



ISSN 0973-3450

(Print)

JUC Vol. 14(6), 163-165 (2018). Periodicity 2-Monthly

(Online)



ISSN 2319-8036

9 772319 803009



Estd. 2005

JOURNAL OF ULTRA CHEMISTRY

An International Open Free Access Peer Reviewed Research Journal of Chemical Sciences and Chemical Engineering

website:- www.journalofchemistry.org

Chemical Analysis and their Therapeutic activity of Ethanolic extract of *Asparagus racemosus* (Shatawari) Root by GC-MS analysis

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Acceptance Date 1st November, 2018, Online Publication Date 2nd November, 2018

Abstract

Asparagus racemosus (Shatawari) a climbing Ayurvedic plant and have numerous medicinal and therapeutic properties like *phytoestrogenic*, antidepressant, antidiarrhoeal, anticancer etc. The objective of the present study was, phytochemical screening of ethanolic extract of roots of *Asparagus racemosus*. The phytochemical screening revealed the presence of flavonoids, steroids, tannins, glycosides terpenoids, *Saponins*. GC-MS analysis revealed the presence of various bioactive compounds confirms the application of *A. racemosus* for various diseases.

Key words : *Asparagus racemosus*, therapeutic, Shatawari, bioactive compounds.

Introduction

Asparagus racemosus belongs to the family Asparagaceae. It is commonly known as Shatawari. The plant is a perennial shrub, with a tuberous root-stock stem covered with recurred spines, linear leaves arranged in a tuft, white flowers and sweet scented appear in October¹. The genus *Asparagus* includes about 300 species around the world in eastern Asia including India, Sri Lanka, Indonesia and Southern part of China.

The Pharmacological activities of root extracts include antiulcer, antitussive, antioxidant and antibacterial activities²⁻⁴. In Ayurveda it is considered a female tonic. Shatawari is the main Ayurvedic

rejuvenative tonic for females^{5,6}. The Major active components of *Asparagus racemosus* are steroidal saponins (Shatavarins I-IV). Isoflavones. Asparagamine, Racemosol, Polysaccharides, mucilage, Vitamins A, B₁, B₂, C, E, Mg, P, Ca, Fe and folic acid present in roots. Other primary chemical constituents of *Asparagus* are essential oils, asparagine, arginine, tyrosine and flavonoids^{7,8}. Asparagine is a strong diuretic.

Asparagus racemosus (Shatawari) is used by Ayurvedic doctors for the prevention and treatment of gastric ulcers, dyspepsia, galactogoue, nervous disorders, inflammations and liver diseases. *Asparagus* species possess a variety of biological properties, such as being antioxidants, immunostimulants,

antiinflammatory, antihepatotoxic, antibacterial, antioxytotic and reproductive agents⁹⁻¹².

Materials and Methods

The fresh roots were collected from Hisar (Haryana). The roots were cleaned and shade dried at room temperature. The dried material was then powdered with a mechanical grinder. The dried powder was refluxed with ethanol for seven days. After that extract was filtered through whatman no. 1 filter paper. The total filtrate was concentrated to dryness in oven at 30°C. The blackish-green dried crude extract was formed, which was then redissolved in ethanol to obtain a solution which is to be used for further assays.

Gas Chromatography-Mass Spectrometry (GC-MS) Analysis :

The analysis of root extract was carried out by GC-MS analysis using perkin elmer clarus 500 (Turbomass Software ver. 5.0.0) column specification was Rt x 5. capillary column (60m* 0.32mm ID* film thickness 2.25 µl). Helium was the carrier gas at a flow rate of 1m/ minute, injection and MS transfer line temperature were set at 220 and 290⁰ respectively. The constituents of the extract were identified by

comparison of their mass spectra with those of the computer library search (NIST/PFLEGER/WILEY) and confirmed by comparison of their retention indices either with those of authentic compounds or with data published in the literature.

Result and Discussion

The root extract of *Asparagus Racemose* were chemically analysed using GC and GC-MS. The result shows to GC-MS analysis lead to the identification of number of compounds from GC fractions of ethanolic extract of *A. racemosus*. The phytochemical constituents such as phytosterols, triterpenoids, phenolic compounds, proteins, fatty acid, alkaloids and saponins possess a wide array of biological activities.

The results revealed the presence of different phytochemicals Table-I by GC-MS analysis of root extract of *Asparagus racemose*. Medicinal plants in all facts of life have served a essential starting material for drug design and development. Antifungal and antibacterial substances found to saponin. Flavonoids and alkaloids etc. are found to be distributed in plants. From these sapanins have been reported to exhibit haemolytic and foaming activity.

Table - 1. Phytochemicals present in the ethanol extract of *A. racemose*

S.No.	Name of compounds	Area (%)	Retention time
1.	2-Fruancarboxyaldehyde 5-(hydroxy methyl)	70.60	7.710
2.	1,9- Nonanediol	1.77	22.670
3.	Hexadecanoic acid	2.17	15.069
4.	2-Propanone 1,3 dihydroxy	9.07	5.311
5.	2-Furaldehyde	1.85	20.601
6.	Hydrazine 1, 1-dimethyl	2.77	16.240
7.	Ethanimidic acid	1.24	15.601

The details of the identified phytoconstituents and its therapeutic activity were given in Table-2.

Table - 2. Therapeutic Activity of Phytochemical constituents from the root extract of *A. racemosus*.

S.No.	Name of compounds	Therapeutic activity
1.	2-Fruancarboxyaldehyde 5-(hydroxy methyl)	Antioxidant, Antitumour cancer preventive
2.	Hexadecanoic acid	Lubricant, antiandrogenic, antioxidant
3.	2-Propanone 1,3 dihydroxy	Artificial respiration, antioxidant
4.	2-Furaldehyde	Antimicrobial and Preservative, Anti bacterial cancer preventive
5.	Hydrazine 1, 1-dimethyl	Antiartsogenic, haemolytic, Antioxidant
6.	Ethanimidic acid	Pesticide, anti-androgenic flavour

Conclusion

Phytochemical analysis of the ethanol extract revealed the presence of phenolic compounds, proteins fattyacids, alkaloids, steroid and saponins. The plant has numerous therapeutic application. All the drugs showed the presence of steroids which play a major role in functional deviations responsible for infertility. We have seen that the root extract is used for many purposes and show many biological activities in Ayurveda.

Acknowledgement

The authors are grateful to FF DC Laboratory Kannauj for providing all the necessary guidance and encouragement this investigation. The authors wish to acknowledge the Herbal Research and Development Institute, Aromatic Plant Centre, Government of Uttaranchal, Selakui-Dehradun.

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