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A Review On Goose Grass

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Abstract

Goosegrass (Eleusine indica) poses significant challenges as a global agricultural weed. Understanding its impact on crop growth is essential for effective weed management.Results indicated a clear inverse relationship between weed density and seed cotton yield, with the highest density (4 plants/m) leading to a notable reduction in yield by 20 to 27%.

In a different context, the aim of the study is to consolidate information on the pharmacological properties, phytochemistry, and toxicity of Eleusine indica.In the searching we are come to know that this plant possesses various beneficial effects, including antidiabetic, antimalarial, antibacterial, antifungal, anti-trypanosomal, antihelmintic, antioxidant, anti-inflammatoryand antiviral activities. The metabolites found in Eleusine indica include alkaloids, terpenes, flavonoids, tannins, anthraquinones, saponins, cardiac glycosides, and anthracene glycosides.Specifically schaftoside (C-glycosyl-6-C-arabinosyl-8-apigenin) and vitexin (apigenin-8-C-glucoside) these are the flavonoids are having antioxidant, anti-inflammatory, anti-cancer, anti-diebetic & neuroprotective activities. Importantly, studies indicate that Eleusine indica exhibits no significant toxicity, further highlighting its potential for various applications in pharmacology and agriculture.

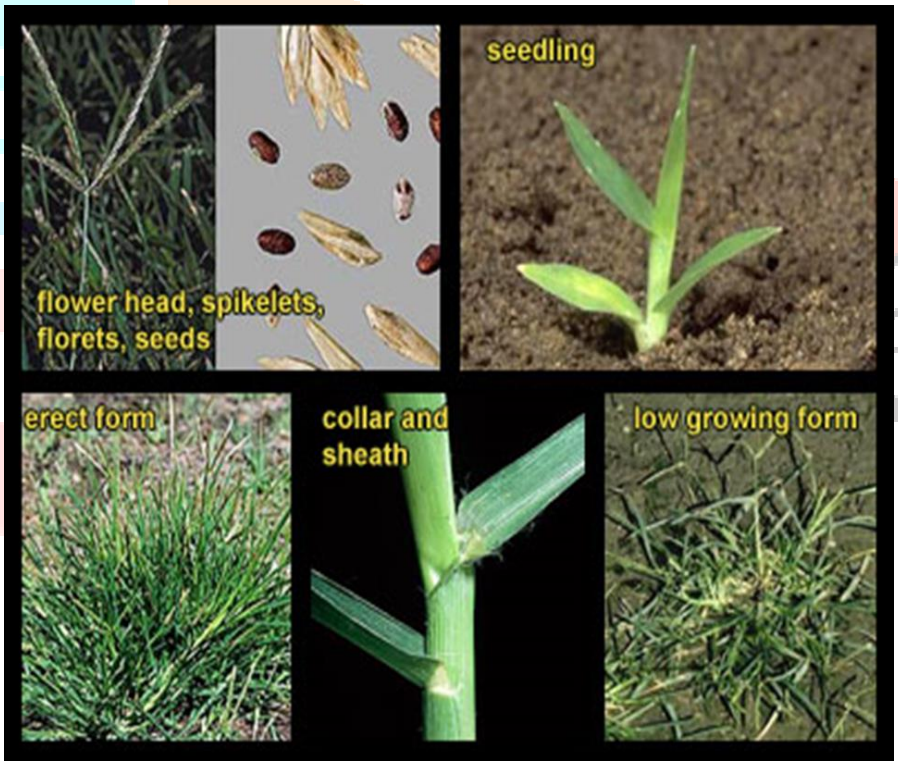
Index terms: **Antihelminthic, , Phytodrugs, Pharmacological properties, Tannins**

INTRODUCTION

Goosegrass is a weed that is found in india and is also known as Indian goosegrass,yard-grass,wiregrass,or crowfootgrass.Eleusine Indica is a genus of Asia,African and South America plants in the grass family,sometimes called by the common name goosegrass.In Africa, the practice of healing with plants has a long history, relying on knowledge passed down orally through generations among traditional healers and herbalists[2].In Benin, traditional medicine is widely practiced, with researchers identifying over 814 medicinal species from around 130 botanical families. Among these, Eleusine indica, commonly known as goosegrass, holds significant importance.

