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A Comparative Antipyretic Activity of the Crude Extracts of the Ariel Parts of *Glycosmis pentaphylla* and *Bauhinia variegata*

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Article Info	Abstract
Article History <i>Received</i> : 19/02/2011 <i>Revised</i> : 27/03/2011 <i>Accepted</i> : 27/03/2011	This study indicates that <i>Glycosmis pentaphylla</i> and <i>Bauhinia variegata</i> extracts have good antipyretic activity. Ethanolic extract of <i>Bauhinia variegata</i> and <i>Glycosmis pentaphylla</i> exhibited significant anti-pyretic activities in Brewer's yeast induced pyrexia in rats. The maximum antipyretic activity throughout the test period of 6 hours was produced by ethanolic extract of plant <i>Glycosmis pentaphylla</i> (200 mg/kg) and standard (paracetamol treated) group. In general, non-steroidal anti-inflammatory drugs produce their antipyretic action through the inhibition of prostaglandin synthetase within the Hypothalamus. Therefore, the antipyretic activity of extracts of <i>Bauhinia variegata</i> and <i>Glycosmis pentaphylla</i> is probably by inhibition of prostaglandin synthesis in hypothalamus.
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Introduction

Glycosmis pentaphylla Correa, Rutaceae is commonly known as tooth-brush plant. Infusion of leaves of *Glycosmis pentaphylla* is used in fever, liver disorders, cough and jaundice, as tonic and appetiser to women after delivery [1,2].

Arborinine, an acridone alkaloid obtained from *Glycosmis pentaphylla*, exhibited significant inhibition of crown gall tumors produced by *Agrobacterium tumefaciens* in a potato disc bioassay.[3] Six new apiosyl-(1→6)-glucosyl isoflavones (1-6) and four known ones were isolated from the stems of *Glycosmis pentaphylla* [4]. Hepatoprotective [5], and anthelmintic [6] activity of *G. pentaphylla* were also reported.

The plant *Bauhinia variegata* Linn. (Caesalpiniaceae) commonly known as Mountain Ebony is a medium-sized, deciduous tree, found throughout India. It has been used in dyspepsia, bronchitis, leprosy, ulcer, to prevent obesity, as an astringent, tonic and anthelmintic [7]. The stem contains β -sitosterol, lupeol, kaempferol-3-glucoside and 5,7-dihydroxy and 5,7-dimethoxy flavanone-4-O- α -L-rhamnopyranosyl- β -D-glucopyranosides. Flowers contain cyanidine-3-glucoside, malvidin-3-glucoside, malvidin-3-diglucoside, and peonidin 3-diglucoside, kaempferol-3-galactoside and kaempferol-3-rhamnoglucoside.

Five flavonoids isolated from the different parts of *Bauhinia variegata* has been identified as quercetin, rutin, apigenin and apigenin 7-O-glucoside. Phytochemical analysis of the root bark of *Bauhinia variegata* Linn was reported to contain a new flavanone: (2S)-5,7-dimethoxy-3'-4'-methylene dioxyflavanone (1) and a new dihydrobenzoxepin 5,6-dihydro-1,7-dihydroxy-3,4-dimethoxy-2-methylidibenz (b,f) oxepin [8,9].

Bauhinia variegata Linn. stem is reported to have antitumour [10], antimicrobial [11], anti-inflammatory[12], hepatoprotective [13], antihyperlipidemic [14] and immunomodulatory activities [15].

The present study was undertaken to verify the claim and evaluate the antipyretic activity of the plant *Bauhinia variegata* and *Glycosmis pentaphylla*.

Experimental

Plant Material

The plants of *Bauhinia variegata* and *Glycosmis pentaphylla* were collected from local areas around the Mangalore, Karnataka, India, and after authentication by botanist two separate voucher specimen (NIMS/2010/NBV, NIMS/2010/NGP) are being maintained in laboratory of Phytochemistry and Pharmacognosy, NIMS Institute of Pharmacy, Shobha Nagar, Jaipur, India, respectively for the plant *Bauhinia variegata* and *Glycosmis pentaphylla*. Ariel parts of plants including, stem, leaves and flower were shade dried and chopped into small pieces separately.

Preparation of extracts

The shade dried plants were powdered (300g) and extracted with ethanol (70%) in two different soxhlet extractors exhaustively for 20-24 hours. The extracts were concentrated to dryness under reduced pressure and controlled temperature (40-50^o C) using flash evaporator. Preliminary phytochemical screening of the crude extracts of the plant *Glycosmis pentaphylla* and *Bauhinia variegata* showed the presence of steroids, alkaloids, glycosides, saponins, flavonoids, tannins and carbohydrates.

