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A comparative antipyretic activity of the crude extracts of the plant *Leucas aspera* and *Glycosmis pentaphylla*

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ABSTRACT

This study indicates that Leucas aspera and Glycosmis pentaphylla extracts have good antipyretic activity. Ethanolic extract of Leucas aspera and Glycosmis pentaphylla 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 Leucas aspera (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 Leucas aspera and Glycosmis pentaphylla is probably by inhibition of prostaglandin synthesis in hypothalamus.

Key words: *Leucas aspera*, antipyretic activity, Brewer's yeast, Pyrexia.

INTRODUCTION

Leucas aspera belonging to the family Labiate is used as anti-inflammatory, stimulant, in jaundice, cough, asthma, conjunctivitis, diabetes, malaria, headache, otalgia, skin diseases, snake bite, toothache, and wound healing etc.[1] *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.[2,3]

Leucas aspera is studied for anti-inflammatory activity[4,5,6],analgesic activity[7], cobra venom induced mortality in mice[8], anti-parasitic activity[9], antibacterial activity against Micrococcus pyrogenes, V.aureus and Escherichia Coli[10], toxic to the filarial vector mosquito[11], antinociceptive, antioxidant and cytotoxic activity[12]. Preliminary chemical examination of entire plants of *L. aspera* revealed presence of triterpenoids[13], contains oleanolic acid, ursolic acid and 3-sitosterol[14], and aerial parts are reported to contain nicotine, sterols, two new

alkaloids (compound A m.p. 61.2°, α-sitosterol and β-sitosterol m.p. 183.4 ^{o}), reducing sugars (galactose), glucoside (230.1 ^{o}).[15]

Arborinine, an acridone alkaloid obtained from *Glycosmis pentaphylla*, exhibited significant inhibition of crown gall tumors produced by *Agrobacterium tumefaciens* in a potato disc bioassay.[16] Six new apiosyl-(1→6)-glucosyl isoflavones (1−6) and four known ones were isolated from the stems of Glycosmis pentaphylla.[17] Hepatoprotective[18],and anthelmintic[19] activity of G. pentaphylla were also reported.

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

EXPERIMENTAL SECTION

Plant Material

The plants of *Leucas aspera* and *Glycosmis pentaphylla* were collected from local areas around the Mangalore, Karnataka, India, and after authentication by botanist two separate voucher specimen (NIMS/2010/NLA, NIMS/2010/NGP) are being maintained in laboratory of Phytochemistry and Pharmacognosy, NIMS Institute of Pharmacy, Shobha Nagar, Jaipur, India, respectively for the plant *Leucas aspera* and *Glycosmis pentaphylla*. Whole plants then, including root, 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 (99.99%) in two different soxhlet extractors exhaustively for 20-24 hours. The extracts were concentrated to dryness under reduced pressure and controlled temperature (40-50^{0} C) using flash evaporator. Preliminary phytochemical screening of the crude extracts of the plant L. aspera showed the presence of steroids, alkaloids, glycosides, saponins, flavonoids, tannins and carbohydrates.

Test animals

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 LD_{50} 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 *Leucas aspera* 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 *Leucas aspera* and *Glycosmis pentaphylla* ethanolic extract 200 mg/kg

respectively, and Group IV standard control 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 i.p. and rectal temperature of animals was recorded at 1 h intervals for 6 h following the administration of drug or different plant extracts.[20]

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 *Leucas aspera 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 *Leucas aspera* (200 mg/kg) and paracetamol group (Fig. and table no.1).

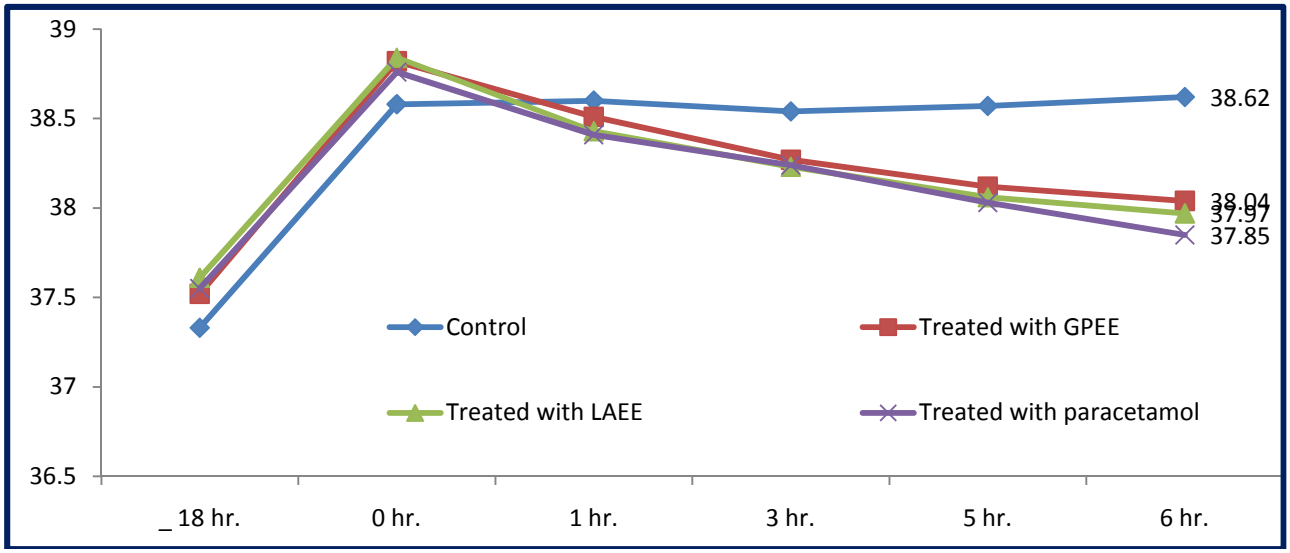

Figure 1 : Effect of L. aspera and G. pentaphylla extracts on Brewer's yeast-induced pyrexia in rats

Table 1: Effect of *L. aspera* and *G. pentaphylla* extracts on Brewer's yeast-induced pyrexia in rats

Group	Treatment	Rectal temperature in ^{0}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 LAEE	37.61 ± 0.11	38.84 ± 0.13	38.43 ± .05**	38.23 ± .09**	38.06 ± .14**	37.97 ± .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, LAPE:- Leucas aspera 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. *Leucas aspera* 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 *Leucas aspera* and *Glycosmis pentaphylla* is probably by inhibition of prostaglandin synthesis in hypothalamus.

CONCLUSION

The extracts of *Leucas aspera* 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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