded by Parthenium. It is also a health hazard to human and livestock. Parthenium has caused adverse effects on food security and biodiversity in the eastern and southern Africa. Its light seeds can travel long distances via wind, water and other agents. The Parthenium infestation causes the yield loss up to 40% in several crops and reduces the forage production up to 90% in India. Sorghum grain yield losses of 40-97% were also reported in Ethiopia in areas left unmanaged throughout the season. Parthenium does not directly compete with crops; rather it releases allelopathic chemicals to the soil that affect various crops and other plants. This review aims to assess the current status of the weed in Ethiopia and discuss the appropriate methods for its control.[5]

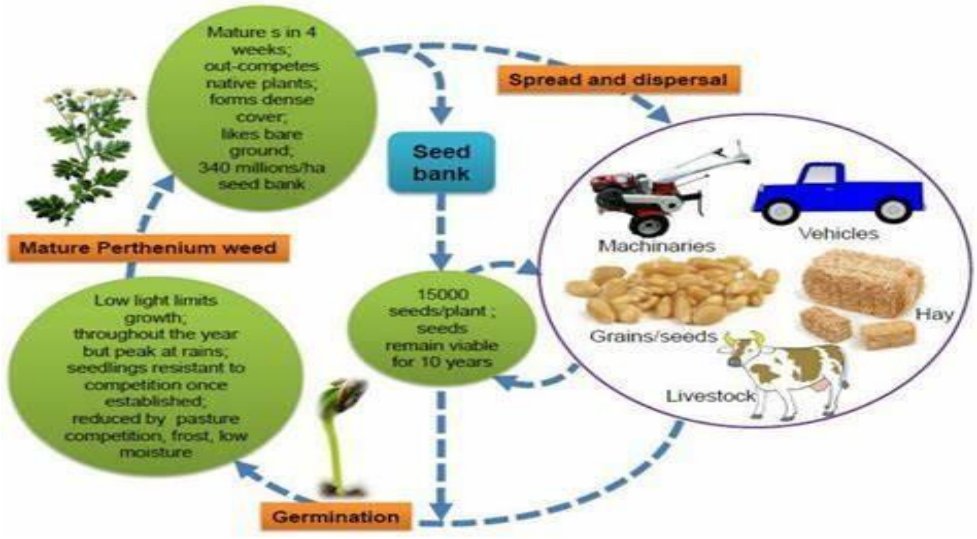

Fig no 1: Life cycle of Parthenium weed.[3]

A BOTANICAL DISCRIPTION OF PARTHENIUM AND ITS DISTRIBUTION

P. hysterophorus is an annual herbaceous plant that reproduces mostly through seeds (Figure 1). Following sprouting, the young plant has a basal rosette of bright green and finely lobed leaves that measure about 8–20 cm in length and 4–8 cm in breadth. During unfavorable conditions, the rosette stage can continue to grow up to a maximum of 2.5 m long. Both leaves and stems have short and fluffy hair or trichomes, four styles of which have been recognized and considered for their taxonomic significance. The flower heads are terminal and somewhat hairy; they consist of several small white capitula-shaped florets. Usually, each head has five productive ray florets, although occasionally six or eight. Thousands of branches, which develop in separate clusters, produce compressed black seeds about 2 mm in size. Originally, Parthenium was found in the Gulf of Mexico, the USA, the West Indies, and Central America. Parthenium has now invaded 46 countries and regions.[3]

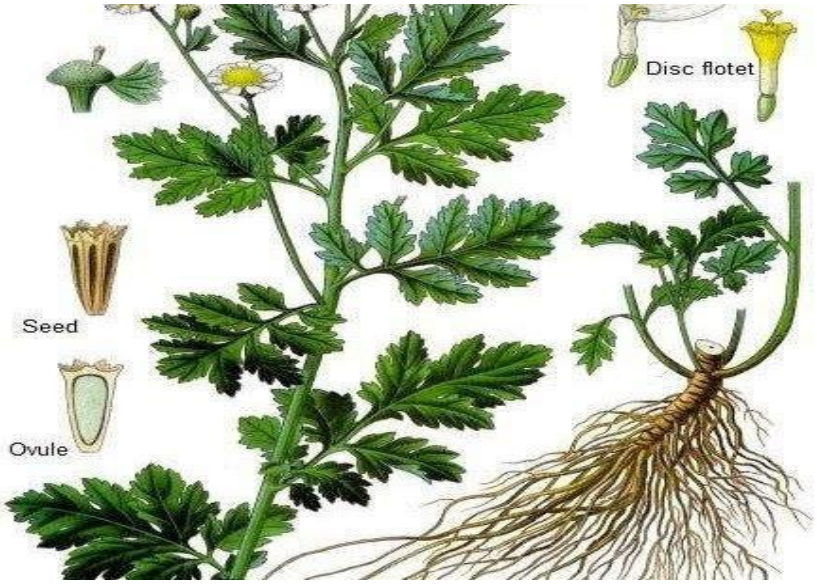

Fig no 2: Different Plant parts of Parthenium hysterophorus.[3]

