

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Chemical Characterization of Medicinally Important Liliaceous Plant *Asparagus racemosus*

Arti Sharma and Vandana Sharma

Department of Botany, Govt. College, Kota, India.

ABSTRACT

The plant *Asparagus racemosus* is widely distributed in the Himalayan and sub-Himalayan regions of India. Based on preliminary reports, there is a lot of interest in using the roots of this plant for treating various disorders in indigenous system of medicine such as antioxidant, antidiarrheal agent, aphrodisiac, used in the treatment of menopause and immune system modulator. The purpose of work is to study medicinally active substances present in ethanol-extract, Aqueous extract and Benzene extract obtained from roots powder of *Asparagus racemosus*. Preliminary Phytochemical screening of the extracts revealed the presence of Alkaloids, Carbohydrates, Phenolic compounds, tannins, Saponins, Steroids and Flavonoids.

Keywords:- *Asparagus racemosus*; Chemical characterization; Medicinally active substances; Steroids.

**Corresponding author*

INTRODUCTION

Asparagus racemosus Willd. (Family: Liliaceae) commonly called shatavari and shatavar. It is an under shrub climbing herbs with a tuberous root stock producing annual stems up to several meter long, flowers are white and unisexual in nature, Fruits are globular or obscurely 3 lobed, pulpy berries which are purplish black when they are ripen, seeds are hard and brittle. The herb is distributed in tropical and subtropical forest and in central parts of India. In the Traditional System of Medicine the herb is used mainly to promote milk secretion, as demulscent, diuretic, aphrodisiac and galactogogue [1]. This plant possess a variety of biological properties, such as being anti oxidants, immunostimulants, anti-inflammatory, anti-hepatotoxic, antimicrobial and reproductive agent. It is also used as diurectic, antispasmodic and nervine tonic [2].

In most cases it is also used in the treatment of stomach ulcers, lung abscess, menopause, herpes, chronic fevers and as a form of health food ingredients in Ayurvedic formulations [3]. Roots and rhizomes of *Asparagus racemosus* has potent antioxidant, antitussive, antidyspepsia antiulcer and anticancer activity [4] Root of *A. racemosus* has been referred as bitter-sweet, emollient, cooling, nervine tonic, constipating, galactogogue, aphrodisiac, diuretic, rejuvenating, carminative, stomachic, antiseptic and as a tonic. Beneficial effects of the root of *A. racemosus* are suggested in nervous disorders, dyspepsia, diarrhoea, dysentery, tumors, inflammations, hyperdipsia, neuropathy, hepatopathy, cough, bronchitis, hyperacidity and certain infectious diseases. [5]

Roots were found to posses antioxidant and anti-ADH activity, antitumour activity and anticancer activity, anti-ulcerogenic activity, anti inflammatory activity and antimicrobial activity [6].

The herb contains several active constituents which are useful in treating many diseases. It mainly contains steroidal saponins [7], aglycons as asparagin which is an anticancer agent and other pharmacologically important constituents .Leaves mainly contain rutin, diosgenin and flavonoid as quercetin 3- glucuronide. Flowers contain quercetin hyperoside and rutin [8, 9]. Thus taking in to the view of this plant, the present investigation is directed to remain some pharmacognostic parameters of the roots for strengthening the traditional knowledge with scientific bases.

MATERIAL AND METHOD

Plant Material

The roots of *Asparagus racemosus* (W.) (Family: Liliaceae) were collected in the month of July and August from Kota district, Rajasthan, India. The collected roots were washed; shade dried and was pulverized with mechanical pulveriser for size reduction. It was then passed through mesh 40 and the fine powder was collected and used for the experiment and preparation of extract.



Preparation of Crude Extracts

Ethanol Extract

The root powder was repeatedly macerated with 95% ethanol in a percolator. The combined filtrate was evaporated to dryness under reduced pressure at 40–50°C. The resulting crude ethanol extract was then stored at 10–15°C.

Aqueous extract

100g of *Asparagus racemosus* root powder were immersed in aqueous solution in a 500 ml flat bottom flask and was cold extracted for 7 days with occasional shaking and warming. At the end of the seventh day, the clear filtrate was obtained. The filtrate was further concentrated by vacuum distillation, cooled, transferred into a Petri dish and dried in an oven at 60°C for a period of five minutes.

Benzene extract

100gm of dried powdered macerated with Benzene .The extracts were filtered and the solvent was removed by rotary evaporator. Finally extracts were dried over desiccator.