- Area : Eukaryota
- Reign : Plantae
- Phylum : Spermatophyta
- Sub-branch : Angiospermes
- Class : Monocotyledonae
- Order : Cyperales
- Family : Poaceae
- Genus : Eleusine
- Species : Indica

- It demonstrates remarkable adaptability to various environmental conditions, although its growth tends to decline during dry seasons[4]
- The entire plant, particularly the roots, possesses depurative, diuretic, febrifuge, and laxative properties,making it useful in treating ailments like influenza, hypertension, oliguria, and urinary retention[4]



- In southern China, resistance to paraquat has been observed in orchards, and glyphosate-resistant gooegrass has been identified in both fruit and vegetable farms.
- Despite the growing awareness of herbicide resistance in goosegrass, there is limited reporting on its severity in China, where farmers often resort to high doses and frequent applications of herbicides.
- This resistance complicates control measures for growers, posing significant challenges in crop management.
- This plant is ranked among the top five most damaging weeds globally, having a substantial impact on the cultivation of 46 different crop species across over 60 countries[5]

MORPHOLOGY

- The morphology of Goosegrass (Eleusine indica) involves a detailed description of its various plant parts, such as the stem, leaves, flowers, and seeds. It is a common weed that grows in tropical and subtropical regions, particularly in disturbed soils such as roadsides, lawns, and fields.

1. Leaves

- The leaves are narrow and linear, with a width of 3–8 mm. They are arranged alternately along the stem, and the leaf blade can be folded or lie flat. The leaf sheath is smooth and wraps around the stem at the base[27]
- STEMS
- The flowering stems, or culms, can be erect or prostrate. They are smooth and slightly flattened, and can reach a height of 28 in (70 cm)[27]

2. Inflorescence

- The inflorescence is a digitate spike with 2–6 spikes that are united at the base. Each spike is made up of many spikelets, and each spikelet contains 3–15 florets[28]

3. Fruit

- The fruit is a black, ellipsoid seed that is 1.5–2 mm long and has a wrinkled surface. The seeds are enclosed by loose, membranous tissue[29]

TAXONOMY

- Goosegrass (often referred to as Eleusine indica) is a species of grass that is commonly found in lawns, fields, and other disturbed habitats. Here is the taxonomy of goosegrass:

- Taxonomy of Goosegrass:
- Kingdom: Plantae (Plants)
- Phylum: Magnoliophyta (Angiosperms or Flowering plants)
- Class: Liliopsida (Monocots)
- Order: Poales
- Family: Poaceae (Grass family)
- Genus: Eleusine

- Species: Eleusine indica
- Scientific Name:
- Eleusine indica (L.) Gaertn.
- Common Names:
- Goosegrass
- Indian Finger Grass
- Wiregrass
- Crabgrass (sometimes confused with other species)

CHEMICAL CONSTITUENT

1. Flavonoids

   Quercetin: A flavonoid with antioxidant properties.
   Kaempferol: A flavonoid that may have anti-inflammatory, antioxidant, and anticancer effects.
   Rutin: A flavonoid glycoside that can have antioxidant and anti-inflammatory effects[24]

2. Triterpenoids

   Betulinic Acid: A pentacyclic triterpene that has been studied for its anti-inflammatory, anticancer, and antiviral activities.

3. Alkaloids

   Alkaloids like indoline derivatives have been detected, which are known for their bioactive properties, including antimicrobial and anti-inflammatory effects.

4. Saponins

   These glycosides can have antifungal, antibacterial, and anti-inflammatory properties. Saponins in Eleusine indica are thought to contribute to its medicinal properties.

5. Phenolic Compounds

   Gallic acid and its derivatives are present, with antioxidant, anti-inflammatory, and potential anticancer properties.

6. Fatty Acids

   Linoleic acid (an essential omega-6 fatty acid), Palmitic acid, and Stearic acid have been identified, which are important for their role in the regulation of various metabolic functions.

7. Amino Acids

   Essential amino acids, including glutamic acid and aspartic acid, have been found in the plant.

8. Steroids

   Sitosterol and other phytosterols, which are beneficial for reducing cholesterol and supporting heart health.

9. Polysaccharides

Polysaccharides present in the plant, particularly from the seeds and stems, have been shown to have immune-boosting properties.

10. Essential Oils

Some studies suggest the presence of essential oils with antimicrobial properties in Eleusine indica[26]

TRADITIONAL USES

1. Fever and Malaria

- In some parts of Africa, Southeast Asia, and the Caribbean, goosegrass has been used as a remedy for fever, which is a common symptom of malaria[30]

2. Urinary Health

- Goosegrass is known for its diuretic properties in traditional medicine. It has been used to promote urine flow and to treat conditions like urinary tract infections (UTIs) and kidney stones.

3. Wound Healing

- Goosegrass has been applied topically in some traditional medical systems to help heal wounds. The leaves are sometimes crushed and made into a paste, which is then applied directly to cuts, bruises, and burns[30]

4. Cough and Respiratory Disorders

- The plant has also been used to treat respiratory conditions such as cough, asthma, and bronchitis. In some traditions, a decoction of the plant is ingested to relieve congestion, clear phlegm, and ease breathing.

5. Blood Purification and Detoxification

- In Ayurvedic and traditional medicine in parts of Asia, goosegrass is considered a blood purifier. The plant is believed to have detoxifying effects and is used to cleanse the body of impurities. This use is typically based on the belief that goosegrass can help balance the body's humors (like in Ayurveda) and promote overall health[31]

6. Digestive Health

- In some indigenous cultures, goosegrass has been used to treat digestive issues, such as indigestion, constipation, and diarrhea. It is sometimes used as a mild laxative or to promote regular bowel movements[31]

7. Anti-inflammatory Uses

- Goosegrass is known to possess anti-inflammatory properties, and traditional healers have used it to treat conditions such as arthritis and rheumatism.