HYSTEROPHORUS: PHYTOCHEMISTRY OF PARTHENIUM

Whole plant: Two types of sesquiterpene lactones, hysterin and dihydroisoparthenin have been isolated from plant P. hysterophorus. Histamine(0.585) is present in upstanding corridor of the plant. Syringaresinal has also been isolated from this weed. Three ambrosanolides; α- epoxymethylacrylyloxy parthenin, its 11α13- dihydro derivatives and 8α eposeymethylacrylylos ambrosin have been isolated from chloroform extract of the upstanding corridor of the P. hysterophorus. A normal sesquiterpenoid, charminarone(the first seco-mock guaianolide) has been isolated from the whole plant. Relative compositions of these lactones vary in different species of Parthenium. Parthenin is characteristic of P. hysterophorus while hysterin, hymenin and ambrosin of P. kipinnatifidum. Hysterin is the major sesquiterpene of P. glomeratum. Quercetagetin 3,7- dimethyl ether is a major flavanol present in this plant. Small amount of 6-hydroxylaemferol, 3,7- dimethyl ether and the glucosides, quercetin3-0- glucoside, Kaemferol 3-0-glucoside and kaempferol 3-0-arabino glucoside have also been isolated from P. hysterophorus. Phenolic glucosides show oscillations in number and amount depending on the collection of point. Accumulation of fumeric acid in stem and leaves and ferulic acids in all corridor of the plant except pollens, have also been reported. These phenolic acids are said to be responsible for allelopathic impact of plant P.hysterophorus.

Leaves: Parthenin, hexacosanol, myricyl alcohol, β sitisterol, campesterol, stigmasterol, betulin, ursolic acid, β- D-glucoside of β- sitosterol and saponin have been isolated from leaves of P. hysterophorus. The saponin on hydrolysis yield oleanolic acid and glucose. The arid extract of P. hysterophorus contains free amino acids, glucose, galactose and potassium choloride.[4,8] Methoxypseudoguaianolides viz. 13- ethoxy- dihydroambrosin, 13-methoxydihydro parthenin and- dimethoxy- dihydroparthenin have been insulated from leaves of this factory. The leaves also contain parthenin, caffeic, chlorogenic, p- hydroxybenzoic, vanilic, salicylic, gentisic,neo-chlorogenic and proto- catechuic acids. The allelochemical parthenin is sequestered at high position in capitate- sessile tirchomes on splint shells of P. hysterophorous. Leaves contain about 5 parthenin.

Flower: Methanolic excerpt of flower of P. hysterophorous contains several ingredients similar as 2β hydroxycoronopilin, 8β- hydroxycoronopilin, 11- H, 13 hydroxyparthenin, parthenin and coronopilin. Parthenin up to 8

is present in capitulum. A new largely oxygenated pseudoguaianolides (8 β- acetoxyhysterone C), parthenin, coronopilin and hysterone C have also been insulated from the flowers.

Root: Histamine(0.35) is present in the roots of factory P. hysterophorus. The roots contain parthenin, caffeic, chlorogenic, p hydroxybenzoic, p- anisic, vanilic, salicylic, gentisic, neo chlorogenic and proto- catechuic acids.

Biological conditioning: Sesquiterpene lactones parade a wide diapason of natural conditioning, which include cytotoxic, antitumour, allergen, antimicrobial, antifeedant, phytotoxic and insecticidal parcels. The sesquiterpene lactone parthenin is the main secondary metabolite of P. hystorophorus L.(Compositae) and retain all the parcels mentioned over. Parthenin the major sesquiterpene lactone becomes useful when duly reused. The early reports suggest that parthenin can be used in pest and pathogen control, either by it tone or as a supereminent emulsion for the development of active and more picky analogues.

Insecticidal: Parthenin the active emulsion present in Parthenium hysterophorus is known to show exertion against termites, cockroaches (as well as migrant grasshoppers, Melanoplus sanguinipes. Whole factory excerpt of Parthenium hysterophorus showed nonentity growth nonsupervisory exertion against the cotton stainer, Dysdercus angulatus, fifth instar naiads of S. litura and poisonous effect on cabbage splint webber, and palpitation beetle overrunning cowpea seeds and diminutives. The natural being resin material of the guayul factory (Parthenium spp.) has been demonstrated to cover wood against termite, molluscan borer and fungal attacks. Petroleum ether excerpt of leaves, stem and inflorescence of P. hysterophorus shows poisonous effect on mean life span and get product of grown-ups of the mustard aphid, Lipaphis erysimi. The environmental biologists have linked its cholinesterase negative parcels which can be used in control of insects and worms.

