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Analgesic Activity of Roots of *Monochoria vaginalis* Presl.

Gupta Manish Kumar[1*], Yadav Mukesh[1], Suthar Sushil[1], Dahiya Ravi[1], Kumawat Radhey Shyam[2]

[1]Sri Balaji College of Pharmacy, Benad Road, Jaipur, Rajasthan, India
[2]Maharishi Arvind Institute of Pharmacy, Jaipur, Rajasthan, India

ABSTRACT

The present study was aimed at evaluation of the analgesic activity of total alcoholic and aqueous extract of root of *Monochoria vaginalis* P in mice. The alcoholic extract of *Monochoria vaginalis* P root at a dose of 200 mg/kg body weight has shown significant analgesic activity as compared to aqueous extract. The result of hot plate indicated that the total alcoholic extract shows a significant increase ($P<0.01$) in reaction time at 2 and 3 hours comparable to the reference drug pentazocin but lesser ($P<0.05$) at 1 hr. The tail immersion and hot plate test reveal that this plant has high analgesic activity. This is because some form of error may be introduced with the animal handing while the test is being elicited. Both test show highest degree of analgesia in alcoholic extract compared to aqueous extract.

KEYWORDS: Analgesic activity, Alcoholic extract, Aqueous extract, Tail immersion method, Eddy's Hot plate method.

*Corresponding Author
Mr. Manish Kumar Gupta
Department of Pharmacognosy & Phytochemistry,
Sri Balaji College of Pharmacy, Benad Road,
Jaipur– 302013, Rajasthan, India
Mobile No. 09309056284
E-mail: manishkumargupta1008@gmail.com

INTRODCTION

The problem of uncontrolled pain led early human to seek remedies from any materials that they could lay their hand on. In resent times, focus on plant research has increase 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 reaction[1]. The plant family Pontederiaceae consists of widespread herbs, perennial or annual, aquatic, Floating, or rooted in substrate, inhabiting tropical and subtropical regions. Monochoria is a small genus of this plant family[2]. The Phytochemical studies reveal the presence of flavonoids (3-o-beta-d-glucopyranoside). Fraction of n-Butanol from *Monochoria vaginalis* exhibited antioxidant activity [3]. The traditional healer have used the entire plant, excepting the roots is eaten as vegetable in java juice of leaves is taken for coughs and that of root for stomach and liver complaints, asthma and toothache[4,5]. The roots are chewed for toothache and bark eaten with sugar for asthma[6]. So, it is necessary to explore and established the analgesic activity..

MATERIAL AND METHODS

PLANT MATERIALS

The *Monochoria vaginalis* Presl roots were collected from the local areas of Magala(Bellary), Karnataka, and authenticated by Dr. B.D. Huddar, Head, Department of Botany, K.L.E.Society's, Vidyanagar, Hubli. (Specimen no. 06PG353). Root was dried under shade, coarsely powdered and stored in airtight container for further use.

PREPARATION OF EXTRACT

The powdered root Soxhlet-extracted with total alcoholic. The extract, on removal of solvent in vacuum, gave light brown semisolid residue (yield: 9.8% w/w). The root of *Monochoria vaginalis* P was shade dried at room temperature, pulverized, and 100g of coarse powder was macerate exhaustively with water then being kept for 5 days in tightly sealed vessels at room temperature, protected from sunlight and shaken several times daily and add preservative(2% chloroform). Concentrate extract by distilling off the solvent and then evaporating to dryness on water –bath, gave yellowish brown semisolid residue (yield: 11.8% w/w)[7-8].

PHYTOCHEMICAL SCREENING

Preliminary Phytochemical investigation was carried out for extracts. Presence of alkaloids was determined by Mayer's, Dragendorf's, Wagner and Hager's test, Flavonoids by Shinoda, Ferric chloride and lead acetate tests, Saponins by Foam and haemolysis test and sterols by Salkowaski and Libermann and Burchards tests[9].

ANIMALS USED

Wister rats of either sex weighing 180-200g and Swiss mice weighing 18-28g were maintained under standard nutritional and environmental conditions throughout the experiment. The animal were of food for 24 h before experimentation but allowed access to tap water throughout. Animal were divided into four (n=6) for each experimental model, control, standard, two extract. The experimental protocol was approved by Institutional Animal Ethical Committee (IAEC) of K.L.E.S College of Pharmacy, Hubli (Karnataka) (Letter No. KLESCOPH /IAEC. Clear /2006-2007/04) dated 16/03/2007 with CPCSEA No. 126/1999/CPCSEA dated 29.06.1999.

TOXICITY STUDY[10]

Monochoria vaginalis P was tested in single doses in each experimental model as per following the OECD guideline no. 420 fixed dose method procedure, the safest dose of total alcoholic extract and aqueous extract are 2000mg/kg body weight. The safe dose was found to be 2000mg/kg body weight; hence $1/10^{th}$ of the dose was taken as effective dose which was found to be 200mg/kg body weight. Pentazocine 5mg/kg was used as the standard analgesic in hot-plate and Acetyl salicylic acid 640mg/kg p.o in tail immersion in mice and required quantity was dissolved in normal saline.

