INTERNATIONAL JOURNAL OF APPLIED BIOLOGY AND PHARMACEUTICAL TECHNOLOGY

Volume: 2: Issue-1: Jan-Mar -2011 IJABPT *ISSN 0976-4550*

ANTIPYRETIC ACTIVITY OF PLATYCLADUS ORIEANTALIS LEAVES EXTRACT

Amit Jaiswal*, Niranjan Sutar, Ranju Garai, Manoj Kumar Pati, Abhinav Kumar.
Department of Pharmacy, Sir Madanlal Group of Institution-206001, India
E mail: niranjansutar77@rediffmail.com,mtjswl63@gmail.com.

ABSTRACT: Antipyretic effect of ethanolic extract of the leaf of Platycladus orieantalis was investigated. Intraperitoneal administration of boiled milk at a dose 0.5 ml/kg body weight in albino rabbit leads to pyrexia. Intraperitoneal (i. p. route) administration of ethanolic extract of the leaf of Platycladus Orieantalis at a dose 80 mg/kg body weight were shown significantly reduce the elevated body temperature of rabbit which was compared with standard aspirin (market product) and solvent used.
Key words: Platycladus orientalis, Leaves extract, Antipyretic activity

INTRODUCTION

The problem of uncontrolled pain led early humans to seek remedies from any materials that they could lay their hands on. In recent times, focus on plant research has increased and non steroidal anti inflammatory drugs constitute one of the most widely used classes of drugs. Herbal drugs are being proved as effective as synthetic drugs with lesser side effects. Herbal Medicines are in line with nature, with less hazardous reactions [1].

Pyrexia or fever is caused as a secondary impact of infection, malignancy or other diseased states. It is the body's natural defence to create an environment where infectious agent or damaged tissue can not survive [2]. Normally the infected or damaged tissue initiates the enhanced formation of pro-inflammatory mediator's (cytokines like interleukin 1â, á, â and TNF- á), which increase the synthesis of prostaglandin E2 (PGE2) near peptic hypothalamus area and thereby triggering the hypothalamus to elevate the body temperature [3]. As the temperature regulatory system is governed by a nervous feedback mechanism, so when body temperature becomes very high, it dilate the blood vessels and increase sweating to reduce the temperature; but when the body temperature become very low hypothalamus protect the internal temperature by vasoconstriction. High fever often increases faster disease progression by increasing tissue catabolism, dehydration and existing complaints, as found in HIV [4].

Most of the antipyretic drugs inhibit COX-2 expression to reduce the elevated body temperature by inhibiting PGE-2 biosynthesis. Moreover, these synthetic agents irreversibly inhibit COX-2 with high selectivity but are toxic to the hepatic cells, golmeruli, cortex of brain and heart muscles, whereas natural COX-2 inhibitors have lower selectivity with fewer side effects [5].

Platycladus orientalis, also known as Chinese Arborvitae or Biota. It is native to north western China and widely naturalized elsewhere in Asia east to Korea and Japan, south to northern India, and west to northern Iran. It is a small, slow growing tree, to 15-20 m tall and 0.5 m trunk diameter (exceptionally to 30 m tall and 2 m diameter in very old trees). The foliage forms in flat sprays with scale-like leaves 2-4 mm long. The cones are 15-25 mm long, green ripening brown in about 8 months from pollination, and have 6-12 thick scales arranged in opposite pairs. The seeds are 4-6 mm long, with no wing. The different parts of the plant are traditionally used as a diuretic, anticancer, anticonvulsant, stomachic, antipyretic, analgesic and anthelmintic [6, 7].

Although the plant is widely used for remission of several ailments related to fever, its antipyretic potential has not been explored yet. Therefore, in the present study an attempt was made to establish the antipyretic effect of ethanolic extract of the leaf of Platycladus Orieantalis.

MATERIALS AND METHODS

Collection and preparation of Plant Extract

The leaves of *Platycladus orientalis* were collected in the month of june from the local field of Etawah, Uttar Pradesh state, India, and authenticated by Dr.Harish .K. Sharma, Ayurvedic Medical College, Davangere, Karnataka, India. A voucher specimen was submitted at Institute's herbarium department for future reference (AN 102). Dried leaves were ground to coarse powder. Powder was first defatted with pet.ether and then extracted with ethanol which is further evaporated to dryness to obtain alcoholic extract.