Antifeedant: Parthenium has been shown to act as a feeding interference to the grown-up of Dysdercus koenigii F., Tribolium castaneum Hbst, Phthorimaea operculella(Zell), Callosobruchus chinensis L. and sixth instar naiads of Spodoptera litura.

Nematicidal: Extract of P. hysterophorus show toxin against root knot nematodes Meloidogyne incognita (Kofoid and white), Chitwood, Helicotylendus dihyslera(Cobb) sher(Hasan and Jain, 1984). Persecuted leaves admixed into the soil are used to reduced root excruciating in papaya caused by M. incognita.

Herbicidal: Pure parthenin as well as excerpt of different corridor of P. hysterophorus show phytotoxic goods on numerous submarine as well as terrestrial weeds. The sesquiterpene lactone parthenin has entered utmost attention regarding allelopathy or implicit herbicidal parcels of the factory.

Antifungal: Antifungal eventuality of different excerpts of P. hysterophorus against mortal pathogenic fungi were delved by Rai and Upadhyay. The dermatophytes and other fungal pathogens have been set up to be sensitive to sesquiterpene lactones which are present as active agent in Asteraceous factory P. hysterophorus.

Antiamoebic: Antiamoebic exertion of parthenin from P. hysterophorus has been estimated in vitro against axenic and polyxenic societies of Entamoeba histolytica. Parthenin has been set up to show acute toxin to the dressed organisms. Parthenin has exertion similar to that of metronidazol.

Antimalarial: Parthenin and some of its derivations were estimated for antimalarial exertion against a multi medicine resistant strain of Plasmodium falciparum. Parthenin and related composites have significant antimalarial action.

Trypanocidal: Crude ethanolic excerpt of factory P. hysterophorus shows conditioning against Trypanosoma evansi. The excerpt exerts antitrypanosomal effect at intraperitoneal boluses of 100 and 300 mg/ kg body weight when used for treatment of infected rats.

Antibactarial: The unpredictable oil painting which contains sesquiterpene and flavanoids were set up to be largely effective against gram positive and gram negative bacteria and colorful species of dermatophytes.

Antiviral: Parthenium excerpt exhibits significant antiviral action against potato contagion Y. This contagion considerably damages the chilli crops. Parthenin might find use as an effective agent against potato contagion Y.

Cytotoxic: Pseudoguaianolides and their analogues parade cytotoxic effect. Themethanolic excerpt of P. hysterophorus has been set up to have antitumour effect in host mice bearing transplantable lymphocytic leukemia. The active emulsion leads to slow development of tumour and increases the survival of mice bearing lymphocytic leukemia. Studies conducted at the Cancer Research Institute, Bombay and in vitro ctotoxicity against mortal cancer cells have shown that P. hysterophorus retain anticancerous parcels. Parthenin exhibits cytotoxicity with chromosomal rarities in supplemental blood lymphocytes when administered to mice. A singleintra-peritoneal cure of 4 31 mg/ kg body weight of beast of parthenin increases the frequence of micronucleated reticulocytes in mice.

Table no 1: Macroscopical characteristics of Parthenium hysterophorus.

Parameter	Characteristics
Common name(s)	Congress grass, parthenium weed, ragweed parthenium, white top weed and karottenkraut (German).
Type	None.
Origin	Native to subtropics of North and South America.
Habitat	All disturbed land including pastures, farms, agricultural areas and range grasslands.
Distribution in Pakistan	Punjab (Sialkot, gujranwala, Lohore, Kasur, Shekhupura, Gujrat, Jehlem, Rawalpind Islamabad).
Distribution in world	Australia, Taiwan, Southern China, Pacific Island, India and has recently spread to East and South Africa
Life form	Short-lived annual.
Habit	Erected, whitish, branched herbs.
Roots and undergrounds structure	Tap roots.
Active growth period flowering period	Summer.
Flowering period	Summer To Autumn (June to November).

CHEMICAL CONSTITUENTS

Allelochemicals produced by P. hysterophorus and some of the physiological effects are explained in. Allelochemicals have a range of physiological effects, including reduction in plant growth, excessive water absorption, leaf area expansion, and mineral nutrient absorption. The mechanism of any phytotoxic mix involves making the cell membrane permeable in general; ion flux and hydraulic conductivity are thereby disrupted. The changes to the membrane can have an impact on the plant– water relationship, photosynthesis rate, oxygenation, ion equilibrium, and stomata opening and closing.