Qualitative phytochemical analysis

The alcoholic, aqueous and benzene extracts of *Asparagus racemosus* were subjected to different chemical tests for the detection of phytoconstituents such as Sterols, Saponin, Alkaloid, Tannins, carbohydrates, Flavonoids, Lactones, Aminoacids/ proteins, Resins and Starch [10,11].

RESULTS

Test for Sterols:

Salkowski test: Few drops of concentrated sulphuric acid was added to the different extract, shaken and allowed to stand, Instead of aqueous extract, in all extract appearance of red color indicates the presence of sterols.

Test for Saponins:

Foam test: Small amount of extract/ fraction was shaken with little quantity of water, if foam produced persists for 10 minutes; it indicates the presence of saponins .Positive result for find out in Aqueous and Alcholic extract and rest of extract show negative response.

Test for Alkaloids:



The various extract/ fractions were basified with ammonia and extracted with chloroform. The chloroform solution was acidified with dilute hydrochloric acid. The acid layer was used for testing the alkaloids.

Wagner's test (Iodine in Potassium iodide): The acid layer was treated with few drops of Wagner's reagent. Formation of reddish brown precipitate in chloroform extract indicates the presence of alkaloids.

Mayer's test (Potassium Mercuric Iodine solution): The acid layer was treated with few drops of Mayer's reagent. Formation of creamy white precipitate indicates the presence of alkaloids.

Test for Tannins:

Ferric chloride test: In different extracts a few drops of 1% neutral ferric chloride solution was added, formation of blackish blue color indicates the presence of tannins which is found in ethyl alcohol solution

Test for Carbohydrate

Small amount of extracts/ fractions were dissolved in little quantity of distilled water and filtered separately. The filtrates were used to test presence of carbohydrates.

Molisch's test: The extract was treated with Molisch reagent and concentrated sulphuric acid was added from the sides of the test tube to form a layer. A reddish violet ring shows the presence of carbohydrates in aqueous and alcoholic extract.

Benedict's test: To the filtrate added 2 mL Benedict's reagent and boiled in water bath. Green reddish brown precipitate is formed.

Test for Flavonoids:

Alkaline reagent test/ NaOH test: To alcoholic solution added few drops of sodium hydroxide solution. Intense yellow color which disappeared after adding dilute HCl indicates the presence of flavonoids. But negative result were found in all extracts.

Test for Amino acid/ Protein:

Ninhydrin test: Heated the 3 mL of extract and 3 drops of ninhydrin solution in boiling water bath for 10 minutes. If purple color appear that shows the presence of amino acids but our case negative result found.

Test for Lactones:

Baljet test: To the extract, sodium picrate solution was added. Formation of yellow color in ethyl alcohol and petroleum ether extract indicates the presence of lactones

Table: 1 Preliminary Phytochemical Screening of *Asparagus racemosus* in Various Extracts

Preliminary phytochemical screening	Aqueous extract	Ethyl Alcohol extract	Benzene extract
Sterols/ Triterpenoids	-	+	+
Saponins	+	+	-
Alkaloids	-	+	-
Tannins	-	+	-
Carbohydrates	+	+	-
Flavonoids	-	+	-
Lactones	-	+	-
Amino acid/ Protein	-	-	-

(+): Indicates the presence of chemical constituents (-): Indicates the absence of chemical constituents

