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REVIEW ARTICLE

A SHORT REVIEW ON PHARMACOLOGICAL ACTIVITY OF *EQUISETUM RAMOSISSIMUM*

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ABSTRACT:

Equisetum ramosissimum species is considered a medicinal plant used to treat various diseases. The present review reveals that the plant *Equisetum ramosissimum* is used in treating various diseases. The plant is used highly by the rural and tribal people in curing various disorders. *Equisetum ramosissimum* has an effective natural origin that has a tremendous future for research. The present review also describe the use of the plant and an attempt was made to gather information about the qualitative analysis of phytochemical and pharmacogical activity of the plant and its constituents.

Keywords: *Equisetum ramosissimum,* pharmacogical activity

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INTRODUCTION:

The stems of the plant *Equisetum ramosissimum* D.(*Equisetaceae*) commonly known in Spain as "cola de caballo" are extensively used in traditional medicine, in the Canary Islands, for the treatment of renal lithiasis, healing fractures and osteoporosis, as well as for the diuretic properties**.** *Equisetum* (horsetail, snake grass, puzzlegrass) is the only living genus in *Equisetaceae*, a family of vascular plants that reproduce by spores rather than seeds.[1]

Figure 1: Whole plant of *Equisetum ramosissimum*

Classification of *Equisetum ramosissimum*

Kingdom- Plantae

Subkingdom - Tracheobionta

Division- Equisetophyta

Class- Equisetopsida

Order- Equisetales

Family- Equisetaceae

Family Genus- *Equisetum* L.

Species - *Equisetum ramosissimum* Desf.

Botany

Putod is a perennial herb, with jointed and branched rootstock. Roots are in whorls from the nodes. Stem is hollow and noding, the length of the internodes 2 to 6 centimeters with longitudinal striations at the surface. Leaves are obsolete, reduced to scales around the node. Cones (strobili) are oblong, green-yellow in color depending on maturity, terminal or spirally

borne on the tip of the stem. The species differs from Equisetum debile in that the fertile stems are much branched, and are grooved and rough.[2]

Distribution

probably widely distributed throughout the Philippines at medium, to high altitudes (about 1,000 to 6,000 ft above sea level). Usually found along exposed stream embankments on sandy to stony soil. Easily overlooked because it blends with grassy landscape. Easily grown in ordinary garden soil.

Parts utilized:

Stem.

Properties

Sweet and slightly bitter tasting.

Cleanses the liver and clears the eyesight.

Diuretic and astringent.

Uses

1. Hypertension, reddening and swelling pain in the eye, pterygium of the cornea.
2. Used for diarrhea, jaunditic hepatitis, and renal lithiasis.
3. Dosage: 15 to 30 gms of dried material in decoction.
4. In China, decoction of whole plant used from wounds and ulcers. Also, used as antitussive and diuretic.
5. In India, used as cooling medicine for gonorrhea.

Studies

Antioxidant:

Study on scavenger activities of three equisetum species, including E ramosissimum, showed *E telmatela* to have the most scavenger and antioxidant activity.[3]

Diuretic / Toxicity / CNS Depressive Activity: An ethanol extract administered to Swiss albino mice showed moderate level of toxicity and central nervous depressive properties. The ethanol extract also exhibited an interesting diuretic activity in male Sprague-Daley rats when administered orally and intraperitoneally.

Other reported Activity

S. No.	Topic	Author	Year	Work done
1	Biofunctional activities of *Equisetum ramosissimum* extract: protective effects against oxidation, melanoma, and melanogenesis. Oxidative medicine and cellular longevity	Pin-Hui Li,Yu-Pin Chiu, Chieh-Chih Shih, Zhi-Hong Wen, Laura Kaodichi Ibeto, Shu-Hung Huang, Chien Chih Chiu, Dik-Lung Ma, Chung-Hang Leung, Yaw-Nan Chang, and Hui-Min DavidWang [4]	2016	Examined biofunctional activities of *Equisetum ramosissimum* Extract: protective effects against oxidation, Melanoma, and Melanogenesis. Oxidative medicine and cellular longevity. Experiments indicated that the biofunctional activities of ethyl acetate extract contained in food and cosmetics protect against oxidation, melanoma, and melanin production.
2	Antioxidative and antiproliferative activities of different horsetail (Equisetum arvense L.) extracts	Cetojevic-Simin DD,Canadanovic-Brunet JM, Bogdanovic GM, Djilas SM, Cetkovic GS, Tumbas VT, and Stojiljkovic BT [5]	2013	Investigated antioxidative and antiproliferative activity of different horsetail (*Equisetum arvense* L.) extracts. The results indicate that n-butanol, methanol, ethyl acetate, and water extracts had significant peroxyl radical scavenging activity. Extracts inhibited cell growth that was dependent on cell line, type of extract, and extract concentration. Ethyl acetate extract exhibited the most prominent ant proliferative effect, without inducing any cell growth stimulation on human tumor cell lines.
3	Scientific evidences for clinical use carneiro Dm. *Equisetum Arvense:* scientific evidences for clinical.	Carneiro Dm**,** Tresvenzol Lmf, Jardim Pcbv, and Cunha Lc.[6]	2013	The results showed of preclinical pharmacological studies demonstrate several important *in vitro* and *in vivo* biological activities, including antioxidant, sedative, antimicrobial, antiplatelet, cytotoxic, vasorelaxant,