In the lettuce plant, the relative water content and leaf water content can be reduced by 10%. This is caused by a reduction in CO2 supply to mesophyll cells and a reduction in photosynthesis. Gulzar and Siddiqui reported that p-coumaric acid, ferulic acid, salicylic acid, and caffeic acids produce water stress in treated seedlings of Glycine max and Sorghum bicolour. According to Einhellig et, several allelochemicals reduced radicle dry weight and moisture content in sprouting mustard seedlings. Caffeine's impact on cell division is limited because it inhibits cell membrane growth and the synthesis of nucleic acid chains. The phenolic acids p-hydroxy phenylacetic acid, p-coumaric acid, and ferulic acid can affect the photosynthesis of plants.

Table 2: Different chemical constituents of Parthenium hysterophorus.

Chemical Constituents	Mechanism
Hydroxyphenyl acetic acid, Ferulic, and p-coumaric acid	Degradation of chlorophyl
P-hydroxybenzoic acid	Impedes seedling growth, generates water stress, and triggers stomatal closing
Caffeine	Prevents cell division, and abnormal root growth
Caffeic acid	Inhibits seed germination, plant development, water relationship, decrease chlorophyll contents
Caffeic, p-coumaric, ferulic, salicylic acids	Induces water stress, reduce hydraulic conductivity
Cinnamic acid and Benzoic acid	Damage to the thylakoid membrane disrupts or changes membrane permeability, causes ion efflux, and reduces chlorophyll content

Health Benefits of Parthenium hysterophorus

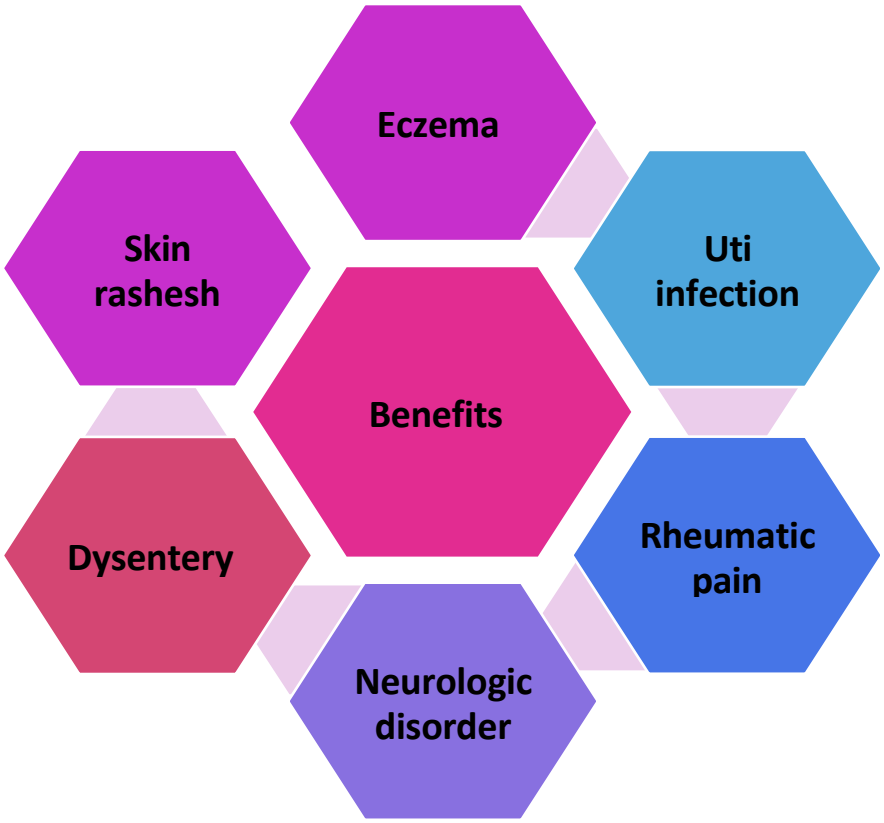

Fig no 3: Health Benefits of Parthenium hysterophorus.[13]

PREPARATION OF PARTHENIUM HYSTEROPHORUS EXTRACT

i) Secondly to obtain filter solution. c. The Parthenium was extracted using Parthenium from aerial parts (Fig no 3) are manually separated from plant and sundried for the duration of 3 weeks.

ii) After drying, the aerial parts are shade dried for the period of seven days. The net weight of separated aerial part of the flowers is 150 grams.

iii) Parthenium aerial or flower parts are crushed in grinder after drying.

iv) Solvent Extraction: Apparatus use for extraction purpose is Soxhlet Extractor. a. First the raw material is divided into three parts of 50 gram each. b. The thimble is first covered with filter paper so that raw material cannot directly pass through the thimble and the solvents methanol, ethanol and chloroform. The extraction time for each run was 12 hours.

v) After extraction process filtration is carried out.

vi) Extract is distilled to remove excess quantity of solvent and finally the sample of extract obtained is sent to High – performance liquid chromatography, HPLC, for detection of Parthenin content in the extract.