ASSESSMENT OF ANALGESIC ACTIVITY[11-13]

Hot Plate Method

In the hot plate method albino mice (18-28) were divided into four groups each consisting of six animals. One group served as a control (received vehicle), second group served as a standard (received Pentazocine 5mg/kg) while the third group received the alcoholic extract (As per b/w), and four group received the aqueous extract (As per b/w). The basal reaction time was noted before and 30, 60, 90 and 120 minutes after the administration of the drugs.

Table 1: Effect of Pentazocine, Alcoholic extract and Aqueous extract of *Monochoria vaginalis* P. roots on Eddy's Hot plate test in mice.

S. no.	Treatment	Mean Latent Time				
		0 min	30 min	60 min	90 min	120 min
1	Control	2.80±0.3121	3.67±0.3325	3.67±0.3326	3.00±0.2832	3.00±0.2635
2	Pentazocine (5mg/kg s.c)	2.83±0.3142	3.67±0.2146*	5.50±0.2236**	6.67±0.3325***	7.50±0.4378***
3	Alcoholic ext. (5mg/kg p.o)	3.00±0.2351	3.50±0.4326*	4.51±0.4362*	5.83±0.3142**	6.52±0.2231***
4	Aqueous ext. (5mg/kg p.o)	2.67±0.2153	3.54±0.2241*	4.66±0.3382*	5.33±0.2194**	5.83±0.3152**

The results were analyzed by ANOVA followed by Dunnet's test

*-Considered significant with P<0.01,

**-Considered significant with P<0.001

***-Considered extremely significant with P<0.0001

TAIL IMMERSION METHOD

In the Tail immersion method albino rats (180-200g) were divided into four groups each consisting of six animals. One group served as a control (received vehicle), second group served as a standard (received Acetyl salicylic acid 640mg/kg p.o) while the third group received the alcoholic extract (As per b/w), and four group received the aqueous extract (As per b/w).The time in second to withdraw the tail clearly out the water was taken as the reaction time.

RESULT AND DISCUSSION

The OECD guideline 420 fixed dose methods study showed that extract was safe at a dose of 2000 mg /kg body weight. The alcoholic extract of *Monochoria vaginalis* P root at a dose of 200 mg/kg body weight has shown significant analgesic activity as compared to aqueous extract. The analgesic activity of root of *Monochoria vaginalis* P was studied for its central activity. The result of hot plate indicated that the total alcoholic extract shows a significant increase (P<0.001) in reaction time at 2 and 3 hours comparable to the reference drug Pentazocin but lesser (P<0.05) at 1 hr. Aspirin leads to a relief from

inflammatory pain by suppressing the formation of pain inducing substances in the peripheral tissues, prostaglandins and bradykinin were suggested to play an important role in the pain process[14]. But aqueous extract did not showed significant activity as compared total alcoholic extract.

Table 2: Effect of Acetyl salicylic acid, Alcoholic extract and Aqueous extract of *Monochoria vaginalis* P. roots on Tail immersion test in rats. (Tail withdrawal time in Seconds at various time periods)

Treatment	Mean latent time					
	0.0 hr	1 hr	2 hr	3 hr	4 hr	6 hr
Control 2%acacia suspension	6.0±0.36	6.0±0.36	6.16±0.54*	5.6±0.49*	5.33±0.42*	6.0±0.36*
Standard Acety salicylic acid, (96mg/kg p.o)	6.0±0.37	7.50±0.22	9.17±0.47**	12.33±0.56**	22.17±0.60***	23.0±0.63***
Aqueous ext. (200mg/kg p.o.)	6.0±0.45	7.5±0.43	8.0±0.36*	9.5±0.43*	15.5±0.76*	16.0±0.93**
Alcoholic ext. (200mg/kg p.o.)	5.83±0.31	7.17±0.48	8.83±0.30*	10.83±0.60**	17.67±0.84**	18.67±0.49***

The results were analyzed by ANOVA followed by Dunnet's test

*-Considered significant with P<0.01,

**-Considered significant with P<0.001

***-Considered extremely significant with P<0.0001

A drug with anti-inflammatory activity usually exhibit antipyretic and analgesic properties. The best examples would be the nonsteroidal anti-inflammatory drugs, which possess all three activities[15]. Inflammation is a defensive reaction of the local microcirculation to tissue injury arising from cell damages due to mechanical trauma, chemical, physical and thermal injury, antigen antibody reactions and infections. The signs and symptoms of inflammation include redness, swelling, heat, pain and loss of function of the affected area. Pain is an unpleasant sensation that is a consequence of complex neurochemical processes in the central and peripheral nervous systems. Non-steroidal anti-inflammatory drugs (NSAIDS) and opioids are used in management of mild to moderate and severe pains respectively. These drugs have serious limitations due to their side effects. Most of the drugs used

presently for the management of pain and inflammation possess some side and toxic effects. It is therefore, inevitable to search for new, less toxic and more effective anti-inflammatory and analgesic agents[16]. The tail immersion and hot plate test reveal that this plant has high analgesic activity. This is because some form of error may be introduced with the animal handing while the test is being elicited. Both test show highest degree of analgesia in alcoholic extract compared to aqueous extract. The result clearly indicate that the total alcoholic extract of *Monochoria vaginalis* P root in context of analgesic activity. The detailed study is required in order to identify the actual active constituent from this drug.

CONCLUSION

The alcoholic extract showed the significant analgesic activity as compared to aqueous extract in both models. The present study demonstrates that *Monochoria vaginalis* has interesting analgesic activity, which needs to be investigated further.

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