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

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Abstract

Asparagus racemosus (Shatawari) a climbing Ayurvedic plant and have numerous medicinal and therapeutic properties like phytoestroganic, 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 Asparagacea. It is commonly known as Shatavari. 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 October. 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 antilucre, antitussive, antioxidant and antibacterial activities. In Ayurveda it is considered a female tonic. Shatavari is the main Ayurvedic rejuvenative tonic for females. 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. 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, antioxytocic and reproductive agents\textsuperscript{9-12}.

**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\degree 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 \mu m). Helium was the carrier gas at a flow rate of 1m/ minute, injection and MS transfer line temperature were set at 220 and 290\degree 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 \textit{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 phytocompounds Table-I by GC-MS analysis of root extract of \textit{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.

| 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 phytocenstituents and its therapeutic activity were given in Table-2.

| 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 fatty acids, 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.

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