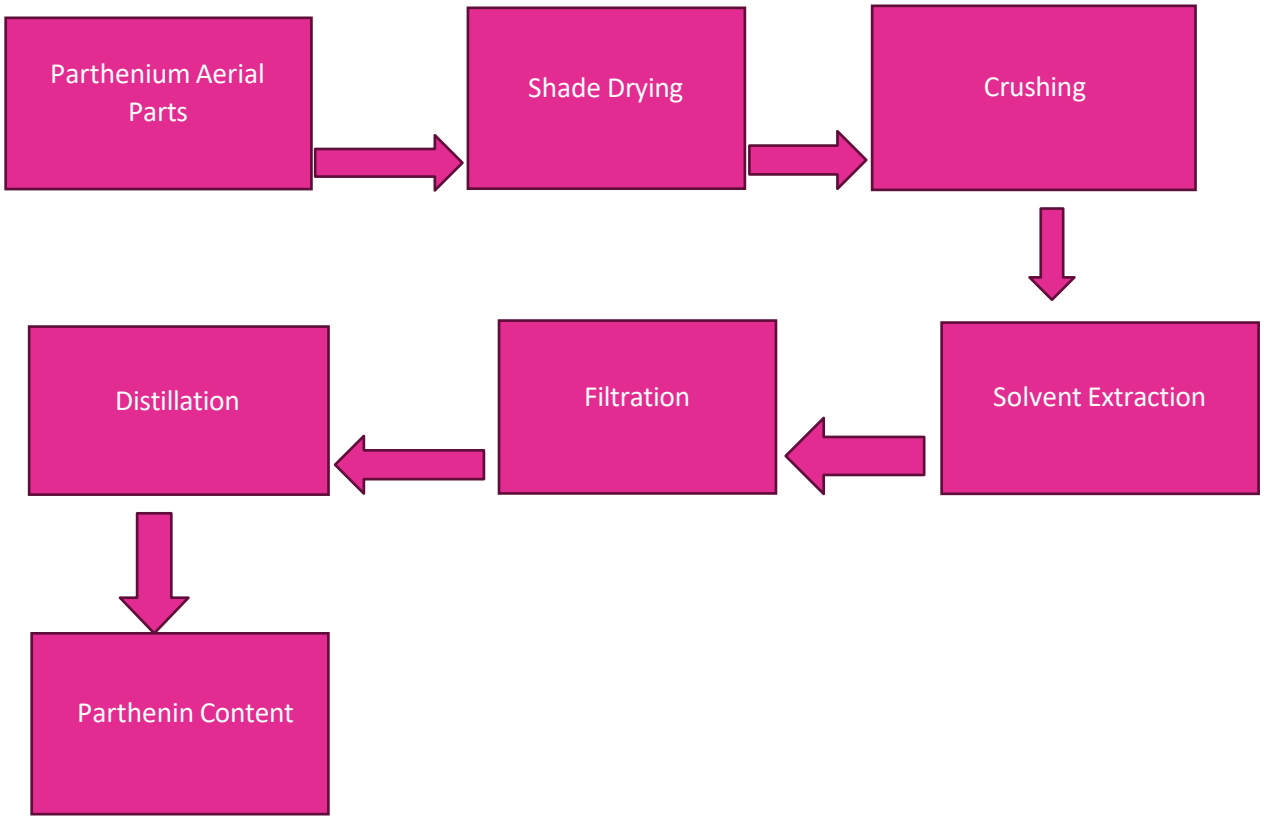

Fig no 4: Process Flow Diagram.

METHODS OF EXTRACTION

Fig no 3: Parthenium Arial Plants.

Soxhlet Extraction: Extraction was accomplished in Soxhlet extraction unit (Figure 3) at 65ºC and normal atmospheric pressure. Soxhlet extraction was performed using a Soxhlet apparatus and a heating mantle/electric heater. 500 ml of solvent (methanol) was filled in a flask, which was placed on a heating mantle to change the solvent to gaseous phase. The sample (small particles of Parthenium Hysterophorus) was filled in porus cellulose thimble and placed in mid portion – (Butt tube) of Soxhlet apparatus. The solvent was liquefied by cooling the solvent vapor by a water cooled condensor. The flow rate of cold water and temperature of heater was adjusted to liquefy the solvent at the rate of 20 drops per minute so that the liquefied solvent trickles in the extraction chamber containing the sample to perform the extraction. Extraction cycle: the extraction chamber is designed so that when the solvent surrounding the thimble exceeds a certain level (200 ml) is overflows and trickles back down in to the boiling flask. This is considered as one cycle. It took approximately 20 min for each. The extraction process was carried over for 3.5 hours. After completion of the experiment the flask containing the extract was removed. Similar runs were taken using ethanol, acetic acid and chloroform as solvent.

