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## **STUDY OF ANTI-PYRETIC ACTIVITY OF ETHANOLIC EXTRACT IN *ANACYCLUS PYRETHRUM* DC**

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### **ABSTRACT**

This study aimed to report on the evaluation of anti-pyretic activity of *Anacyclus pyrethrum* (Asteraceae) in rat. *Anacyclus pyrethrum* was therapeutically used in erectile dysfunction, paralysis, dental pain, diabetes, headache, urinary tract infections etc. The ethanolic extract of the plant was prepared and screened for anti-pyretic activity. Pyrexia was induced using yeast 1ml/kg i.p. to rats. The test drug *Anacyclus pyrethrum* at a dose of 100mg/kg i.p. possessed significant anti-pyretic activity. The activity was very comparable to standard drug Paracetamol 150mg/kg i.p. The acute toxicity study was also carried out. The maximum non-lethal dose was found to be 2g/kg.

## INTRODUCTION

Pyrexia is the increase of body temperature than the normal due to metabolic disturbances [1]. Antipyretic drugs are widely used in the treatment of fever and pain. But the greatest disadvantage in presently available synthetic drugs is that they cause gastrointestinal irritation and reappearance of symptoms after discontinuation [2]. *Anacyclus pyrethrum* is widely distributed in Indian subcontinent North Africa and Arabia. Other species are *Pyrethrum germanicum*, *Anacyclus officinarum* Hayne (more). Polyunsaturated alkyl amides isolated from *Anacyclus pyrethrum*, and other species were shown to possess inhibitory activity in vitro cyclooxygenase (sheep seminal microsomes) and 5-lipoxygenase (porcine's leucocytes) assays. Organic extracts of the roots were shown to have some antibacterial activities but did not have antifungal properties and they are against yeast. The drug is not completely inoffensive. India possesses rich floristic wealth and diversified genetic resources of medicinal plants (Arora et al., 2003). The use of the plant extract and pure compounds isolated from natural sources provided the foundation to modern pharmaceutical compounds (Alluri et al., 2006) [3].

## MATERIALS AND METHODS

### Preparation of plant material:

The dried roots of *Anacyclus pyrethrum* DC was collected from Puducherry during the month of February 2012 with the help of our guide Mr C.A. Arul Anandraj, HOD, M-Pharm. The voucher specimen of the plant is deposited in the Department of Pharmaceutical Analysis, College of Pharmacy, Mother Theresa Post Graduate and Research Institute of Health Sciences, Puducherry for the future references.

### Preparation of the plant extract:

The dried roots are collected and made free from other foreign organic matter by garbling and hand picking methods. The roots were grinded to moderately coarse powder in a mechanical grinder. Then the powder is passed through sieve no.22 and stored in a tightly closed amber coloured bottle at room temperature away from sunlight. The dried root powder 100mg was extracted with 80% aqueous ethanol by continuous hot percolation technique using Soxhlet apparatus for about 72 hrs. The concentrated aqueous ethanolic extract is 7g. A stock solution of 40mg/ml of alcoholic extract of the drug was prepared with distilled water.

**Animals:** The experiment was carried out on albino rats, weighing between 100-130g. The animals were adapted to lab conditions for 7 days prior to the experiment free access to water. Number of rats in each group was five.

1. Negative control (received normal saline 10ml/kg)
2. Positive control (Paracetamol 150mg as standard antipyretic agent).
3. Test control (*Anacyclus pyrethrum* DC 100mg/kg).

### Acute Toxicity Studies

Acute toxicity study was conducted on mice to determine the minimum lethal dose of the drug. Swiss albino mice of either sex weighing between 20-25 g fasted overnight was used for the study. The test drug at the dose of 2 g/ Kg was given. The animals were observed for 24hrs for symptoms like difficulty in breathing, sedation, decreased motor activity etc. The animals did not show any above said symptoms or any other toxic effects. No mortality was observed for 3 days, so it was found to be safe dose.

### Effect of Alcoholic Extract of *Anacyclus pyrethrum* DC on Yeast Induced Pyrexia in Rats

Before experiment rectal temperature of rat were recovered by inserting a bulb of digital thermometer in the rectum. Care was taken to insert it to the same depth each time. Yeast solution 15% concentration was prepared to induce pyrexia at the dose of 1ml/kg (subcutaneous route) body weight to induce pyrexia. Induction of fever was taken about in one to two hours. The aqueous ethanolic extract (100mg/kg, intraperitoneal route) was given on experimental group; standard antipyretic agent Paracetamol (150mg/kg, intraperitoneal route) was taken as positive control. Finally rectal temperatures were recorded for 3hrs at consecutive time intervals.

**TABLE-1: EFFECT OF ALCOHOLIC EXTRACT OF *Anacyclus pyrethrum* ON YEAST INDUCED PYREXIA**

Sl.no	Drug & Dose	Rectal temperature(°c)					
		Before Treatment	After induction of pyrexia	Temperature after treatment (°C)			
				30min	1hr	2hr	3hr
1	Normal saline (0.1ml/10g,i.p)	36.45	39.5	39.5	39.62	39.48	39.68
2	Paracetamol (150mg/kg,i.p)	36.70	40	40.10	37.12	37.02	36.50
3	<i>Anacyclus pyrethrum</i> (100mg/kg,i.p)	36.70	38.5	38.5	38.1	38.0	36.4

Values are given as mean  $\pm$  S E M, n =5, \*P > 0.01, \*\* P > 0.001 using student 't' test

## RESULTS AND DISCUSSION

The tested drug *Anacyclus pyrethrum* DC (100 mg/Kg, i.p) did not show any toxic effect at the dose of 2g/kg. Hence the drug was found to be safe to use. It also possessed significant antipyretic activity which was very comparable to standard drug Paracetamol (150mg/kg, i.p.). 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 cannot survive [4]. Normally the infected or damaged tissue initiates the enhanced formation of proinflammatory mediator's (cytokines like interleukin 1beta, alpha, beta and TNF- alpha), which increase the synthesis of prostaglandin E2 (PGE-2) near peptic hypothalamus area and thereby triggering the hypothalamus to elevate the body temperature.[5] 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 temperatures 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 [6]. 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, glomeruli, cortex of brain and heart muscles, whereas natural COX-2 inhibitors have lower selectivity with fewer side effects [7]. A natural antipyretic agent with reduced or no toxicity is therefore, essential. As the plant had many pharmacological activities it was screened for antipyretic activity too. It also showed significant antipyretic activity. Hence it was an effective alternative medicine as antipyretic agents to synthetic drugs.

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