iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** III **Month of publication:** March 2022

DOI: https://doi.org/10.22214/ijraset.2022.40892

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue III Mar 2022- Available at www.ijraset.com

Plant Profile, Phytochemistry and Pharmacology of Asparagus Racemosus (Shatavari): A Review

K. Dalvi[1], R. Vaykos[2], Dr. G. Sanap[3], S. Nikam[4]
[1, 2, 3, 4]*Department of Pharmaceutical Chemistry & Pharmaceutics, Dr. Babasaheb Ambedkar Technological University, Lonere, Maharashtra-402103*

Abstract: ***Asparagus racemosus is one of the member of family Liliaceae and popularly called as Satavari. It is observed all over in INDIA at a low altitude. It is utilized as herbal medicine and served as food. All the parts of the plant have therapeutically importance for the treatment of the various disorders such as liver disorder, stomach ulcer, inflammation, stress related disorders, dyspepsia. It also regulates blood fat and cholesterol levels. It is found that the drug also control the symptoms of AIDS. This mini review highlights the importance and pharmacological Activity of the A. racemosus.***
Key points: Asparagus racemosus, morphology, Classification, phytochemicals, pharmacological Activity.

I. INTRODUCTION

Shatavari is an essential medicinal plant of tropical and subtropical India. In Ayurveda, this herb is called as "Queen of herbs", as it promotes love and devotion. This herb is helpful in problems related with female reproductive system. It is used to rectify gynecological problems like irregularities in menstrual cycle and sexual dysfunction. It is well known Ayurvedic rasayana which prevent ageing, increase longevity, impart immunity and improve mental function[1]-[6].

II. MORPHOLOGY

A. Racemosus is grow about 1- 2m in height. It is highly branded, consist of thorn under shrubs. The leaves look like pine needles, Uniform and small in size. The roots have a finger like structure and clustered. It has a white coloured flower. The plant has bittersweet in taste[7],[8].


Fig. 1 Flower of A. Racemosus


Fig. 2 Leaves of A. Racemosus

III. SCIENTIFIC CLASSIFICATION

Kingdom : Plantae
Class : Tracheophytes
SubClass : Angiosperms
Class : Monocots
Order : Asparagales
Family : Asparagaceae
Subfamily : Asparagoideae
Genus : Asparagus
Species : Asparagus racemosus
Bionomial name - Asparagus racemosus
Synoname - Asparagus rigidulus- Protasparagus racemosus[9].
Habitat : It is common at low altitude in shade and in tropical climates throughout Africa, Asia, Australia, Java and southern part of China[10].

IV. PHYTOCHEMICALS

The chemical constituent are as follows –

Steroidal saponins, known as shatvarins. Shatvarin I to VI are present. Shatavarin I is the main glycoside with 3-glucose & rhamnose moieties connected to sarsapogenin [11-14]; Oligospirostanoside referred to as Immunoside [15]; Poly-cyclic alkaloid-Aspargamine A, a cage type pyrrolizidine alkaloid [16-18]; Isoflavones-8-methoxy-5, 6, 4-trihydroxy isoflavone-7-0-beta-D-glucopyranoside [19]; Cyclic hydrocarbon-racemosol, dihydrophenanthrene [20, 21]; Furan compound-Racemofuran[22]; Carbohydrates-Polysaccharides, mucilage[23]; Flavonoids-Glycosides of quercetin, rutin & hyperoside are present in flower & fruits[24]; Trace minerals are examined in roots- zinc, manganese(19.98 mg/g), copper(5.29 mg/g), cobalt(22.00 mg/g) along with calcium, magnesium, potassium zinc & selenium[25 , 26]; Kaepfrol-Kaepfrol along with Sarsapogenin from woody portions of tuberous roots could be isolated[27]; Miscellaneous- Essential fatty acids-Gamma linoleinic acid, vita. A, diosgenin, quercetin 3-glucourbnides[28-30].

V. PHARMACOLOGICAL ACTIVITY

A. Galactagogue Effect

Alcoholic extract of shatavari have effects on lactating mother to increase milk production and increases the growth of mammary gland alveolar tissue and acini [31-37] .