Extraction and phytochemical screening of plant

The powdered plant materials (500g) were extracted with petroleum ether at 40-60○ C, by continous hot percolation using soxhlet apparatus. The extraction was carried out by using solvent of increasing polarity starting from petroleum ether and methanol respectively. The extraction was carried out for 72 hours. The petroleum ether extract was filtered and concentrated to dry mass by using vacumm distillation. A dark greenish brown residue was obtained. The marc left, after petroleum ether extraction was taken and then subsequently extracted with methanol for 72 hours. The methanolic extract was then filtered and concentrated to dry mass. A dark greenish residue was obtained .Phyto chemical screening was performed using standard procedures [8, 9, and 10].

Drug: Aspirin as Disprin soluble tablet was collected from local market of etawah U.P. was used as known antipyretic agent. The standard solution was prepared by dissolving the tablet in the solvent to obtain 15 mg aspirin per 2 ml solution. The dose of aspirin was maintained 10 mg/kg body weight [11].

Animals: The experiment was carried out on albino rabbits. They were 13-15 months old of both sexes weighing between 1.5-1.6 kg [12]. They were collected from the C.D.R.I. Lucknow. The rabbits were kept in iron cages [13] (considering group), were fed with cauliflower, cabbage, banana and tap water for 40 days before experiment to adjust with environment. Food and water were withdrawn 6 hours prior to the experiment. The animals were grouped as:

a. Experimental groups- One group receiving ethenolic fraction.

b. Control groups were-

1. Aspirin group (+Ve Control) - receiving standard antipyretic agent aspirin.
2. Solvent group (-Ve Control) - receiving solvent (used).

Number of rabbits in each group was four.

Acute Toxicity Study: Acute toxicity study was carried out by using graded doses of drug were administered intraperitoneally in graded doses (200 to 1000 mg/kg body weight). They were observed continuously for the first 2 h for toxic symptoms and up to 24 h for mortality [14].

***Antipyretic test*:** Before experimentation rectal temperature of rabbits were recorded by inserting a well lubricated bulb of a thermometer in the rectum. Care was taken to insert it to the same depth each time (about 6 cm). Milk was collected from local cow had been boiled. When temperature of the boiled milk equilibrates to room temperature then rabbits were injected boiled milk at the dose of 0.5 ml/kg body weight, to induce pyrexia. Induction of fever was taken about one to two h [15].

Then ethenolic extract of drug is given to one group and aspirin is given to another group and in control solvent is given. (Table 1). Intraperitoneal route was used to administer boiled milk, aspirin solution, and sample solution. Finally, rectal temperatures were recorded 1 h intervals up to 3 h.

Table 1: Effect of ethenolic extract of Platycladus Orieantalis leaves on boiled milk induced pyrexia in rabbit

		Rectal temp. (F)		Rectal temp. after admin. of drug (F)		
Group	dose	Normal(A)	3 h. after boiled milk admin.(B)	1 h.C1	2 h. C2	3 h. C3
Solvent	2ml/rabbit	101.2±0.2	104.20±0.23	103.9±0.23 (3.84±0.10)	103.9±0.23 (3.84±0.10)	103.9±0.23 (3.84±0.10)
Asprin	10mg/kg	101.3±0.1	104.1±0.11	102.7±0.23 (16.0±0.10)*	101.8±0.10 (96.3±0.10)*	101.5±0.10 (96.3±0.10)*
Ethenolic extract	80mg/kg	101.3±0.1	104.1±0.08	102.9±0.28 (7.4±0.18)	101.7±0.13 (88.9±0.23)*	101.5±0.13 (88.9±0.23)*

All values are expressed as mean±SE (n = 4), percentage reduction in rectal temperature is given within parentheses. * P < 0.05 significant compared to control.

RESULTS AND DISCUSSION

The preliminary phytochemical screening of the ethenolic extract showed the presence of plant phytoconstituents such as carbohydrates, alkaloids, glycosides, flavonoids, tannins and saponins were carried out on the powdered leaves following standard procedure.
In acute toxicity study, it was found to be safe and no mortality was observed to a dose as high as 800 mg/kg. The results of effect of ethenolic extract of Platycladus Orieantalis leaves on boiled milk induced pyrexia in rabbits are depicted in Table 1.Ethenolic extract produced significant ($P<0.05$) antipyretic effect. At a dose of 80 mg/kg body weight, ethenolic extract reduced (92.3±0.20) % of elevated rectal temperate compared to aspirin (96.3±0.10) % after 3 hours.
It was also observed that extract have no effect on the reduction of pyrexia of rabbit. Search for safe herbal remedies with potent antipyretic activity received momentum recently as the available antipyretic, such as paracetamol, aspirin, nimusulide etc. have toxic effect to the various organs of the body [16]. The acute toxicity result reveals that this plant might be considered as a broad non-toxic one. The antipyretic activity exhibited that the ethanol extract of leaf possess a significant antipyretic effect in maintaining normal body temperature and reducing boiled milk induced elevated rectal temperature in rabbits and their effect are comparable to that of standard antipyretic drug aspirin. Such reduction of rectal temperature of tested animals by the extract at 80 mg/kg appears to be due to the presence of a single bioactive principles or mixture of compounds in them. The phytochemical analysis of the fractions showed the presence of tannins and flavonoids.
The antipyretic activity observed can be attributed to the presence of flavonoids have been reported to exhibit antipyretic effect [17, 18]. The present study, therefore, supports the claims of traditional medicine practitioners as an antipyretic remedy.

