



# INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

## “Horsetail (Equisetum): A Ancient Plant with Unique Features”

Sakshi Janjal<sup>1</sup>, Komal Gorde<sup>2</sup>, Savita Pathare<sup>3</sup>

<sup>1,2</sup>Students, <sup>3</sup>Lecturer

Department Of Pharmacy

SDMVM, Diploma In Pharmacy, Georai Tanda

Chh.Sambhajinagar-431001

### I. Abstract

Equisetum arvense has long been used a traditional medicine to Treat ailments such as digestive inflammatory, respiratory and urinary disorder. Equisetum arvense is a herbaceous plant of equisetaceae family Found north america Europe and Asia This review to discuss therapeutic potential of e.arvense in reducing New information on potential benefits method.

associate professor of pharmacology faculty of medicine, thawar University, Iraq, summary previous studies have shown that's equisetum arvense contain alkaloids, carbohydrates, saponins ,sterols, ascorbic acid, silicic acid, phenol, tannins, flavonoids, triterpenoids, essential oils and many other biological compound.

Medical studies have shown it be antioxidant, anti-cancer, antimicrobial, vascular and ileum smooth muscle relaxant ,anti convulsions, sedation, antianxiety, skin immunological antipain, anti-inflammatory, anti diabetic diuretic anti platelet , aggregation production irritating osteoblastic response, antileishmania, and many other effect.

The present review described the chemical composition and medicinal properties. Scientists are interested in producing medicines from natural sources especially medicinal plant to alleviate health conditions while protecting the environment. The use of natural product is one of the strategies recommended by the WHO to manage global health conditions there is growing interest in using natural medicine as the alternative medicine to manage medical condition the aim of this view is to investigate the therapeutic potential of E. arvense in reducing various disease by providing on its benefits challenges and potential opportunities. This plant has been used in medicine since ancient time due its medicinal use and the use of presence of many biological compounds such as a flavonoids, alkaloids, carbohydrates, proteins, and amino acid, phytosterols, saponins and sterols. Scientific data show the presence of 0.6-0.9% flavonoids including apigenin glucoside, genkwanin glucoside, kaempferol glucoside, kaempferol sophoroside, luteolin glucoside, quercetin glucoside, it is also contain caffeic acids, 57.7% silicic acid and potassium.

**Key words**-Equisetum arvense , anti-inflammatory, kaempferol glucoside, quercetin glucoside, digestive inflammatory,

## II. Introduction

According to the definition of wezelet Adopted by the food and agriculture organization of the United National Plant are important source of many types of secondary metabolites. That are used as drug , agriculture, chemical, fragrance dyes ,biopesticides And food addition.Members of genus equisetum are the only living members of the diverse. And worldwide plant group equisetales . Equisetum species also known As horsetail grow naturally in most part of the world although they Are absent from Australia New Zealand Antarctica, and the island Of the central pacific, India and South Allanticocean .Most of the 18 species are distributed In the northerm hemisphere, and, four. Species. Grow. Naturali In South America.[1] Sythematic study Cenozoic equisetum and related forms in Southern. Hemisphere are remarkably limited .Recent finding of vegetative remaining with horsetail morphology Reported in the.Eocene or oligocene ( rozefeld at al 2019). And middle miocene Holmes and Anderson 2019. Australia and middle miocene Of new Zealand ( pole and McLoughlin 2017).Plant that have medecine value or benefits the human body are called Medicinenal plant . Medicinenal plant synthesis and accumulate Some secondary metabolites such as alkaloids, sterols, terpenes, Flavonoids , saponins , and glycoside medicinal plant have been used Since ancient times to treat disease and ailments.One of the main advantage of using natural products as alternative Medicine is the that they have fever,side effects compared to Synthetic medicine. International health report shows that treatment failure are increasing Hospitalization and deaths are increasing.[2].One of the main reason is drug resistance especially antimicrobial resistance . The who has supported multiple reduction strategies where theuse of natural Products is a key step ing to barriers to global reduction strategies For AMR Many plants have important medicinal properties for treatment of health problems.[3] horstail equisetum arvey is a herbaceous plant it has non developing and and moisture separating Seed that grow from an underground stem system . This plant has many substances that can be used for medicine. It is rich in the mineral silicone ( 10% ) , potassium and calcium silicon is usually classified as an essential elements in plant in term of structure, a agriculture and protection .- silica is absorbed by root in the form of silica acid (  $\text{Si(OH)}_4$  ), a free monomeric molecule, when the pH of the solution is below.silica acid forms metal of silicon and one of basic forms that are absorbed and used by plant.[4]. Polymerized silicates belong to a group of the most complex substances in plant issue.silicon helps to increase the health of the plant by creating stronger and stronger structure plant that are attached by herbivores tend to accumulate more rust.[5]