B. Antiulcer Activity

Ulcer is induced due to imbalance among aggressive factors, especially gastric acid and pepsin and protective factors including gastric mucosa, bicarbonate and prostaglandin. Shatavari is antiulcerogenic agent whose activity can compared with that of ranitidine hydrochloride. It causes an inhibitory effect on release of gastric hydrochloric acid and protect gastric mucosal damage[38 - 40].

C. Antitussive Effect

Shatavari is used in treatment of cough and in minor infections of upper respiratory tract. In the experimental setup by Akanksha Singh and Sinha 2014 , the Activity against Sulphur induced cough in mice [41].

D. Gastrointestinal Effects

Shatavari is used for constipation, and stomach ulcers. It can be also used for anxiety, cancer, diarrhoea, bronchitis, TB, and diabetes[42 - 46].

E. Molluscicidal Activity

Aqueous and ethanolic extract of shatavari show a high mortality rate (100%) against Biomhalaria pfeifferi and lymnaea natalensis. The LC50 was noticed to be 0.1, 5, 10 and 50 mg/mL for Biomphalaria pfeifferi and 0.5, 5, 1, 10 mg/mL for Lymnaea natalensis. The action was attributed to the presence of terpenoids, steroids and saponins in the extract [47].

F. Antihepatotoxic Activity

Alcoholic extract of A. Racemosus significantly reduces the increased levels of alanine transakinase, alkaline phosphate in CCI4 induced hepatic damage in rats. [48,49]

G. Antineoplastic Activity

Alcoholic extract of root of shatavari has been shown remarkably to reduce the increased levels of alanine transakinase, aspartate transaminase and alkaline phosphate in CCl4 induced heptic damagein rats indicating antihepatotoxic potential of A. racemosus [50 - 52] .

H. Cardiovascular Effect

Alcoholic extract of roots of shatavari produces posit- ive ionotropic and chronotropic effects on frog heart with lower doses and cardiac arrest with higher doses. The extract produces hypotension in cats and show no effect on i.v. administration in rabbits [53].

I. Effect on CNS

Shatavari did not produce catalepsy in experimental animals such as rats even massive oral doses are given [54 -55].

J. Immunomodulatory Activities

Dried roots of shatavari modulates the action of immune system. It induces immunity system to fight against immune deficiencies like AIDS, infections and cancer. It also helps to obtain higher protective antibodies against different vaccinations, which response against various bacterial, viral and other diseases [56 -57].

K. Antioxidant Action

Antioxidants are moieties which are involved in prevention of cell damage. As given by Aarti K, the Methanolic extract of roots posses significant antioxidant properties when administered through the oral root [58].

L. Anti-inflammatory Effects

ACE inhibited topical edema in the mouse ear administered at 200 mg/kg (I.P.), leading to substantial reductions in skin thickness and tissue weight, inflammatorycytokine production, neutrophil-mediated myeloperoxidase activity, various histopathological indicators [59].

M. Anti-stress Activity

Shatavari is used in the indian traditional medicine system to enhance general state of health and for stress related immune disorders. The action of methanol and aqueous extract of roots of shatavari was studied in experimental mouse stress model induced by swimming [60-61].

N. A Versatile Female Tonic

In Ayurveda, shatavari is considered as a female tonic. It is useful in female infertility as it increases libido, cures inflammation of sexual organs . moistens dry tissue of sexual organs. Play role as post-partum tonic by increasing lactation. Normalise uterus & changing hormones [62].

O. Cytotoxicity, analgesic and antidiarrhoeal Activities

Ethanol extracts of A. racemosus was investigated for biological action. The test for analgesic action of the crude ethanol extract was performed using acetic acid induced writhing model in mice [63].

P. Anticancer Activity

As described by Shankar et. al the isolated Asparagus racemosus IV with AR - 2B having 5.05% shatavarin IV show potent cytotoxicity. This shows increase in non - viable cell count when compared to untreated groups of mice in study [64].

Q. Antidiabetic Effect

In treatment of DM the extract of shatavari has been observed to reduce blood glucose levels in the rats and rabbits[65].