				hepatoprotective, ant diabetic, analgesic, anti-inflammatory, wound-healing, rematerializing, antilithiasic and diuretic activities. No clinical studies supporting the use of horsetail as a diuretic or studies on the mechanism of action of horsetail extracts were identified.
4	Review: hepatoprotective and microbiological studies of three genera: *Equisetum, Lycopodium,* and *Gentiana*.	Maria Suciu, Aurel Ardelean [7]	2012	Reviewed on the potentials of a few miracle plants that have the ability to reduce or cure liver damage. *Equisetum, Lycopodium* and *Gentiana* genera species are well known homeopathic plants in the Northern Hemisphere. Their properties are used in many disorders, and in the recent studies they are tested for their microbiological and hepatic curative actions.
5	Evaluation of antioxidant activity of some pteridophytes.	Amit Semwal, Mamta S Farswan, Kamalesh Upreti, SP Bhatt, Kumud Upadhyaya [8]	2013	Worked on antioxidant activity of *Diplazium esculentum* was the strongest, followed in descending order by *Adiantum lunulatum*, *Pteris vittata*, *Equisetum ramosissimum* Desf. and *Ampelopteris prolifera* (Retz.). All the *methanolic* extracts exhibited antioxidant activity significantly. The IC_{50} of the methanolic extracts ranged between 0.32 ± 0.12 and 0.81 ± 0.21 mg/ml.
6	Evaluation of *in vitro* antioxidant potential of methanolic extracts of the Ferns, *actiniopteris radiata* (SW) link. and *equisetum ramosissimum* desf	Paulsamy S. Moorthy, D. Nandakumar K. Saradha M.[9]	2013	Reported that the antioxidant activities of methanolic extracts of *Actiniopteris radiata* and *Equisetum ramosissimum*. *Actiniopteris radiata* and *Equisetum ramosissimum* were found to have potent antioxidant activity against DPPH with

				the I_{C50} value of 93.48 and 78.58 respectively. *Actiniopteris radiata* had the highest values for ABTS·+ radical scavenging activity (2523.11µ TE/g) and reducing power assay (0.853 absorbance at 700µg/ml). However, the fern, *Equisetum ramosissimum* exhibited higher ferrous iron chelating activity (41.18% at 5000µg/ml) than *Actiniopteris radiata*.
7	Exploring *Equisetum arvense* L., *Equisetum ramosissimum* L. and *Equisetum telmateia* L. as sources of natural antioxidants	Dubravka Stajner, Bories M. popavic, Jasna Candanovic Brunet, Goran Anackov. [10]	2009	Worked on the antioxidant and scavenging activities of above ground parts of *Equisetum arvense* L., *Equisetum ramosissimum* L. and *Equisetum telmateia* L. phosphate buffer (pH 7) extracts were investigated. The total antioxidant capacity was determined by ferric reducing antioxidant power assay. The *Equisetum telmateia* extract demonstrated scavenging and antioxidant properties better than *Equisetum ramosissimum* and *Equisetum arvense.*
8	Antimicrobial Activity of Some Medicinal Plants from East and Central Part of Nepal	*Bimala Subba, Prakash Basnet* [11]	2014	Prepared ethanolic extracts of various plants such as *Cissus repens, Hedyotis scandens, Jatropha curcas, Morus alba, Inula cappa, Equisetum ramosissimum, Osyris wightiana, Alternantheria sessilis* and *Hibiscus lampas* investigated individually for antimicrobial activity. These were investigated against selected species of *Staphylococcus aureus, Escherichia coli, Proteus vulgaris* and *Klebsiella pneumoniae* to find the inhibitory activities of the microbes.

9	Physiological metabolism and protective enzyme activity of Equisetum ramosissimum under Cu stress.	Li Y, Liu D. [12]	2006	Concluded that high concentration Cu disturbed the physiological metabolism, and critically threatened the normal growth of *E. ramosissimum*. The activities of protective enzyme, especially of SOD and POD, were enhanced with increasing Cu concentration, and had a positive correlation with Cu concentration (rPOD = 0.978, rSOD = 0.926, $P < 0.05$).
10.	Antifungal activity of some plant extracts against two yeasts isolates in vitro.	Najwa Mohammed Jameel Ali Abu-Mejdad [13]	1992	Conclude that the antifungal activity alcoholic extracts of six plants and contain more active compounds allowing Recommended therapeutic alternatives to antifungal chemical drugs.

Conclusion

The present review reveals that the plant *Equisetum ramosissimum* is used in treating various diseases. The plant is used highly by the rural and tribal people in curing various disorders. *Equisetum ramosissimum* has an effective natural origin that has a tremendous future for research. The present also describe the use of the plant and an attempt was made to gather information about the qualitative analysis of phytochemical and pharmacological activity of the plant and its constituents.

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