Fig no 4: The Soxhlet Extractor Unit.

Packed Bed Extraction: Extraction was performed using a packed bed column. 5 litres of methanol was filled in a tank. The sample (small particles of Parthenium Hysterophorus) was introduced in the column from the top to a height of 35 cm. The solvent was pumped from the tank to the top portion of column. The solvent (methanol) was trickled into the column through a glass sparger. The Flow rate of solvent was adjusted at 20 drops per min to perform as extraction. The extract was collected from the bottom. The extraction was carried for 3.5 hours. Figure 4 gives us the details of the experimental setup of packed bed column.

Fig no 5: The Packed Bed Reactor Unit.

Advantages & Disadvantages of Soxhlet Extraction over Fixed Bed Extraction

Advantages:

1) The displacement of transfer equilibrium by repeatedly bringing fresh solvent in contact with the solid matrix.
2) Maintaining a relatively high extraction temperature with heat from distillation flask.
3) No filtration requirement after leaching.
4) Also, the Soxhlet method is very simple and cheap.

Disadvantages

1) Extraction time is long.
2) Large amount of solvent is used.
3) Agitation cannot be provided in the Soxhlet device to accelerate the extraction.
4) The large amount of solvent used requires an evaporation/ concentration procedure.
5) The possibility of thermal decomposition of target compounds cannot be ignored as the extraction usually occurs at the boiling point of the solvent for the long time.[17]

USES

Antimicrobial and Wound healing activity: Hydroalcoholic extract of P. hysterophorus was in vitro effective against Plasmodium falciparum. In vitro, this plant demonstrated antiamoebic activity comparable to the standard drug Metronidazole against axenic and polygenic cultures of Entamoeba histolytica, responsible for amoebiasis Fusarium wilt, an economically important fungal disease in potato caused by Fusarium solani was significantly inhibited by aqueous, methanol and n-hexane extracts.Externally leaf paste application of P. hysterophorus showed wound healing activity.

Antioxidant activity: The antioxidant phytochemicals protect the cells from oxidative damage caused by free radicals. DPPH (2, 2-diphenyl-1- picrylhydrazyl radical) scavenging assay revealed that Methanolic and ethanolic extract of Parthenium antioxidant hysterophorus activity showed 78.25561% and66.28858% respectively. But next time acetone extract was found to have higher anti-oxidant activity than methanol and chloroform extracts. 200mg/kg of body weight of fresh leaves ethanolic extract has been showed significant antioxidant activity in rats. Hypoglycemic activity Administration of aqueous extract of P. hysterophorus flower (100 mg/kg of body weight) has been shown significantly

decreased the serum glucose level in normal and alloxan induced diabetic rats. Slightly decreased blood glucose level was found in rats after oral administration of fresh leaves extract.

Thrombolytic activity: Crude methanolic extract of P. hysterophorus has been shown significant thrombolytic effect comparable to standard thrombolytic agent, streptokinase Parthenolide and some other metabolites were determined as the inhibitor of human blood platelet function.

Pesticidal activity: Antifeedent bioassay revealed that lactone was found to be about 2.25 times more active than parthenin against sixth-instar larvae of Spodopteralitura and pyrazoline adduct was found to be the most effective as an insecticide against the adults of store grain pest Callosobruchus maculatus used pathenium against major insect pest of cruciferous crops Plutella xylostella and Aphis craccivora Koch.

Antifungal activity: Antifungal potential of different extracts of P. hysterophorus against human pathogenic fungi were investigated (Rai 1990). The dermatophytes and other fungal pathogens 3552 Int.J.Curr.Microbiol.App.Sci (2018) 7: 3548-3557 have been found to be sensitive to sesquiterpene lactones which are present as active agent in asteraceous P.hysterophorus (Rai 2003).[13]