VI. CONCLUSION

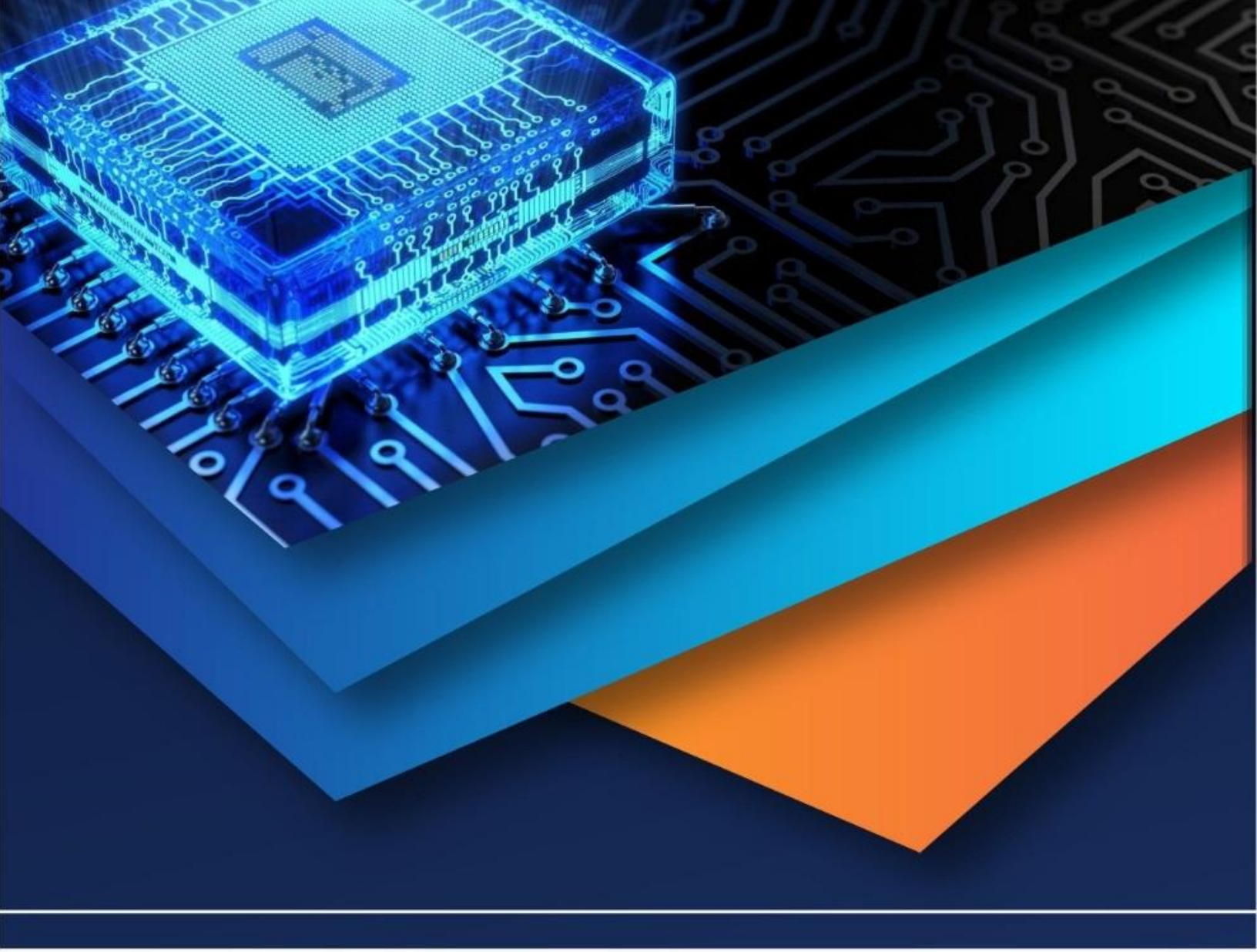
Various studies have been conducted on shatavari. It is a very important medicinal plant, which can be employed in different phases of medicament.

