

ANTIPIRETTIC POTENTIAL OF DIFFERENT EXTRACTS OF *CASSIA FISTULA* LINN (FABACEAE) BARK

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ABSTRACT

Ethnobotany is a multidisciplinary science defined as the interaction between plants and people. On the basis of ethnomedicinal use, antipyretic activity of petroleum ether, ethyl acetate, chloroform, methanol extract of *Cassia fistula* Linn (*Fabaceae*) bark has been investigated in albino rats. Normal body temperature is regulated by a centre in the hypothalamus that ensures a balance between heat loss and production. Fever occurs when there is a disturbance of this hypothalamic 'thermostat', which leads to the set-point of body temperature being raised. Once there has been a return to the normal set-point, temperature regulating mechanism (dilatation of superficial blood vessels, sweating etc.) operates to reduce temperature. The study was carried out by using dose of 300 mg/kg orally. Experimental results exhibited that petroleum ether, ethyl acetate, chloroform, methanol extract of *Cassia fistula* bark, possess a significant antipyretic effect. After inducing 15% w/v suspension of yeast (1ml /100gm Body weight), temperature of experimental animal was increased. Then different extracts of the drug was induced into albino rats, which shows significant results. It was observed that methanol extract at a dose of 300 mg / kg body weight showed maximum antipyretic activity amongst other extracts which is statistically significant as the value of $p < 0.05$.

KEY WORDS: Cassia fistula, Antipyretic, Albino Rat, Yeast, Diclofenac sodium, Paracetamol

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INTRODUCTION

Nature always as a golden mark to exemplify the outstanding phenomenon of symbiosis. The plants are indispensable to man for his life. Plants from nature are being used in medicine from time immemorial because they have fitted the immediate personal needs and nature remains as the potential source of organic structures of unparalleled diversity. The selected plant *Cassia fistula* was reported to have wide ethnomedicinal use¹. On the basis of the report of literature review the plant *Cassia fistula* was selected for antipyretic activity. It is a deciduous, medium-sized tree with a gray, smooth, exfoliating bark. 4-8 pairs of leaflets distinctly stalked, oblong or ovate, with a silvery pubescence; the flowers are bright yellow, in auxiliary, pendulous, lax racemes; the pods are cylindrical, smooth, hard, dark brown or black; the seeds light brown. Pyrexia comes from the Latin word "febris" meaning fever. It is a frequent medical symptom that describes an increase in internal body temperature to levels that are above normal-37°C or 98.6F. Fever is most accurately characterized as a temporary elevation in body's thermoregulatory set point usually by about 1-2°C. It is the body's natural defense to create an environment where infectious agent or damaged tissue can not survive. Normally the infected or damaged tissue² initiates the enhanced formation of pro-inflammatory mediator's (cytokines like interleukin 1 β , α , β and TNF- α), which increase the synthesis of prostaglandin E2 (PGE2) near peptic hypothalamus area and thereby triggering the hypothalamus to elevate the body temperature³. 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. Most of the antipyretic drugs inhibit COX-2 expression to reduce the elevated body temperature by inhibiting PGE2 biosynthesis⁴.

MATERIAL AND METHODS

Plant Material

The bark of *Cassia fistula* was collected from Ushakothi and Kuagola, Jamankira, are the places in the Sambalpur district of Orissa in May. It was identified and authenticated at Central National Herbarium, Botanical Garden, Howrah.

Preparation of Extracts

The barks were dried in shade and powdered to get a coarse powder. About 1kg of dry coarse powder was extracted with methanol (40-60°C) by continuous hot percolation using soxhlet apparatus. The extraction was continued for 72hours. Then petroleum ether, ethyl acetate, chloroform, methanol extract were prepared by following fractionation process for experiment.

Animals

Healthy adult Wister strain albino rats of both sex between 2-3 months of age and weighing 150- 200 gm were used for this study. Animals were allowed to be acclimatized for a period of 2 weeks in our laboratory environment prior to the study. Rats were housed in polypropylene cages (3 animals per cage), maintained under standard laboratory conditions (*i.e.* 12:12 h light and dark sequence; at an ambient temperature of 25 \pm 2°C; 35-60% humidity); the animals were fed with standard rat pellet diet (Hindustan Liver Ltd. Mumbai, India) and water *ad libitum*. The principles of Laboratory Animals care were followed and instructions given by our institutional animal ethical committee were followed throughout the experiment.

Antipyretic activity

Induction of yeast induced pyrexia & Drug administration

Rats were divided into 6 groups of 6 rats each. Fever was induced in rats by subcutaneous injection of 10 ml/kg body wt of 15% w/v yeast suspended in 0.5% w/v methyl cellulose solution. After 19 hrs of yeast injection, the elevated body temperature ensures induction of pyrexia, then pet-ether, ethylacetate, chloroform, and methanol extracts of bark at the dose of 300 mg/kg orally administered into the experimental animal. Then rectal temp was recorded after 1:30 hrs, 2.30hrs and 3.30hrs gradually.

Statistical analysis

The results are expressed as mean \pm S.E.M. The statistical analysis was performed by analysis of variance (A.N.O.V.A) by Dunnett's Multiple Comparison test.

RESULTS

Paracetamol is a common antipyretic agent, which is safe in therapeutic doses. The resultant effects of *Tephrosia Purpurea* root extracts on yeast-induced pyrexia in rats are depicted in Table1. Experimental results exhibited that all the extracts of root produced a significant antipyretic effect to maintain a normal body temperature and reduce yeast induced elevated rectal temp in rat and their effect are comparable to that of standard antipyretic drug, paracetamol. It was observed that chloroform extract at a dose of 150 mg / kg body weight showed maximum antipyretic activity amongst other extracts. The result of the present study suggests that all the extracts of *Tephrosia Purpurea* significantly reduced the temperature of pyretic rats as the value of $p < 0.05$ was considered as statistically significant.

DISCUSSION

It was found that the different extracts of *Cassia fistula* bark are having the antipyretic effect. It was observed that methanol extract at a dose of 300 mg / kg body weight showed maximum antipyretic activity.

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Table1: Antipyretic effect of *Cassia fistula* Linn (*Fabaceae*) bark in rats

Sl. No.	Treatment	Initial Temp.(⁰ C)	Rectal Temperature ⁰ C in hour \pm SEM			
			0 Hour	1 ½ Hour	2 ½ Hour	3 ½ Hour
1.	Control	37.50 \pm 0.32	37.6 \pm 0.26	37.7 \pm 0.29	37.90 \pm 0.32	38.10 \pm 0.39
2.	Paracetamol (150mg)	37.40 \pm 0.40	39.0 \pm 0.50	38.6 \pm 0.33	38.40 \pm 0.39	38.0 \pm 0.46*
3.	Methanolic Extract (300mg/kg)	37.20 \pm 0.48	37.5 \pm 0.92	37.42 \pm 0.70*	37.25 \pm 1.47**	37.58 \pm 0.92**
4.	Pet.Ether Extract (300mg/kg)	37.40 \pm 0.40	37.77 \pm 1.46	37.46 \pm 0.57**	37.07 \pm 0.62	37.60 \pm 1.06**
5.	Chloroform Extract (300mg/kg)	36.10 \pm 0.07	37.2 \pm 0.66	36.35 \pm 1.72*	36.23 \pm 0.67	37.68 \pm 1.09
6.	Ethylacetate Extract (300mg/kg)	36.20 \pm 0.05	37.36 \pm 0.65	36.42 \pm 1.95	36.22 \pm 1.77	37.23 \pm 0.76

Mean \pm SEM, * $p < 0.05$, ** $p < 0.001$

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