ANALGESIC ACTIVITY OF AQUEOUS AND ALCOHOL ROOT EXTRACTS OF *ASPARAGUS RACEMOSUS* WILLD.

Fasalu Rahiman O.M*, Bodapati Srilatha, Rupesh Kumar M, Mohamed Niyas k, Satya Kumar B, Phaneendra P

***Author for correspondence:**
Fasalu rahiman .O.M
Dept. of Pharmacology,
Bharathi College of pharmacy,
Bharathinagara, Mandya,
Karnataka, India – 571422
Email: fasaluom@gmail.com

Summary

Asparagus racemosus willd. (Lilliaceae) is used in traditional system of medicine for the treatment of number of disease. The present study was undertaken to evaluate the analgesic activity of the aqueous and alcohol root extracts of *Asparagus racemosus* using eddy's hot plate and heat conduction method. In eddy's hot plate method the aqueous extract showed significant analgesic activity at the doses of 150 mg/kg ($p<0.01$) and 250 mg/kg ($p<0.001$) and alcohol extract showed significant analgesic activity at the doses of 150 and 250 mg/kg ($p<0.001$). In heat conduction method both extracts showed significant analgesic activity at the doses of 150 & 250 mg/kg ($p<0.001$) as compared to control group, when analyzed statistically by Tukey Kramer Multiple Comparison Test. The result obtained show that the aqueous and alcohol root extracts of *Asparagus racemosus* willd. have significant analgesic activity.

Keywords: *Asparagus racemosus willd* Root, Analgesic activity, Eddy's hot plate method, heat conduction method

Introduction

Pain is an unpleasant sensation no doubt, but on the whole it is usually beneficial to man (or animal). It is mainly a protective mechanism for the body, occurs whenever any tissues are being damaged, and it causes the individual to react to remove the pain stimulus [1]. Typically, it is a direct response to an untoward event associated with tissue damage, such as injury, inflammation or cancer, but severe pain can arise independently of any obvious predisposing cause (e.g. trigeminal neuralgia), or persistent long after the precipitating injury has healed (e.g. phantom limb pain). It can also occur as a consequence of brain or nerve injury (e.g. following a stroke or herpes infection). With many pathological conditions, tissue injury is the immediate cause of the pain, and this result in the local release of a variety of chemical agents, which are assumed to act on the nerve terminals, either activating them directly or enhancing their sensitivity to other forms of stimulation [2].

Due to having adverse side effects, like gastric lesions, caused by NSAIDs and tolerance and dependence induced by opiates, the use of these drugs as analgesic agents have not been successful in all the cases. Therefore, analgesic drugs lacking those effects are being searched all over the world as alternatives to NSAIDs and opiates. During this process, the investigation of the efficacy of plant based drugs used in the traditional medicine have been paid great attention because they are cheap, have little side effects and according to WHO still about 80% of the world population rely mainly on plant based drugs [3].

Asparagus racemosus Willd. (Liliaceae), commonly known as 'satawar', satavari' or 'shatavari', it has been used in India for thousands of years for its therapeutic and tonic properties. It is an all-round tonic and rejuvenative which can be given to a person with any type, constitution, males or females, youngsters or elders. Indeed, Shatavari is the Universal Rasayana. The name Shatavari is symbolic which means one who possesses one hundred husbands. It has been proved that it possess Immunomodulatory activity [4], Antiulcer activity [5], Antioxidant Activity[6], Hypolipidemic activity [7], Anti cancer activity [8], Anticandidal activity [9], Anti diabetic actions [10], Anti inflamatory effect [11], Anti-diarrhoeal activity [12], Anti microbial activity [13], Galactogenic activity [14].

As The plant have phytochemical constituents such as alkaloids, triterpenes and saponins, Ethanol and aqueous extract of *Asparagus racemosus* root has to be tested for its analgesic activity Therefore, the present study was undertaken with the objective to investigate the analgesic activity of the aqueous and alcohol root extracts of *Asparagus racemosus* in a scientific manner using Swiss albino mice.

Materials and methods

Plant material: The roots of *Asparagus racemosus* used for the present studies were collected from poonoor in Calicut district of Kerala in India. The plant was identified, confirmed and authenticated by comparing with voucher specimen available at Calicut university herbarium, Department of botany, university of Calicut, Emerald by Botanist Dr. Pradeep AK. A voucher herbarium specimen was stored.

Preparation of extracts: Fresh roots of *Asparagus racemosus* were washed, shade dried, powdered, passed through a #60 mesh sieve and were extracted with alcohol (95% v/v) in a soxhlet apparatus by continuous heat extraction. The extract was concentrated in a rotary flash evaporator at a temperature not exceeding 50ºC. The alcohol extract was prepared in distilled water containing 2% v/v Tween 80 (as a suspending agent) for experimental purpose.
The aqueous extract was prepared by maceration in chloroform water. The macerate was filtered through Whatman No.1 filter paper and concentrated in a rotary flash evaporator at a temperature not exceeding 50ºC.