REFERENCES

[1] Gogte VM. Ayurvedic pharmacology and therapeutic uses of medicinal plants. Mumbai: SPARC; 2000.
[2] Frawley D. Ayurvedic healing-a comprehensive guide. Delhi: Motilal Banarsidass Publishers Private Limited; 1997.
[3] Sharma RK, Dash B. Charaka samhita-text with english translation and critical exposition based on Chakrapani Datta's Ayurveda dipika. India: Chowkhamba Varanasi; 2003.
[4] Garde GK, Vagbhat S. Marathia translation of vagbhat's astangahridya. Uttarstana: Aryabhushana Mudranalaya; 1970; p. 40-48.
[5] Atreya. Ayurvedic healing for women. York: Samuel Weiser Inc.; 1999.
[6] Srikantha MKR. Appendix and indices. Varanasi: Krishnadas Academy; 1997.
[7] Freeman R. Liliaceae-famine foods. Centre for New Crops and Plant Products, Department of Horticulture & Landscape Architecture. Purdue University. Retrieved 2009.
[8] Asparagus racemosus information from NPGS/ GRIN. Germplasm resources information network. United States Department of Agriculture; 2009.
[9] Simon D. The wisdom of healing. New York: Harmony Books; 1997, p.148.
[10] Gaitonde BB, Jetmalani MH. Antioxytocic action of saponin isolated from Asparagus racemosus Willd (Shatavari) on uterine muscle. Arch Int Pharmacodyn Ther 1969; 179:121-129.