Acknowledgement
The authors are thankful to Mr.Vivek Yadav, Chairmen, Sir Madanlal Group of Institutions, Etawah (UP) for providing necessary facilities and cooperation during this research work.

REFERENCES

1. Ramarao AV, Gunjar MK. Drugs from plant resources an overview, Pharma times.1990; 22:19-27.
2. Chattopadhyay, D., G. Arunachalam, L.Ghosh, K. Rajendran, A.B. Mandal and S.K.Bhattacharya, 2005. Antipyretic activity of *Alstonia macrophylla* Wall ex A. DC: An ethnomedicine of Andaman Islands. Journal of Pharmacy and Pharmaceutical Science, 8: 558-564.
3. Spacer, C.B. and C.D. Breder, 1994. The neurologic basis of fever. New England Journal of Medicine, 330: 1880-1886.
4. Veugelers, P.J., J.M. Kaldor, S.A. Strathdee, K.A. Page-Shafer, M.T. Schechter, R.A. Coutinho, I.P. Keet and G.J. van Griensven, 1997. Incidence and prognostic significance of symptomatic primary human immunodeficiency virus type 1 infection in homosexual men. Journal of Infectious Disease, 176: 112-117.
5. Cheng, L., H. Ming-liang and B. Lars, 2005. Is COX-2 a perpetrator or a protector? Selective COX-2 inhibitors remain controversial. Acta Pharmacological Sinica, 26: 926-933.
6. Kirtikar K.R. and Basu B.D. (1999) *Indian Medicinal Plants, Allahabad*, *Vol.-II,* 856.
7. Asima C., Satyesh C.P. (1995) *the Treatise on Indian Medicinal Plant. Editors, Publication and Information Directorate, New Delhi*, *Vol.6*. 149.
8. Sofowora A. Medicinal plants and Traditional Medicine in Africa. Spectrum books Ibadan.1993; 150.
9. Trease GE, Evans WC. Pharmacognosy. 11th edn.Bailliere Tindall, London, 1978; 176-180.

10. Harbone JB, Phytochemical Methods. Chapman and Hall Ltd, London, UK. (1st eds). 1973; 49-188.

11. Grover, J.K., 1990. Experiments in Pharmacy and Pharmacology. 1st ed., Vol. 2, India, pp: 155.

12. Nammi, S., M.K. Boini, S.D. Lodagala and R.B.S. Behara, 2003. The juice of fresh leaves of *Catharanthus roseus* Linn. Reduce blood glucose in normal and alloxan diabetic rabbits.BMC Complementary and Alternative Medicine, 3: 4-7.

13. Brithsh Veterinary Association Animal Welfare Foundation (BVAAWF), Fund for replacement of Animals in Medical Experiments (FRAME), Royal Society for the Prevention of Cruelty to Animal (RSPCA) and Universities Federation for Animal Welfare (UFAW) Joint working group on Refinement, 1993. Refinement in rabbit husbandry. Laboratory Animals, 27: 301-329.

14. Mutalik, S., K. Paridhavi, C.M. Rao and N.Udupa, 2003. Antipyretic and analgesic effect of leaves of *Solanum Melongena* Linn. in rodents.Indian Journal of Pharmacology, 35: 312-315.

15. Grover, J.K., 1990. Experiments in Pharmacy and Pharmacology. 1st ed., Vol. 2, India, pp: 155.

16. Guyton, A.C. and J.E. Hall, 1998. Textbook of Medical Physiology. 9th ed. W.B. Saunders Company, Philadelphia, pp: 920-922.

17. Brasseur, T., 1989. Antiinflammatory properties of flavonoids. Journal de pharmacie de Belgique, 44: 235-241.

18. Vimala, R., S. Nagarajan, M. Alam, T. Susan and S. Joy, 1997. Anti-inflammatory and antipyretic activity of *Michelia champaca* Linn.(White variety), *Ixora brachiata* Roxb. And *Rhynchosia cana* (wild.) D. C. flower extract.Indian Journal of experimental Biology, 35: 1310-1314.

****