8. Skin and Hair Care

- In some cultures, goosegrass is used in skin care preparations due to its supposed antimicrobial, anti-inflammatory, and soothing properties. It is sometimes used in herbal shampoos to treat dandruff or to promote hair growth. Additionally, goosegrass is sometimes applied to the skin to soothe rashes or reduce irritation[32]

9. Antioxidant and General Health Tonic

- In traditional medicine, goosegrass is sometimes used as a general tonic for improving overall health. Its antioxidant properties are believed to contribute to its health benefits, including improving energy levels and reducing oxidative stress[32]

10. Treating Inflammation of the Liver and Spleen

- In some regions, particularly in Southeast Asia, goosegrass is used to treat liver and spleen disorders, especially those that involve inflammation. It is believed to have the potential to help regulate liver function and detoxify the body.

PHARMACOLOGICAL PROPERTIES OF E. INDICA

1. Antiplasmodial Activity :
   - In vitro studies have shown that the methanolic extract of E. indica exhibits strong antiplasmodial activity against the chloroquine-resistant strain of Plasmodium falciparum[12]
   - The ethanolic extract of Eleusine indica leaves demonstrated significant antiplasmodial activity in mice infected with Plasmodium berghei, with effects similar to those of chloroquine at a dose of 5 mg/kg[18]
2. Antidiabetic Activity :
   - The ethanolic extract from Eleusine indica leaves exhibited antidiabetic (hypoglycemic) effects in rats that were induced to be diabetic using alloxan[8]
3. Antibacterial Activity :
   - Chloroform and methanolic extracts of E. indica have demonstrated effectiveness against Staphylococcus aureus, Enterobacter aerogenes, Escherichia coli, Proteus vulgaris, Klebsiella aerogenes, Pseudomonas aeruginosa, as well as various species of Streptococcus and Bacillus.
4. Antifungal activity :
   - The antifungal activity of goosegrass is likely due to the presence of various bioactive compounds, many of which have been identified in its leaves, stems, and roots. Some of the known compounds with antimicrobial and antifungal properties in goosegrass include:
   - Flavonoids: These are known for their antioxidant, anti-inflammatory, and antimicrobial properties.
   - Alkaloids: Alkaloids from plants often show significant antifungal activity.
   - Saponins: These compounds have been associated with antifungal and antibacterial effects in numerous plant species.
   - Tannins and Glycosides: Some studies suggest these compounds may contribute to the inhibition of fungal growth.
5. Antioxidante activity :
   - The extracts of Eleusine indica have been shown to possess oxidizing capabilities against hydrogen peroxide and superoxide anions[13]
   - Scientific evidence indicates that the robust antioxidant properties of E. indica may contribute to its tolerance to herbicides[14]

6. Anti-inflammatory activity :
   - Goosegrass (Eleusine indica) has been studied for its anti-inflammatory properties, which are a central feature of its traditional medicinal uses. The plant is used in various cultures to treat conditions that involve inflammation, such as joint pain, wounds, skin conditions, and respiratory issues.
   - In a separate study, both ethanolic and ethyl acetate extracts of E. indica were found to dose-dependently decrease paw edema in rats induced by xylene.

7. Antiviral activity :
   - E. indica exhibits potent inhibitory effects against the Herpes Simplex virus.
8. Lipid reducing activity :
   - E. indica has demonstrated the ability to lower blood lipid levels. The hexane extract of Eleusine indica has shown significant potential in inhibiting porcine pancreatic lipase[16]
9. Anti-hypertensive properties :
   - Both ethanolic and chloroform extracts of E. indica have demonstrated antihypertensive effects, as evaluated in an experimental study.
   - The findings revealed that the ethanolic extract significantly inhibited hypertension, while the methanolic extract showed comparatively lower activity[17]
10. Phytochemical composition **:**

- Phytochemical screening of the E. indica extract has shown the presence of alkaloids, terpenes, flavonoids, tannins, anthraquinones, saponins, and cardiac glycosides[8]

CONCLUSION

This literature review has enabled the identification of all existing scientific data regarding the pharmacological, chemical, and toxicological aspects of E. indica for the first time.The synthesis reveals that E. indica exhibits various pharmacological properties supported by numerous scientific investigations.

The properties of the plant are attributed to the presence of secondary metabolites. Furthermore, the toxicological studies conducted indicate that the medicinal plant shows no signs of toxicity.

All of this supports the numerous traditional applications of this member of the Poaceae family. E. indica should be further explored in more comprehensive scientific studies, including advanced pharmacological testing, isolation of active compounds, and the development of phytomedicines.

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