

Phytochemical and Pharmacological Review Profile of *Adiantum venustum*.

Sofi Mubashir* and Wajahat A. Shah*#

*Department of Chemistry, University of Kashmir, Srinagar-19006, J&K- India

#*Corres. author: shahwajaht@yahoo.com/sfmubashir3@gmail.com

Abstract: A world health organization survey indicated that about 75-80% of the world's populations rely on non conventional medicine, mainly of herbal source, in their primary health care. There has been an explosion of scientific information concerning plants, crude extracts and various substances from plants as medicinal agents during last 30-40 years. Nowadays *Adiantum venustum* plant parts are commonly used in the medicinal treatments. There is vast anecdotal information about the biological activity of *Adiantum venustum* which includes anti cancerous, anti bacterial, anti fungal, anti oxidant, anti tumor and anti inflammatory type of activities. The plant leaves and stem of *Adiantum venustum* Don were found to contain higher amount of triterpenoids and flavonoids. The present review comprises the Phytochemical, ethno pharmacological and pharmacological reports of *A. venustum*. The future scope of the plant has been emphasized with a view to isolate bioactive moieties which could be used for multifarious biological activities.

Key words: *Adiantum venustum*; anti oxidant; anti inflammatory, triterpenoids.

Introduction.

The use of medicinal plants to treat human diseases has its roots in prehistorical times. In this regard interest has increased in plant based natural products to combat infectious diseases (1-3). Over 60% of all pharmaceuticals are plant based (4). Therefore medicinal plants are increasingly substituting chemical and synthetic medicine (5). Plants are considered as state-of-art chemical laboratories capable of biosynthesizing number of biomolecules of different chemical classes. Many of these are proved to be precursors for development of other drugs (6). As pointed out recently, natural products from medicinal plants represent a fertile ground for the development of novel anti cancer agents (7). This has attracted the attention of many scientists, and encouraged them to screen plants and their extracts in order to unveil the hidden treasury of biological activities.

Adiantum venustum is one of such plants in folk medicine that has been used for the management of various disease condition. Various parts of the plant has been used in traditional medicine to manage conditions like headaches, scorpion stings (8,9), cuts,

wounds etc (10). It was also observed from Ayurvedic literature and ethanobotanical studies that the plant is very useful in treating tumour, prevention of hair from falling and as diuretics but no scientific investigation has been done in such direction (11-13).

Taxonomy of *Adiantum venustum*

Kingdom	:	Plantae
Division	:	Pteridophyta
Subdivision	:	Filicophytina
Class	:	Filicopsida
Order	:	Filicales
Family	:	Adiantaceae
Genus	:	<i>Adiantum</i>
Species	:	<i>Adiantum venustum</i> D.Don
Chemical constituents of <i>Adiantum venustum</i> trm.		

Phytochemical screening suggest that ethnolic extract of plant containssaponin, terpenoids, tannins, and flavonoids.(14). A novel triterpenoid has been isolated from the fern *A. Venustum*, whose structure has been elucidated to be fern -9(11)-en-25-oic acid (15)

.Phytochemical studies in the aerial parts of *A.venustum* resulted in the isolation of normethyl lupine- type and lanostane type triterpenes. The structures of these triterpenes have been established as 30-normethyl lupine- 20 one, 30- normethyl olean- 3- One- 30- betol, and lanost-20(22)- ene-30-ol, On the basis of spectral data analysis (16). A triterpenic ether, lanost-20(22)-en-3, 19-ether, named adiantulanostene ether was isolated from *A.venustum* (17)

Anti -inflammatory activities

The ethanolic extract showed positive test for flavanoids, alkaloids, saponins and carbohydrates. Chronic anti-inflammatory study was evaluated by Carrageen induced paw edema method. The result of Anti-Inflammatory study of two dose levels tested in rats, exhibited significant anti-inflammatory activity. The maximum percentage inhibition of inflammation was (71.15%) recorded with 100mg/Kg of plant extract (18)

Anti -cancerous activities

Anti –cancer evaluation of *A.venustum* Don. against Ascites carcinoma in animal model indicated that the ethanolic extract possess significant anti-cancer activity also reduce elevated level of lipid Peroxidation due to higher content of terpenoids and flavanoids .the ethanolic extract of *A.venustum* could have vast therapeutic application against cancer (19)Anticancer or antitumor effects of *A.venustum* was assayed by

Standard procedures (20-22)which revealed that the given extract of *Adiantum venustum* did not show any mortality up to the dose of 2000 mg / kg. The extract shows sedation, hypnosis, mild muscle relaxant property (23).

Anti-microbial activities.

Most of the species belonging to genus *Adiantum* have potent traditional uses pertaining to various infectious diseases(24-25). A methnolic extract of *A. venustum* exhibited maximum antimicrobial activity. The extract of herb was tested for its antimicrobial activity against five gram positive and six gram negative including multi-resistant staphylococcus aureus bacteria and against eight fungal strains using the standard micro-dilution assay. The MIC values of plant extracts against pathogenic strains were determined by micro-dilution method (26)

Assay for Total Phenolics.

The total phenolic content of the methnolic extract of *A. venustum* was determined by employing the methods of Slinkard and Singleton (1977) and Chandler and Dodds (1983), involving the Folin-ciocaltau's reagent and gallic acid as standard. The

total phenolic constituents of *A. venustum* were 0.81% (w/w) (27-28). The total phenolic content present in *A.Venustum* may be responsible for potent antimicrobial activity. Some of the higher Phenols like Ellagic acid, and Gallic acid have also been reported for potent antimicrobial activity (29).

Assay methods for antioxidants (30-42)

ABTS (2,20-azinobis (3-ethylbenzothiazoline-6-sulfonate) assay or TEAC (The Trolox equivalent antioxidant capacity) assay, DPPH (1,1-diphenyl-2-picrylhydrazyl radical) method

FRAP (Ferric reducing ability of plasma) assay, ORAC (The oxygen radical absorbance capacity) assay, TRAP (The total radical trapping parameter) assay, DCFH-DA (Dichlorofluorescein-diacetate) based assay, Cyclic voltammetry method ,TOSC (total oxyradical scavenging capacity) assay, PCL (Photochemiluminescence) assay, Crocin CL test assay (crocin chemoluminescence assay), Chronocoulometric assay, CAA assay (Cellular antioxidant activity),

Conjugated diene assay ,Superoxide radical scavenging activity, Hydroxyl radical scavenging activity, Nitric oxide radical inhibition activity, Reducing power method, Phospho molybdenum method, Peroxynitrile radical scavenging activity, β -carotene linoleate method ,Xanthine oxidase method ,Cytochrome C test ,Erythrocyte ghost system Microsomal lipid peroxidation or Thiobarbituric acid (TBA) assay.

Conclusion

This study attempts to highlighten the Therapeutic potential of *A.venustum* and their constituents in the prevention or therapy of disease. From this study we can conclude that the results reviewed in the study are aimed at attracting the attention of researchers seeking new drugs from *A.venustum* and its chemical compounds. The isolated compounds can hopefully be considered in future for more clinical evaluations and possible applications and as adjuvant to current medications. We should maintain our efforts in considering and valorizing our natural patrimony as well as conducting more research in *A.venustum* and its Pharmacological aspects.

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