Phytochemical analysis: Each extract was concentrated by distilling off the solvent and evaporating to dryness. The dry extracts were subjected to preliminary phytochemical screening for detection of various phytoconstituents [15].

Experimental animals: Swiss albino mice weighing 18-25 g of either sex were used for the study. The animals were procured and housed in the animal house maintained under standard hygienic conditions, at 20 ± 2o C, humidity (60 ± 10%) with 12 hour day and night cycle, with food and water *ad libitum*. The study protocols were duly approved by the Institutional Animal Ethics Committee (IAEC) of Bharathi College of pharmacy, Bharathinagara, Mandya. Studies were performed in accordance with the CPCSEA guidelines.

Analgesic activity: Analgesic activity of aqueous and alcohol extracts of *Asparagus racemosus* was studied by eddy's hot plate and heat conduction method.

Eddy's hot plate method: The animals were divided into six groups of 6 animals each. Group I served as control.
Group II served as standard and were injected Diclofenac sodium (9 mg/kg) intraperitonially. Group III and IV were treated orally with aqueous extract of 150 and 250 mg/kg body weight respectively. Group V and VI were treated orally with alcohol extract of 150 and 250 mg/kg body weight respectively. The animals were individually placed on the hot plate maintained at 55°C, one hour after their respective treatments. The response time was noted as the time at which animals reacted to the pain stimulus either by paw licking or jump response, whichever appeared first. The cut off time for the reaction was 15 seconds [16].

Heat conduction method: The animals were divided into six groups of 6 animals each. Group I served as control.
Group II served as standard and were injected Diclofenac sodium (9 mg/kg) intraperitonially. Group III and IV were treated orally with aqueous extract of 150 and 250 mg/kg body weight respectively.
Group V and VI were treated orally with alcohol extract of 150 and 250 mg/kg body weight respectively. After one hour, the tip of tail was dipped up to 5 cm into hot water maintained at 58°C. The response time was noted as the sudden withdrawal of the tail from the hot water. Cut off time of 10 seconds was maintained to avoid damage to the tail for all groups. The time required for flicking of the tail, was recorded, to assess response to noxious stimulus [17]**.**

Statistical analysis: All the values ware statistically analyzed by one-way analysis of variance (ANOVA) followed by Tukey- Kramer multiple comparison test. Comparison between control and drug treated groups were considered to be significant. All values are expressed as mean ± SEM.

Results & Discussion

The LD50 is >1g/kg. No toxic effects or mortality were observed with doses ranging from 50mg/kg to 1g/kg for four weeks. Acute and subacute (15-30 days administration) toxicity studies did not detect any changes in vital organ function tests [18].The results of present study indicate the aqueous and alcohol root extracts of *Asparagus racemosus* willd. Possesses analgesic effect, which is in accordance with its ethno medical use. Analgesic effect of the extracts was demonstrated in the experimental models using Eddy's hot plate and Heat conduction method using thermal stimuli, an increase in reaction time is generally considered an important parameter of analgesic activity. The preliminary phytochemical study revealed the presence of alkaloids, carbohydrates, phytosterols, tannins, flavonoids. Both extracts showed the analgesic activity when compared with control and analyzed when analyzed statistically by

Tukey Kramer Multiple Comparison Test. On the basis of these findings, it may be inferred that *Asparagus racemosus* willd. is an effective agent for analgesic activity. In conclusion, this study provides evidences for the analgesic activity of *Asparagus racemosus* willd. which could partly contribute to its ethno medical use.

Table 1: analgesic activity of aqueous and alcohol root extracts of *Asparagus racemosus* . by Eddy's hot plate method

Group	Response time (mean ± S.EM)
Control	2.33 ± 0.2108
Standard (Diclofenac sodium 9 mg/kg)	12.73 ± 0.4014***
Aqueous extract 150 mg/kg	4.33 ± 0.4363**
Aqueous extract 250 mg/kg	7.23 ± 0.3333***
Alcohol extract 150mg/kg	6.46 ± 0.5733**
Alcohol extract 250mg/kg	9.33 ± 0.2453***

One- way Analysis of Variance ANOVA: p value found to be 0.0001 is considered extremely significant. The data were expressed as mean ± S.E.M.; Tukey Kramer multiple comparison test: ***p<0.001, **p < 0.01 (Extracts vs. control).