[11] Joshi JDS. Chemistry of Ayurvedic crude drugs: Part VIII: Shatavari 2. Structure elucidation of bioactive shatavarin I and other glycosides. Indian J Chem Section B Organ Chem 1988; 27(1):12-16.
[12] Nair AGR, Subramanian SS. Occurrence of diosgenin in Asparagus racemosus. Curr Sci 1969; 17: 414.
[13] Patricia YH, Jahidin AH, Lehmann R, Penman K, Kitchinga W, De Vossa JJ. Asparinins, asparosides, curillins, curillosides and shavatarins. Structural clari.cation with the isolation of shatavarin V, a new steroidal saponin from the root of Asparagus racemosus. Tetrahed Lett 2006; 47: 8683-8687.
[14] Handa SS, Suri OP,Gupta VN, Suri KA, Satti NK, Bhardwaj V,et al. Oligospirostanoside from Asparagus racemosus as immunomodulator. US Patent No. 6649745, 2003.
[15] Sekine TN. Fukasawa Structure of asparagamine A, a novel polycyclic alkaloid from Asparagus racemosus. Chem Pharm Bull Tokyo 1994; 42(6): 1360-1362.
[16] Kukasawa N, Sekine T,Kashiwagi Y,Ruangrungsi N, Murakoshi I. Structure of asparagamine A, a novel polycyclic alkaloid from Asparagus racemosus. Chem Pharm Bull 1994; 42:1360-1362.
[17] Sekine TN. TIFFNal structure and relative stereo- chemistry of a new polycyclic alkaloid, asparagamine A, showing anti-oxytocin activity, isolated from Asparagus racemosus. J Chem Soc 1995; 1: 391-393.
[18] Saxena VK, Chourasia S. A new isoflavone from the roots of Asparagus racemosus. Fitoterapia2001; 72: 307-309.
[19] Boger DL, Mitscher LA, Mullican MD, Drake SD, Kitos PAntimicrobial and cytotoxic properties of 9, 10- dihydrophenanthrenes: structure-activity studies on juncusol. J Med Chem 1985; 28:1543-1547.
[20] Sekine TN, Fukasawa. A 9,10-dihydrophenanthrene from Asparagus racemosus. Phytochemistry 1997; 44(4): 763-764.
[21] Wiboonpun N, Phuwapraisirisan P,Tip-pyang S. Identification of antioxidant compound from Asparagus racemosus. Phytother Res 2004; 8(9): 771-773.
[22] Acharya SR, Acharya NS, Bhangale JO, Shah SK, Pandya SS. Antioxidant and hepatoprotective action of Asparagus racemosus Willd. root extracts, Indian J Exp Biol. 2012;50(11):795-801. [PubMed] [Google Scholar]
[23] Sharma SC. Constituents of the fruits of Asparagus racemosus Willd. Pharmazie 1981;36(10): 709.
[24] Choudhary BK, Kar A. Mineral contents of Asparagus racemosus. Indian Drugs 1992; 29(13): 623.
[25] Mohanta B, Chakraborty A, Sudarshan M, Dutta RK, Baruah M. Elemental profile in some common medicinal plants of India. Its correlation with traditional therapeutic usage. J Rad Anal Nucl Chem 2003; 258(1): 175-179.
[26] Ahmad S, Ahmed S, Jain PC. Chemical examination of Shatavari Asparagus racemosus. Bull Medico-Ethano Bot Res 1991; 12(3-4):157-160.
[27] Subramanian SS, Nair AGR. Chemical components of Asparagus racemosus. Curr Sci 1968;37(10):287-288.
[28] Subramanian SS, Nair AGR. Occurrence of Diosegenin in Asparagus racemosus leaves. Curr Sci 1969; 38(17): 414.
[29] Tambvekar NR. Ayurvedic drugs in common eye conditions. J Natl Integ Med Assoc 1985; 27(5): 13-18.
[30] Nadkarni AK. Indian materia medica. Bombay; Popular Book Depot; 1954, p.153-155.
[31] Joglekar GV,Ahuja RH, Balwani JH. Galactogogue effect of Asparagus racemosus. Indian Med J 1967; 61: 165.
[32] Sholapurkar ML. Lactare-for improving lactation. Indian Practitioner 1986; 39:1023-1026.
[33] Narendranath KA, Mahalingam S, Anuradha V,Rao IS. Effect of herbal galactogogue (Lactare) a pharmacological and clinical observation. Med Surg 1986; 26: 19-22.
[34] Patel AB, Kanitkar UK. Asparagus racemosus Willd. Form Bordi, as a galactogogue, in buffaloes. Indian Vet J 1969; 46: 718-721.
[35] Sharma S, Ramji S, Kumari S, Bapna JS. Randomized controlled trial of Asparagus racemosus (Shatavari) as a lactogogue in lactational inadequacy. Indian Pediatr 1996; 33:675-677.
[36] Joglekar GV,Ahuja RH, Balwani JH. Galactogogue effect of Asparagus racemosus. Indian Med J 1967; 61: 165.
[37] Singh KP,Singh RH. Clinical trial on Satavari (Asparagus racemosus Willd.) in duodenal ulcer disease. J Res Ay Sid 1986; 7:91-100.
[38] Bhatnagar M, Sisodia SS. Antisecretory and antiulcer activity of Asparagus racemosus Willd. Against indomethacin plus phyloric ligation-induced gastric ulcer in rats. J Herb Pharmacother 2006; 6(1): 13-20.
[39] Sairam K, Priyambada S, Aryya NC, Goel RK. Gastroduodenal ulcer protective activity of Asparagus racemosus: an experimental, biochemical and histological study. J Ethnopharmacol 2003; 86(1):1-10.
[40] Mandal SC, Kumar CKA, Mohana LS,Sinha S, Murugesan T, Saha BP, et al. Antitussive effect of Asparagus racemosus root against sulfur dioxide-induced cough in mice. Fitoterapia 2000; 71(6): 686.
[41] Dalvi SS, Nadkarni PM, Gupta KC. Effect of Asparagus racemosus (Shatavari) on gastric emptying time in normal healthy volunteers. J Postgrad Med. 1990;36:91-94. [PubMed] [Google Scholar]
[42] Kishore P,Pandey PN. Pandey SN, Dash S. Treatment of duodenal ulcer with Asparagus racemosus Linn. J Res Indian Med Yog Homeo, 1980;15:409 415. (Google Scholar]
[43] Dahanukar S, Thatte U. Pai N, Mose PB, Karandikar SM. Protective effect of Asparagus racemosus against induced abdominal sepsis. Indian Drugs. 1986;24:125-128. [Google Scholar]
[44] De B, Maiti RN, Joshi VK, Agrawal VK, Goel RK. Effect of some Sitavirya drugs on gastric secretion and ulceration. Indian J Exp Biol. 1997;35:1084-1087. [PubMed] [Google Scholar]
[45] Jetmalani MH, Sabins PB, Gaitonde BB. A study on the pharmacology of various extracts of Shatavari Asparagus racemosus (Willd) J Res Indian Med. 1967;2:1-10. [Google Scholar]
[46] Chifundera K, Boluku B, Mashimango B. Phytochemical screening and molluscicidal potency of some Zairean medicinal plants. Pharmacol Res. 1993;28(4):333-340. [PubMed] [Google Scholar]
[47] Zhu X, Zhang W,Zhao J, Wang J. Qu W. Hypolipid- aemic and hepatoprotective effects of ethanolic and aqueous extracts from Asparagus officinalis L. by-products in mice fed a high-fat diet. J Sci Food Agric. 2010:90(7):1129-1135. [PubMed] [Google Scholar]
[48] Muruganadan S, Garg H, Lal J, Chandra S, Kumar D. Studies on the immunostimulant and antihepato- toxic activities of Asparagus racemosus root extract. J Med Arom PI Sci. 2000;22:49 52. [Google Scholar]
[49] Rao AR. Inhibitory action of Asparagus racemosus on DMBA induced mammary carcinogoenesis in rats. Int J Cancer. 1981;28:607-610. [PubMed] [Google Scholar]
[50] Sabins PB, Gaitonde BB, Jetmalani M. Effect of alcoholic extract of Asparagus racemosus on mammary glands of rats. Indian J Exp Biol. 1968;6:55-57.