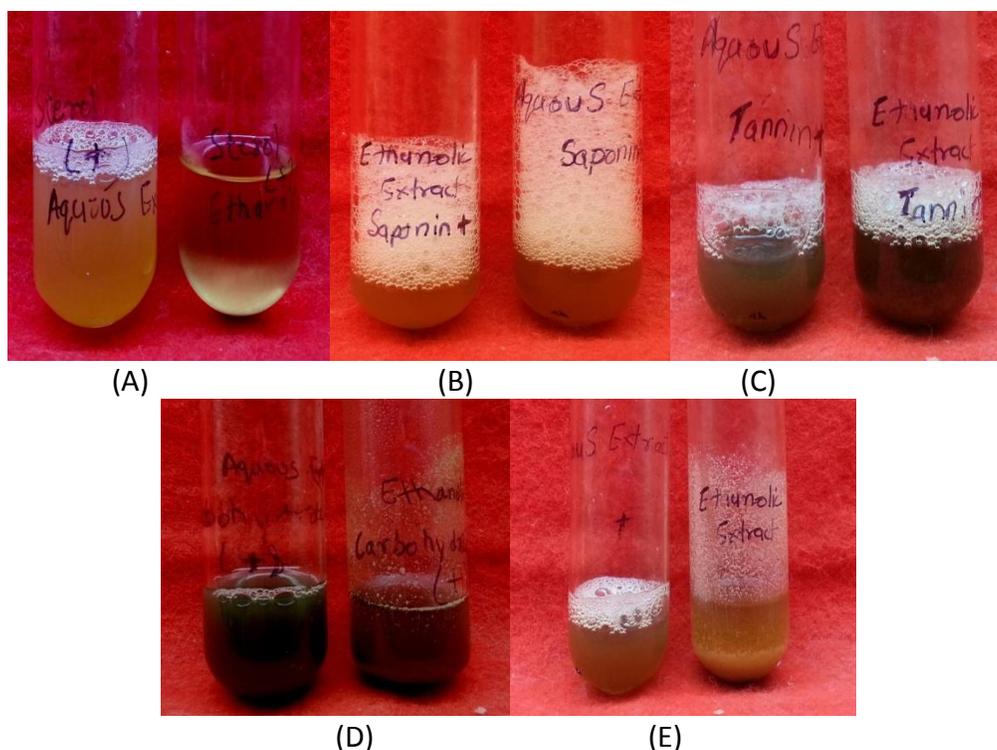


Figure: 1 A-test result of sterols, B-test result of saponin, C-test result of tannins, D-test result of carbohydrate, E-test result of Lactones

DISCUSSION

The alcoholic, aqueous and benzene extracts of *Asparagus racemosus* were subjected to qualitative phytochemical screening for the detection of phytoconstituents like Sterols, Saponin, Alkaloid, Tannins, carbohydrates, Lactones, Aminoacids/ proteins, Resins and Starch. The results revealed the presence of Sterols, Saponin, Alkaloids, carbohydrates, Flavonoids, Tannins and Lactones (Table 1). These findings show slightly similarities from previous work of Nagamani (2012), Ravishanker et al (2012) and Javeed Ahmed Wani (2011) [12].

CONCLUSION

Now a day the standardization of crude drugs has become very important for identification and authentication of a drug. But due to certain problems the importance was not up to the mark. Thus, the lack of standardization technique fails to identify the drug from its originality which there by exploits the usage of drug from its Traditional System of medicine. Thus the present investigation was aimed and the results were found to be significant and encouraging towards the goal. The results of preliminary phytochemical screening have been done; will help in future for proper identification of root powder of *Asparagus racemosus*.

ACKNOWLEDGEMENT

We are thankful to Department of Botany Government College, Kota & Vital Biotech Laboratory, Kota for providing Laboratory facilities and also thankful to staff member of Botany department, Government College, Kota for encouragement.

REFERENCES

- [1] M Kundu, R Mazumder, MD Kushwaha, and GS Chakraborty. Pharmacologyonline 2011;3:587-592.
- [2] Rk Goyal, J Singh and H Lal. Indian J Med Sci 2003;57 (9):408-414.
- [3] Hayes PY, Jahidin AH, Lehmann R, Penman K, Kitching W, De Voss JJ. Tetrahedron Lett 2006;47: 8683-8687.
- [4] Javeed Ahmed Wani, Rajeshwara N Achur, RK Nema. International journal of Pharmaceutical Science and Drug Research 2011;3(2):112-115.
- [5] P C Sharma, MB Yelne and TJ Dennis. Data Base on Medicinal Plants Used in Ayurveda, Central Council for Research in Ayurveda & Siddha, Documentation & Publication Division, Delhi, 2000;1: 418.
- [6] Bopana N and Saxena S. J Ethnopharmacol 2007;110(1):1-15.
- [7] Jahidin AH, Lehmann R, Penman K, Kitching W, De Voss JJ. Phytochemistry 2008;69(3):796-804.
- [8] Mandal D, Banerjee S, Mondal NB, Chakravarty AK, Sahu NP. Phytochemistry 2006;7: 1316-1321.



- [9] Battu GR and Kumar BM. International Journal of Chemical Science 2010;8(2):1329-1338.
- [10] Garabadu D, Muruganandam AV, Joshi VK and Krishnamurthy S. Pharmacol Biochem Behav 2009; 91(3):283-90.
- [11] Sairam K, Priyambada S, Aryya N Cand Goel RK. J Ethnopharmacol 2009; 86 (1):1-10.
- [12] Nagmani et al. Annals of Biological Research 2012;3(3):1294-1304.