CONCLUSION

The area alone, has become a global problem. The allelopathic chemicals released from this weed are the main factors responsible for its rigorous invasion. Since its introduction, Parthenium is adversely affecting the food security, and the human and animal health in Ethiopia, but the method of its control is confined to hand weeding involves a direct health risk. Different methods are being performed to control the Conclusion Parthenium, which often displaces the native plant species of the ecosystem and dominates weed in Ethiopia. Although not yet practiced in the country, biological control method is believed to be effective as it is environmentally friendly and comparatively cost-effective method. Tested in Ethiopia under quarantine, it has given promising results, which is good news to the Ethiopian agricultural sector in general and to the poor farmers in particular. However, since every single control method has its own limitations, combination approach is recommended to control Parthenium.[5] Parthenium plant is mostly known for its traits on natural ecology and its adverse effect on human and animal health. There are different techniques utilized so far to control this toxic weed. The most promising way is to manage the weed by proper utilization. Parthenium plant can be used as herbicide, pesticide, insecticide and also as a row material or as additives in different industry as paper, pulp and dye industries to list some of them. Different investigation has also shown the presence of essential compounds extracted from parthenium plant with potent antioxidant, antimicrobial, anticancer properties. Therefore parthenium plant can be considered as an alternative medicinal plant if further investigation is performed.[14] Parthenium can be used as an herbicide, pesticide, insecticide, raw material, or additive in a variety of industries, including paper, pulp, and dye industries, to name a few. Various studies have also revealed that Parthenium has potent antioxidant, antimicrobial, and anticancer properties. Its nutritive contents make it a potential composting agent, but more extensive research is needed to investigate it as a source of compost and a natural pesticide for various crops. There is a need to develop a low-cost, simple method for removing harmful allelopathic chemicals in order to exploit Parthenium in a useful way. Parthenium is an interesting weed due to having both harmful and beneficial effects in relation to crops, humans, and livestock. Further more, P. hysterophorus has many phenolic derivatives that are responsible for weed suppression. These phenolic derivatives should be investigated for their bioherbicide potential.[3]

REFERENCES

1. Loveleen Kaur a, Dharambeer Singh Malhi Harvinder Singh Sohal a, Vishal Mutreja a a, Raymond Cooper, Ajay Sharma a a, * b, Manvinder Kaur a, Harvinder Singh Sohal a, Raymond Cooper, Ajay Sharma. Comprehensive review on ethnobotanical uses, phytochemistry, biological potential and toxicology of Parthenium hysterophorus L.: A journey from noxious weed to a therapeutic medicinal plant.
2. Dr.Naushad Khan. Economic Review of Parthenium Hysterophorus L.Plant in the World.
3. H. M.Khairul Bashar 1,2, Abdul Shukor Juraimi 1,*, Muhammad Saiful Ahmad-Hamdani 1, Md Kamal Uddin 3, Norhayu Asib 4 andFerdoushiRahaman. A Mystic Weed, Parthenium hysterophorus: Threats, Potentials and Management. Accepted: 23 July 2021 Published: 29 July 2021.
4. Sarita Oli1, Rajeev Joshi2,*, Bhuwan Bohara3, A Review on Parthenium hysterophorus L. and Its Application in Agriculture. Accepted: 2023-11-15.
5. Abadi Birhanu and Pervaiz Rasheed Khan, The distribution, status and mitigation methods of Parthenium hysterophorus L. in Ethiopia: A review. Received: 03-05-2018 Accepted: 08-06- 2018.
6. P.C. Bhowmik, D. Srrkar and N.T. Yadrraju*, The status of partttenium hysterophor u.' and its potential managemen, 2007; 14.
7. Ali Kashkooe 1, Atefeh Jalali 1, Mohammad M. Zarshenas 1,2,* and Azadeh Hamedi Exploring the Phytochemistry, Signaling Pathways, and Mechanisms of Action of Tanacetum parthenium (L.) Sch.Bip.: AComprehensive Literature Review. Accepted: 8 October 2024 Published: 10 October 2024.
8. Archana Joshi1, R.K. Bachheti2* Ashutosh Sharma2 and Ritu MAMgAIN2, Parthenium hysterophorus. L. (Asteraceae): A Boon or Curse? (A Review), (Received: April 29, 2016; Accepted: June 02, 2016).
9. Veena B. Kushwaha* and Shivani Maurya, Biological utilities of Parthenium hysterophorus.
10. Chembolli Lakshmi, C. R. Srinivas. Parthenium: A wide angle view Parthenium: A wide angle view.
11. Manpreet Kaur, Neeraj KumarAggarwa l, VikasKumar, and Romika Dhiman. Review Article Effects and Management of Parthenium hysterophorus: A Weed of Global Significance Accepted 11 June 2014; Published 20 August 2014.
12. Javed Iqbal 1, Ayaz Ali Khan 1,*, Tariq Aziz 2,*, Waqar Ali 1 Anas S. Dablool 6, Saeed Ahmad 3, Shafiq Ur Rahman4, Zafar Iqbal 5,, Mashael W. Alruways 7, Abdulraheem Ali Almalki 8, Abdulhakeem S. Alamri 8 and Majid Alhomrani. Phytochemical Investigation, Antioxidant Properties and In Vivo Evaluation of the Toxic Effects of Parthenium hysterophorus. Accepted: 24 June 2022 Published: 29 June 2022.
13. Alka Sahrawat1, Jyoti Sharma1, Siddarth Nandan Rahul1*, Snigdha Tiwari1 and D.V. Rai2, Parthenium hysterophorus Current Status and Its Possible Effects on Mammalians- A Review 10 November 2018.
14. Terefe Tafese Bezuneh, Phytochemistry and Antimicrobial Activity of Parthenium hysterophorus L.: A Review, 2015; 3(3): 30-38.
15. Abhismita Roy1, Prashant Kumar2, A Review on The Pharmacological Properties and Other Aspects of Parthenium Hysterophorus (L.).
16. Anita Rathore*, Rohitash Dadhich and Anirudh Khatri, Ameliorative effect of prosopis cineraria extract ongross and histopathological parameters against parthenium hysterophorus induced skin damage in wistar albino rats, Received: 12.10.2023; Accepted: 22.12.2023.
17. Nitin T. Satao* and N. H. Shinde, Extraction of Parthenin from Parthenium Hysterophorus, JCPS, Sep-Oct 2014;