Acute toxicity study

Male wistar albino rats (160 – 200 g) were used in the experiment. Animals maintained under standard environmental conditions, were fed with a standard diet (Hindustan Lever, India) and water ad libitum. The animals were fasted for 16h before experimentation but allowed free access to water. Institutional animal Ethics Committee's permission was obtained before starting the experiments on animal.

The acute oral toxicity study was done by 'Up-and- Down' method in healthy adult female albino rats according to CPCSEA recommended 'OECD' guideline 425. There were no changes from dose level of 175 mg/kg, p.o, to 2000 mg/kg, p.o. Drug extracts did not cause any death upto 2000 mg/kg. The LD₅₀ calculated is 2000 mg/kg for both the extracts, so one tenth of the maximum tested dose (i.e. 200 mg/kg, p.o.) was selected for the evaluation of the antipyretic effect.

Effect of *Bauhinia variegata* and *Glycosmis pentaphylla* extracts on Brewer's yeast induced pyrexia

Albino Swiss rats of either sex weighing 150–180 g were used and fed standard animal feed and tap water ad libitum before the experiments (n=6). Group I vehicle control, Group II, and Group III treated with *Bauhinia variegata* and *Glycosmis pentaphylla* ethanolic extract 200 mg/kg respectively, and

Group IV standard 150 mg/kg of paracetamol. All drugs are given as freshly prepared aqueous suspension in 0.9% saline.

The initial rectal temperatures of the rats were recorded using an electric telethermometer. Rats were made hyperthermic by a subcutaneous injection of 20% yeast suspension in 0.9% saline at a dose of 1 mL/100 g body weight. When the temperature was at a peak (18 h after yeast injection) the rectal temperature was recorded again. Those animals that showed a rise in rectal temperature of more than 1.2°C were used. Test substances and control vehicle were given orally and rectal temperature of animals was recorded at 1 h intervals for 6 h following the administration of drug or different plant extracts.[16]

Statistical analysis

The results are expressed as mean ± S.E.M. the significant of various treatments was calculated using students t-test.

Results

Ethanolic extract of *Bauhinia variegata* and *Glycosmis pentaphylla* showed significant antipyretic activity, but the maximum antipyretic activity throughout the test period of 6 hours was produced by ethanolic extract of the plant *Glycosmis pentaphylla* (200 mg/kg) and paracetamol group (Table-1).

Table 1: Effect of *Bauhinia variegata* and *Glycosmis pentaphylla* extracts on Brewer's yeast-induced pyrexia in rats

Group	Treatment	Rectal temperature in °C at different hours					
		-18 hr.	0 hr.	1 hr.	3 hr.	5 hr.	6 hr.
I	Control	37.33 ± 0.08	38.58 ± 0.11	38.60 ± 0.09	38.54 ± 0.12	38.57 ± 0.09	38.62 ± 0.05
II	200 mg/kg of BVEE	37.51 ± 0.11	38.84 ± 0.13	38.58 ± .05**	38.43 ± .09**	38.26 ± .14**	38.11 ± .14**
III	200 mg/kg of GPEE	37.52 ± 0.10	38.82 ± 0.16	38.51 ± 0.16**	38.27 ± 0.16**	38.12 ± 0.16**	38.04 ± 0.12**
IV	150 mg/kg of paracetamol	37.55 ± 0.17	38.76 ± 0.15	38.41 ± 0.14*	38.24 ± .12**	38.03 ± .15**	37.85 ± .18**

Values are expressed as mean ± S.E.M. (n = 6);

** p < 0.01 compared with 0 h of the same group,

BVEE:- *Bauhinia variegata* ethanolic extract;

GPEE:- *Glycosmis pentaphylla* ethanolic extract.

Discussion

In general, non-steroidal anti-inflammatory drugs produce their antipyretic action through the inhibition of prostaglandin synthetase within the Hypothalamus. *Bauhinia variegata* was tested for its prostaglandin (PG) inhibitory activity. The extract showed inhibition of PGE-1 and PGE-2 induced contractions in guinea pig ileum¹². Therefore, the antipyretic activity of extracts of *Bauhinia variegata* and *Glycosmis pentaphylla* is probably by inhibition of prostaglandin synthesis in hypothalamus.

Conclusion

The extracts of *Bauhinia variegata* and *Glycosmis pentaphylla* showed significant antipyretic activity, However further investigations are required to isolate active constituents responsible for this activity and to elucidate the exact mechanisms of action.

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