[PubMed] [Google Scholar]
[51] Liu W, Huang XF, Qi Q, Dai QS, Yang L, Nie FF, et al. et al. Asparanin A induces G(2)/M cell cycle arrest and apoptosis in human hepatocellular carcinoma HepG2 cells. Biochem Biophys Res Commun. 2009;381(4): 700 705. [PubMed] [Google Scholar]
[52] Roy RN, Bhagwager S, Chavan SR, Dutta NK. Preliminary pharmacological studies on extracts of root of Asparagus racemosus Willd, Lilliaceae. J Res Indian Med. 1971:6:132-138. [Google Scholar]
[53] Narendranath KA, Mahalingam S, Anuradha V, Rao IS. Effect of herbal galactogogue (Lactare) a pharmacological and clinical observation. Med Surg. 1986;26:19-22. [Google Scholar]
[54] Parihar MS, Hemnani T.Experimental excitotox- icity provokes oxidative damage in mice brain and at- tenuation by extract of Asparagus racemosus. J Neur Transm. 2004;111(1):1-12. [PubMed] [Google Scholar]
[55] Dahanukar 5, Thatte U. Pai N, Mose PB, Karandikar SM. Protective effect of Asparagus raremosus against induced abdominal sepsis. Indian Drugs. 1986,24 125 128 [Google Scholar]
[56] Thatte U, Chhabría S, Karandikar SM, Dahanukar s. Immunotherapeutic modification of E. coli induced abdominal sepsis and mortality in mice by Indian medicinal plants, Indian Drugs. 1987:25:95-97. (Google Scholar]
[57] Takeungwongtrakul S, Benjakul-S, H-Kittikun A. Lipids from cephalothorax and hepatopancreas of Pacific white shrimp (Litopenaeus vannamei): Compositions and deterioration as affected by iced storage. Food Chem. 2012;134(4):2066 2074. [PubMed] [Google Scholar]
[58] Lee do Y, Choo BK. Yoon T, Cheon MS, Lee HW, Lee AY, et al. et al. Anti inflammatory effects of Asparagus cochinchinensis extract in acute and chronic cutaneous inflammation. J Ethnopharmacol. 2009;121(1):28-34. [PubMed] [Google Scholar]
[59] Kanwar AS, Bhutani KK. Effects of Chlorophytum arundinaceum, Asparagus adscendens and Asparagus racemosus on pro-inflammatory cytokine and cor- ticosterone levels produced by stress. Phytother Res. 2010:24(10):1562-1566. [PubMed] - [Google Scholar]
[60] Joshi T.Sah SP,Singh A. Antistress activity of ethanolic extract of Asparagus racemosus Willd roots in mice. Indian J Exp Biol. 2012;50(6):419 424. [PubMed] [Google Scholar]
[61] Sharma K, Bhatnagar M. Asparagus racemosus (Shatavari): A versatile female tonic. Int J Pharm Biol Arch. 2011;2(3):855-863. [Google Scholar]
[62] Karmakar UK, Sadhu SK, Biswas SK. Chowdhury A, Shill MC, Das J. Cytotoxicity, analgesicand antidiarrhoeal activities of Asparagus racemosus. J Appl Sci. 2012;12:581-586. [Google Scholar]
[63] Venkatesan N, Thiyagarajan V,Nar Raja S and Gurusamy S: Anti-diar Asparagus racemosus wild Pharm



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY