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Evalution of antipyretic activity of ethanolic extracts of *Dalbergia sissoo* (Roxb.) leaves and bark

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ABSTRACT

Natural products obtained from various plant materials including terrestrial plants play an important role in chemistry of drugs. They provide amazing source of new drugs leading to development of new chemical entities for further drug development. In the course of study an attempt was made for the identification of biologically active constituents present in the ethanolic extract of Dalbergia sissoo leaves and bark and evaluation of both extracts for antipyretic activity through Brewer's yeast–induced pyrexia in Albino Wistar Rats. This antipyretic activity is related to the inhibition of prostaglandin synthesis. Results showed significant antipyretic activity in pyrexia in rats throughout the observation period of 5 hrs. The Test agent or co-solvent was administered orally and the temperature was measured at 1, 2, 3, 4, and 5 hrs. After drug administration.

Keywords: *Dalbergia sissoo*, Antipyretic activity, Brewer's yeast induced pyrexia, prostaglandin synthesis;

INTRODUCTION

Dalbergia sissoo(Roxb.) belongs to family Fabaceae ,a legume family which is native to India and had been long cultivated in Egypt as shade tree on the banks of irrigation canals . It is large deciduous tree, often with crooked trunk and light crown. Under favorable conditions the tree attains a height of about 100 ft and girth up to 8 ft. It grows well on porous soils containing sand, pebbles and boulders. It reaches its finest development in the river and rain tracts . *Dalbergia* genus includes many members which are broadly used in folk medicine for several diseases. Literature survey reveals the isolation of several compounds with confirmed biological activity such as flavones, isoflavones, quinines and coumarins from *Dalbergia sissoo.* It also contains tectoridin, caviunin-7-*O*- glucoside, iso-caviunin, tectorigenin, dalbergin, bio-chanin-A, and 7-hydroxy -4-methylcoumarin. The heartwood gave 3,5-dihydroxy-trans-stibene, biochanin A, dalbergichromene, dalbergenone and iso-dalbergin [1-2]. The concentrated extract of heartwood in milk was prescribed in fevers; extract of leaves in jaundice, bark extract is used as anti-inflammatory agent in piles, sciatica, and as blood purifier. The oil was used externally in the skin diseases and infected ulcers. The wood exhibits alterative, stomachic, anthelmintic, antileprotic and cooling properties[3]. It was found useful in scalding of urine. Arial parts showed significant spasmolytic activity. The tree has immense enthnomedicinal uses and has been used traditionally since a long time. It is known as premier timber species of rosewood genus. *Dalbergia sissoo* leaves extract is used in the treatment of emesis, ulcers, arthritis, leucoderma, dysentery, stomach troubles and skin diseases[4]. The present study reveals the antipyretic activity of ethanolic extracts of leaves and bark of *Dalbergia sissoo*(Roxb.) by Brewer's yeast- induced pyrexia in Wistar rats[5].

MATERIALS AND METHODS

Collection of plant material and preparation of extract

Dalbergia sissoo leaves and bark were collected from Bhownari near Bairagarh, Bhopal . The plant parts were authentified at Botanical survey of India, Dehradun. specimen no. 114139.

These were placed in plastic air tight bags and washed thoroughly with fresh and distilled water to remove the unwanted matter. These were dried in shade, powdered and extracted with 95 % ethanol and 5% distill water by heating in Soxhlet apparatus[6]. The ethanol extract so obtained was concentrated to dryness in a rotary evaporator under reduced pressure and controlled temperature (40- 50ºC). The concentrated ethanol extract was suspended in distilled water and fractionated by the light petroleum ether, chloroform and acetic acid [7]. The collected fractions were separately concentrated to yield the reddish brown semi solid residue [8]. Then, the obtained residue was subsequently washed with chloroform and ethyl acetate to get the separated greenish powder solid material. This was found to be amorphous having light green colour. The ethanol extract was subjected to preliminary phytochemical screening [9-10].

b. Experimental animals

The Albino Wistar rats weighing (150-250 g) were used for studying antipyretic activity. Animal were maintained under standard laboratory conditions. Study protocol was approved by the Institutional Animal Ethics Committee (IAEC) of Pinnacle Research Institute before the experiment [11]. The animals were kept in polypropylene cages and maintained on balanced ration-standard diet with free access to clean water regularly. Animals were further divided into eight groups with four animals in each group(Table-1). The route of administration of drug was orally[12].The extracts of *Dalbergia sissoo* used in the doses of 300, 500 and 1000 mg/kg orally in the study test, standard drug administration of Aspirin (200 mg/kg) and sodium carboxymethyl cellulose (CMC)(5mg/kg) were used for comparing Antipyretic effect[13] .Four animals were used in each treatment group. First group was administrated with vehicle CMC; second group with standard drug Aspirin; third group with ethanolic extract of *D.sissoo* leaves(DSEL-1)300mg/kg; fourth group ethanolic extract of *D.sissoo* leaves(DSEL-2)500mg/kg; fifth group ethanoicl extract of *D.sissoo* leaves(DSEL-3)1000mg/kg; sixth group ethanolic extract of *D.sissoo* bark (DSEB-1)300mg/kg; seventh group ethanolic extract of *D.sissoo* bark (DSEB-2) 500mg/kg; eighth group ethanolic extract of *D.sissoo* bark (DSEB-3) 1000mg/kg. The antipyretic activity was marked throughout the observation period up to 5 hrs and the increase in temperature [14-15].

Table- 1 - Animal Group and Doses

S. No.	Treatment	Dose	No. of animals
1	Vehicle (0.5%CMC)	5ml/kg	4
2	Standard(Asprin200mg/kg)	200mg/kg	4
3	DSEL-1	300mg/kg	4
4	DSEL-2	500mg/kg	4
5	DSEL-3	1000mg/kg	4
6	DSEB-1	300mg/kg	4
7	DSEB-2	500mg/kg	4
8	DSEB-3	1000mg/kg	4

c. Protocol Procedure

Antipyretic activity of drug was measured by slightly modifying the method described by Adams *et.al*[16].Male Wistar rats were fasted overnight with water and kept for experiments. Pyrexis was induced by subcutaneously injection 20% (w/v) Brewer's yeast suspension (10ml/kg) into the animal's dorsum region. Seventeen hours after the injection, the rectal temperature of each rat was measured using thermometer. Only rats that showed an increase in temperature of at least 0.7ºC were used for the experiments. Test agent or co-solvent was administered orally and the temperature was measured at 1, 2, 3, 4, and 5 hrs. After drug administration. Each groups used four rats.

RESULTS AND DISCUSSION

The antipyretic activity was marked throughout the observation period up to 5 hrs and the increase in temperature was noted at regular interval (Table 2).

Table 2 -Rectal Temperature [ºC]

S.N	TREATMENT	DOSE	O hr.	1 hr.	2 hrs.	3hrs.	4 hrs.	5 hrs.
1.	Vehicle (0.5% CMC)	5 ml/kg	39.1± 0.264	39.2±0.216	39.5±0.216	39.6 ± 0.216	39.4 ± 0.171	39.6 ± 0.221
2.	Standard (Aspirin)	200mg/kg	39.0±0.262	37.9±0.170	37.6 ± 0.191	37.2 ± 0.182	36.8 ± 0.258	39.3 ± 0.221
3.	DSEL-1	300mg/kg	39.4±0.208	39.0±0.191	38.7 ± 0.221	38.3 ± 0.275	38.0 ± 0.264	37.2 ± 0.238
4.	DSEL-2	500mg/kg	39.1±0.457	38.6±0.221	38.2 ± 0.311	37.8 ± 0.264	37.5± 0.264	37.3± 0.316
5.	DSEL-3	1000mg/kg	39.1±0.680	38.2±0.559	37.8 ± 0.535	37.4± 0.450	37.1 ± 0.535	36.8± 0.499
6.	DSEB-1	300mg/kg	39.5±0.170	39.2±0.171	38.9±0.129	38.6± 0.244	38.2± 0.250	37.0 ± 0.171
7.	DSEB-2	500mg/kg	39.1±0.359	38.8±0.238	38.4 ± 0.330	38.0 ± 0.275	37.7± 0.264	37.4 ± 0.275
8.	DSEB-3	1000mg/kg	39.0±0.298	38.3±0.250	38.0± 0.298	37.6 ± 0.294	37.3± 0.162	37.6± 0.331

The antipyretic activity of ethanol extract of leaves and bark *D. sissoo* (Roxb.) with eight groups of Albino Wistar rats suggested that ethanol extract of bark (DSEB-3) (1000mg/kg) and Aspirin 200mg/kg showed significant antipyretic effect may be related to the inhibition of prostaglandin synthesis. Presence of flavonoids was reported in *Dalbergia* species and flavonoids are known to inhibit prostaglandin synthetase .Since prostaglandins are involved in inhibition by flavonoids, it could be suggested that reduced availability of prostaglandins by flavonoids of DSE of leaves and bark be responsible for its antipyretic activity. It appears that antipyretic activity is related to the inhibition of prostaglandin synthesis in hypothalamus. The inhibition % is shown in Tables of different for Antipyretic activity. Albino Wistar rats weighing (150-250 g) were used for studying acute toxicity

CONCLUSION

In conclusion, the present study demonstrates that *Dalbergia sissoo* ethanol extract of bark (1000mg/kg)and Aspirin 200mg/kg has marked significant antipyretic activities. The DSE was used in the doses of 200, 300 and 1000 mg/kg orally in the study test. The standard drug Aspirin (200 mg/kg) and vehicle drug CMC (5mg/kg) were used as for Antipyretic effects and four animals were used in each treatment group the increase in temperature showed significant throughout the observation period up to 5 hrs The presence of flavanoids are known to inhibited the prostaglandins synthetase which suggested to play an important role in the Antipyretic effects. Therefore, it is likely that DSE might suppress the formation of these substances or antagonize the action of these substances and thus exerts its Antipyretic activity in Albino Wistar rats. There was significantly increased the rectal temperature, suggesting its Antipyretic activity. The presence of Flavonoids are responsible factors for increase antipyretic activity. .Pyrex's was induced by subcutaneously injection 20% and brewer's yeast suspension (10ml/kg) into the Animals dorsum region. Seventeen hours after the injection, the rectal temperature of each rat was measured using thermometer. Only rats that showed an increase in temperature of at least 0.7ºC were used for the experiments. Test agent or co-solvent was administered orally and the temperature was measured at 1, 2, 3, 4, and 5 hrs. After drug administration. Each groups used four rats.

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