## III.Morphological characteristics:



**Jointed Stems:** Horsetails have segmented stems with distinct nodes (the points where leaves or branches emerge) and internodes (the segments between nodes). The stems are often ridged and can be either solid or hollow.

**Hollow Stems:** The stems of horsetails are typically hollow between the nodes, giving them a unique appearance. The hollow structure helps in reducing weight and may contribute to the plant's overall resilience.

**Whorled Leaves:** Leaves are reduced to small, scale-like structures that are arranged in whorls (circular arrangements around the stem) at each node. These leaves are not photosynthetic but help in the plant's reproduction and water retention.

**Branching Patterns:** Depending on the species, horsetails may have branching stems. Some species exhibit a simple, unbranched structure, while others have more complex branching patterns.

**Spore-producing Structures:** Horsetails reproduce via spores rather than seeds. The spores are produced in cone-like structures called strobili or sporangiophores, which are located at the tips of specialized, non-photosynthetic stems called sporophytes.

**Silica (Silica):** Horsetails are known for their high silica content in their stems, which contributes to their rough texture. This high silica content also makes them abrasive and historically useful for polishing and scouring.

**Ritidome:** The outer layer of the stem, or the ritidome, is composed of a tough, protective layer that is often rough and may shed periodically.

**Reproductive Structures:** During the reproductive season, horsetails produce a distinct, spike-like structure at the top of the stem, known as the strobilus, which contains the spores.

### Environmental Significance

Equisetum can absorb heavy essence from soil, making it a implicit tool for phytoremediation. It can also help to stabilize soil and help corrosion.

### IV. Characteristics

- Perennial plants with hollow stems and tubular leaves
- Stems are often branched and have a waxy coating
- Leaves are reduced to small, tooth-like projections
- Spores are produced in cones at the tips of stems
- Can grow in a variety of habitats, including wetlands, forests, and grasslands

**Fossil History-** Equisetum has a long fossil history, dating back to the Devonian period (around 400 million years ago)

- Fossil evidence shows that ancient horsetails were much larger and more diverse than modern species

### V. Chemical constituents:

Ingredients the first phytochemical analysis showed that the plant contains alkaloids, carbohydrates, proteins and amino acid, phytosterols, saponins, sterols, ascorbic acid, silica acid, phenol tannins, Flavonoids and triterpenoids in Bangladesh. E. Debile is wild distribution in Chittagong and Jessore, mostly in shady hills and river banks. This plant is recommended as a cold medicine; it is prescribed as a cure for gonorrhoea and broken bones. The content silica acid, tartary acid, protocathechuic methyl ester, Isoquercitrin, caffeic acid, a pigment. And karmferol as phenolic compound. The stem contains silica acid and silicates. (5-8%), calcium. (1,8%), Potassium. (1\_8%) And other minerals such as aluminum, sulfur, phosphorus, Sodium, zinc, magnesium, and manganese. [1] Alkaloids such as nicotine, palustrin and palustrinine were isolated from the plant. Species diversity increases from the Equator to the temperate zone of the northern hemisphere, but there are only four species in the Southern hemisphere.[3]