3(5).

18. Urmilesh J, Pritesh M C, Tushar T S, et al., CNS activity of methanol extract of Parthenium hysterophorus L. in experimental animals. Scholars Research Library, 2011; 3(4): 335-341.
19. Richa P, Asvene K S, Dharm D, et al., Phenolic Acids from Parthenium hysterophorus: Evaluation of Bioconversion Potential as Free Radical Scavengers and Anticancer Agents. Advances in Bioscience and Biotechnology, 2015; 6: 11-17.
20. Nganthoi D Y, Dutta B K, Romesh S et al., Allelopathic effect of Parthenium hysterophorus L. on growth and productivity of Zea mays L. and its phytochemical screening. International Journal of Current Microbiology and Applied Science, 2014; 3(7): 837-846.
21. Talemos S, Abreham A, Fisseha M et al., Distribution status and the impact of parthenium weed (Parthenium hysterophorus L.) at Gedeo Zone (Southern Ethiopia). African Journal of Agricultural Research, 2013; 8(4): 386-397.
22. Dipankar C R, Munan S., Toxicology, Phytochemistry, Bioactive compounds and Pharmacology of Parthenium hysterophorus. Journal of Medicinal Plants Studies, 2013; 1(3): 126- 141.
23. Weyl, P.; Ali, K.; GonzálezMoreno, P.; ul Haq, E.; Khan, K.; Khan, S.A.; Khan, M.H.; Stewart, J.; Godwin, J.; Rehman, A.; et al. The biological control of Parthenium hysterophorus L. in Pakistan: Status quo and prospects. Manag. Biol. Invasions, 2021; 12: 509–526.
24. Shabbir, A.; Dhileepan, K.; Adkins, S.W. Spread of parthenium weed and its biological control agent in the Punjab, Pakistan. Pak. J. Weed Sci Res., 2012; 18: 581–588.
25. Adkins, S.; Shabbir, A. Biology, ecology, and management of the invasive parthenium weed (Parthenium hysterophorus L.). Pest. Manag. Sci., 2014; 70: 1023–1029.
26. Bashar, H.M.K.; Juraimi, A.S.; Ahmad-Hamdani, M.S.; Uddin, M.K.; Asib, N.; Anwar, M.P.; Rahaman, F. A Mystic Weed, Parthenium hysterophorus: Threats, Potentials and Management. Agronomy, 2021; 11: 1514.
27. Chib, R.; Shah, B.A.; Andotra, S.S.; Bharadwaj, V.; Gupta, R.K.; Taneja, S.C.; Khajuria, R.K. Quantification of sesquiterpene lactones in Parthenium hyterophorous by normal-phase HPLC. J. Chromatogr. Sci., 2013; 51: 950–953.
28. Dhileepan, K.; Callander, J.; Shi, B.; Osunkoya, O.O. Biological control of parthenium (Parthenium hysterophorus): The Australian experience. Biocontrol. Sci. Technol, 2018; 28: 970–988.
29. Nithya et al. Oriental Journal of Chemistry, 2015: 31(4): 2319-2326.
30. Mcconnachie, A. J.; Strathie, L. W.; Mersiet, W.; Gebrehiwott, L.; Zewdies, K.; A Abdurehim, A.; Abrha, B.; Araya, T.; Asaregew, F.; Assefa, F.; Gebre-Tsadik, R.; Nigatutt, L.; Tadesse, B.; Tanatt, T. Weed Research, 2010; 51: 71-84. Patel, S. 3 Biotech, 2011, 1, 1-9.
31. Wakjira, M.; Berecha, G.; Tulu. S. African Journal of Agricultural Research, 2009; 4(11): 1325-1330.