Table 2: analgesic activity of aqueous and alcohol root extracts of *Asparagus racemosus*. By heat conduction method

Group	Response time (mean ± S.EM)
Control	1.833 ± 0.3132
Standard (Diclofenac sodium 9 mg/kg)	8.5 ± 0.2236***
Aqueous extract 150 mg/kg	3.2 ± 0.4123**
Aqueous extract 250 mg/kg	5.1 ± 0.2472***
Alcohol extract 150mg/kg	4.533 ± 0.3073**
Alcohol extract 250mg/kg	5.833 ± 0.3126***

One- way Analysis of Variance ANOVA: p value found to be 0.0001 is considered extremely significant. The data were expressed as mean ± S.E.M.; Tukey Kramer multiple comparison test: ***p<0.001(Extracts vs. control).

Conclusion

The aqueous and alcohol root extracts of *Asparagus racemosus* Willd. at a dose of 150 mg/kg and 250 mg/kg body weight were investigated for analgesic activity. The aqueous and alcohol extracts showed significant analgesic activity in both doses (p<0.01 & p<0.001) from 1 hour onwards as compared to standard drug diclofenac sodium. The significant analgesic activity may be due to the presence of flavonoids. Flavonoids are known to target prostaglandins, which are involved in the late phase of acute inflammation and pain perception.

Acknowledgements

The author is thankful to, Bharathi College of pharmacy, Bharathinagara, Karnataka, India for providing necessary facilities throughout this work.

References

1. Kanodia L, Das S. A comparative study of analgesic property of whole plant and fruit extracts of *Fragaria vesca* in experimental animal models. Bangladesh J Pharmacol 2008;4: 35-38.
2. Rang HP, Dale MM, Ritter JM et al. Pharmacology. 5th ed., Churchill Livingstone. London; 1993: pp.562.
3. Kumara NKVMR, 2001. Identification of strategies to improve research on medicinal plants used in Sri Lanka. In: WHO Symposium. University of Ruhuna, Galle, Sri Lanka.
4. Rege, N.N., Nazareth, H.M., Isaac, A., Karandikar, S.M. and Dahanukar, S.A. Immunotherapeutic modulation of intraperitoneal adhesion by Asparagus racemosus. J Postgrad Med 1989; 35, 199-203.
5. Singh KP, Singh RH. Clinical trial on Satavari (Asparagus racemosus Willd.) in duodenal ulcer disease. J Res Ay Sid 1986;7:91-100.
6. Wiboonpun N, Phuwapraisirisan P, Tip-pyang S. Identification of antioxidant compound from Asparagus racemosus. Phytother Res 2004;18(9):771-773.
7. NP Visavadiya, AV R.L. Narasimhacharya ,Hypolipidemic and antioxidant activities of Asparagus racemosus in hypercholesteremic rats . Indian Journal of Pharmacology 2005; 37(6).
8. Rao AR. Inhibitory action of Asparagus racemosus on DMBA-induced mammary carcinogoenesis in rats. Int J Cancer 1981; 28:607-10
9. B Uma, K Prabhakar, S Rajendran Anticandidal activity of *Asparagus racemosus*. Indian Journal of Pharmaceutical Sciences 2009; 71 (3).
10. Kar, A Choudhary, B.K. and Bandyopadhyay, N.G. Preliminary studies on the inorganic constituents of some indigenous hypoglycaemic herbs on oral glucose tolerance test. J Ethnopharutacol 1999; 64: 179-184.
11. MandaI S.C., Mukherjee P.K., Nandy A, Pal. M and Saba. Some pharmacognostical characteristi of Asparagus racemosus Willd roots. Ancient Sci Life1996; 15: 282.
12. Venkatesan N, Thiyagarajan V, Narayanan S, Arul A, Raja S, Kumar SG, Rajarajan T, Perianayagam JB Anti-diarrhoeal potential of Asparagus racemosus wild root extracts in laboratory animals. J Pharm Pharm Sci 2005; 8(1):39-46.
13. Ahmad N, Mehmood Z, and Mohammad. Screening of some Indian medicinal plants for their antimicrobial properties. J Ethnopharmacol 1998; 62: 183-19.
14. Nadkarni AK. Indian Materia Medica. Bombay. Popular Book Depot 1954; 1: 153-5.
15. Harborne JB. Phytochemical methods. 3rd ed. London: Chapman and Hall; 1998; 160-78.
16. Eddy NB, Leimbach DJ. Synthetic analgesics: II Dithienyl butenyl and Dithienyl butylamines (Retracted by Turner RA. Screening methods in Pharmacology I, 1 ed. New York. LondonAcademic Press 1965; 105-109) J Pharmacol Therap 1953; 107(3): 385-93.
17. Kulkarni SK. Handbook of Experimental Pharmacology. 3rd rev. ed. New Delhi:Vallabh Prakashan; 1999; 123-25.
18. Rege NN, Thatte UM, Dahanukar SA. Adaptogenic properties of six rasayana herbs used in Ayurvedic medicine. Phytother Res 1999; 13(4):275-291.