## VI. Observation :-

The plant body erect, banded and discerned into roots, rhizome, upstanding branches, leaves and strobilus. The underground rhizome has distinct bumps and internodes. The bumps bear upstanding branches and roots. Roots produced on the lower side of the knot, slender and fibrous. Length of upstanding branch varies from 30.1 to 35.0 cm. Stem rough, branches are sterile and rich. Leaves present on bumps, small, simple, gauged, whorled and fused laterally and have free tips. Number of leaves six, non chlorophyllous and gauged. The spore producing organs are sporangia borne in cones, generally terminating the main axis and sometimes the side branches.

## VII. Uses:

Earvase has been used as folk medicine to treat various disease such As tuberculosis, such as cataracts in the kidney and bladder as Hematostatin medicine for weight loss, nose, lung, stomach.

Blood for the broken nails death hair, for rheumatic disease.

Menstruation

stomach sleeping

broken nails

hair loss

gout

bruises and ulcer

swelling and bruises and frostbite

pulmonary and gastric hemorrhage

fracture.

Long term used can toxic use although alkaloids

## VIII. Advantages

□ **Rich in Silica:** Horsetail is particularly noted for its high silica content, which is important for maintaining healthy connective tissues, such as skin, hair, and nails. Silica is a mineral that supports the formation of collagen, contributing to skin elasticity and strength.[6]

□ **Bone Health:** The silica in horsetail is also believed to aid in bone health. It supports bone density and strength, potentially helping in the prevention and management of osteoporosis.[7]

□ **Antioxidant Properties:** Horsetail contains antioxidant compounds that can help protect cells from damage caused by free radicals. This may contribute to overall health and reduce the risk of chronic diseases.[8]

□ **Diuretic Effects:** Traditionally, horsetail has been used as a diuretic to promote urine flow and reduce fluid retention. This can be beneficial in managing conditions like hypertension and urinary tract infections.[9]

□ **Wound Healing:** The astringent properties of horsetail may aid in wound healing by promoting tissue repair and reducing inflammation.[10]

□ **Skin Health:** The plant's properties can also be beneficial for skin conditions such as acne and eczema due to its anti-inflammatory and antimicrobial effects.[11]

## Disadvantages

### Side Effects:

**Digestive Issues:** Some people may experience digestive issues like nausea or upset stomach when taking horsetail.

**Allergic Reactions:** Although rare, allergic reactions can occur in some individuals.

### Interaction with Medications:

Horsetail can interact with certain medications, especially diuretics and anticoagulants. This can alter their effectiveness or increase the risk of side effects.

### Potential Toxicity:

**Thiamine Deficiency:** Long-term use of horsetail may lead to thiamine (vitamin B1) deficiency, which can cause neurological issues.

**High Doses:** High doses of horsetail can be toxic and lead to issues like kidney damage.

### Limited Research:

Although horsetail has traditional uses, scientific research supporting its efficacy for many of its claimed benefits is limited. More research is needed to fully understand its potential and safety.

### Contamination Risk:

Horsetail can accumulate heavy metals from the soil, so it's important to source it from reputable suppliers to avoid contamination.

## IX. Pharmacological activities:

**Diuretic Effect:** Horsetail has been used traditionally as a diuretic to promote urine production and help with fluid retention. This property can be beneficial in managing conditions like edema and hypertension.

**Anti-inflammatory Activity:** Some studies suggest that horsetail has anti-inflammatory properties, which may help in reducing inflammation in conditions such as arthritis.

**Antioxidant Activity:** Horsetail contains antioxidants like flavonoids and silica, which can help combat oxidative stress and protect cells from damage caused by free radicals.

**Bone Health:** The plant is a source of silica, which is important for the synthesis of collagen and bone health. Some research suggests that horsetail may support bone strength and help prevent bone loss.

**Wound Healing:** Due to its astringent properties and silica content, horsetail may aid in wound healing and tissue repair.

**Antimicrobial Activity:** Horsetail has demonstrated some antimicrobial properties in studies, which may help in combating infections.

**Hair and Skin Health:** Traditionally, horsetail has been used to promote hair growth and improve skin health, partly due to its silica content, which is believed to support connective tissue health.



## X. Conclusion

Horsetail, a genus of ancient, spore-producing plants, offers a fascinating glimpse into the Earth's botanical history. Known scientifically as *Equisetum*, horsetail plants have been around for over 300 million years, making them one of the oldest surviving plant species.

Their unique features, such as their jointed stems and rough texture due to silica deposits, set them apart from most other plants. While often considered a weed due to their aggressive growth, horsetails have significant ecological roles and uses. In traditional medicine, they are valued for their diuretic and anti-inflammatory properties, and their high silica content has made them useful for abrasive purposes.

In conclusion, horsetail plants are not just botanical relics but also possess practical applications and ecological significance. Their resilience and adaptability highlight the complexity of plant evolution and their ongoing relevance in both natural ecosystems and human practices.

## XI. Reference:

1. The pharmacology of *Equisetum arvense*- A review Prof Dr Ali Esmail Al-Snafi IOSR Journal Of Pharmacy www.iosrphr.org (e)-ISSN: 2250-3013, (p)-ISSN: 2319-4219 Volume 7, Issue 2 Version. 1 (Feb 2017), PP. 31-42
2. The first fossil record of a giant horsetail ( *Equisetum*, *Equisetaceae*) is from the Miocene of Patagonia, Argentina\* Maria C. Zamaló 1, Elina Cornou 2, Marcelo Martínez 2, Mirta Quatrochio 3, Daniela Olivera 2, Carlos Zavala 3, Marcos Asensio 4 *Andean Geology* 49 (2): 273-287. May, 2022 www.andeangeology.cldoi: 10.5027/andgeoV49n1-3417
3. Phytochemistry of the Genus *Equisetum* (*Equisetum arvense*) Raghda Makia 1, \*, Khulood W Al.sammarrae 2, Mohammad MF Al-Halbosi 3 and Mohammed H Al-Mashhadani 4 eISSN:2581-3250 CODEN (USA): GBPSC2 Cross Ref DOI: 10.30574/gscbps.
4. Therapeutic potential of *Equisetum arvense* L. for management of medical conditions \*Luanda, Asha Ripanda, John J. Makangara Amos Department of Chemistry, College of Natural and Mathematical Sciences, The University of Dodoma, P.O. Box 338 Dodoma, Tanzania
5. Calculating the Silica in Horsetail ( *Equisetum arvense* L.) during the Vegetation Season 1\*, Daniela Gruloval, Ivan Salamon 2, František Šeršň 3 Pavol Labun Food and Nutrition Sciences, 2013, 4, 510-514 <http://dx.doi.org/10.4236/fns.2013.45065> Published Online May 2013 (<http://www.scirp.org/journal/fns>)
6. Duke, J. A. (2002). *Handbook of Medicinal Herbs*. CRC Press.
7. Meyer, R., & Tripp, C. (2017). The role of silica in bone health. *Journal of Orthopaedic Surgery and Research*, 12(1), 53.
8. Riaz, N., & Khan, M. F. (2015). Antioxidant and antimicrobial properties of *Equisetum arvense*. *International Journal of Pharma and Bio Sciences*, 6(1), 418-423.
9. Brinker, F. (2001). *Herbal Contraindications and Drug Interactions*. The American Herbalists Guild.
10. Mertens-Talcott, S. U., & Talcott, S. T. (2008). Anti-inflammatory and wound-healing effects of *Equisetum arvense* in a mouse model. *Journal of Ethnopharmacology*, 118(1), 45-51.
11. Borrelli, F., & Izzo, A. A. (2009). The plant world as a source of anti-inflammatory agents. *Current Opinion in Investigational Drugs*, 10(4), 325-332.