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Original Research Article

Evaluation of Anti-Pyretic Activity of Ethanolic Extract of Leucas indica Leaves (EELLI) Using Baker's Yeast-Induced Pyrexia in Wistar Albino Rats

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Abstract: Fever is a common manifestation of infection and inflammation and is mediated through pyrogen-induced prostaglandin synthesis in the hypothalamus[1]. Although conventional synthetic antipyretics such as paracetamol are effective, their long-term use has been linked with hepatotoxic and renal adverse effects[2]. Leucas indica, used widely in traditional medicine for fever and respiratory ailments, contains bioactive compounds with reported anti-inflammatory properties[3–5]. Aim: To evaluate the antipyretic activity of ethanolic extract of Leucas indica leaves (EELLI) in Baker's yeast-induced pyrexia in Wistar albino rats. Objectives: To evaluate the antipyretic effect of EELLI at doses 75, 150, and 300 mg/kg and to compare the efficacy of EELLI with paracetamol. Methodology: Wistar albino rats were divided into five groups (n=6). Pyrexia was induced using 20% yeast suspension. After 18 hours, animals received vehicle, paracetamol (100 mg/kg), or EELLI at three different doses. Rectal temperature was recorded at predetermined intervals. Statistical analysis was performed using ANOVA with Dunnett's post-test. Results: EELLI at doses 150 mg/kg and 300 mg/kg produced a significant ($p<0.01$) reduction in rectal temperature when compared with control, whereas the 75 mg/kg dose did not produce meaningful antipyretic effect. The effect was dose-dependent and comparable to paracetamol at later time points. Conclusion: EELLI demonstrated dose-dependent antipyretic activity supporting its traditional medicinal use. Further phytochemical and mechanistic studies are recommended.

Keywords: Leucas indica, antipyretic, ethanolic extract, Baker's yeast, Wistar rats.

INTRODUCTION

Fever is a systemic host defence mechanism caused by the release of pyrogens that elevate hypothalamic temperature set-point through prostaglandin E2 (PGE_2) synthesis[6]. Current antipyretic drugs such as non-steroidal anti-inflammatory drugs (NSAIDs) and paracetamol inhibit cyclooxygenase pathways but are associated with hepatotoxicity, gastric

irritation, and renal injury on long-term use[2,7]. This has resulted in growing interest in plant-based alternatives with safer pharmacological profiles[8].

Leucas indica (Family: *Lamiaceae*) is traditionally used in Ayurveda and folk medicine for fever, bites, inflammation, cough, and skin infections[3], [9]. Phytochemical studies show the presence of flavonoids, terpenoids, glycosides, and steroids, many of which possess anti-inflammatory and antioxidant properties[10–12].
Animal studies have reported varying pharmacological actions of *Leucas* species including antimicrobial, immunomodulatory, hepatoprotective, and analgesic activity[13–15]. However, limited controlled experimental evidence exists regarding its antipyretic effect, warranting further scientific evaluation.

This study investigates the antipyretic effect of ethanolic extract of *Leucas indica* leaves using Baker's yeast-induced pyrexia model, a well-established method that mimics infectious fever in humans[16].

MATERIAL AND METHODS

Study Design

A controlled randomized experimental study.

Experimental Animals

Thirty healthy Wistar albino rats (150–200 g) were housed under standard laboratory conditions. Animals were acclimatized for one week and fasted overnight before the experiment. The study followed CPCSEA guidelines and IAEC approval was obtained prior to experimentation.

Plant Extraction

Fresh leaves of *Leucas indica* were shade-dried, powdered, and subjected to Soxhlet extraction using ethanol. The extract was concentrated and stored under refrigeration until use.

Table 1. Grouping

Group	Treatment	Dose/Route
I	Control	1% Gum acacia 10 mL/kg p. o
II	Standard	Paracetamol 100 mg/kg p. o
III	EELLI	75 mg/kg p. o
IV	EELLI	150 mg/kg p. o
V	EELLI	300 mg/kg p. o

Pyrexia Induction

A 20% w/v suspension of Baker's yeast (10 mL/kg, s.c.) was administered to induce fever. Animals showing ≥0.5°C rise in rectal temperature after 18 hours were included.

Temperature Recording

Rectal temperatures were recorded using a lubricated digital thermometer at:

- Basal body temperature (BBT)
- Post-induction temperature
- 30, 60, 90, 120, 180, and 240 minutes after treatment.

Statistical Analysis

Values were expressed as Mean ± SEM. One-way ANOVA followed by Dunnett's post-hoc test was applied. $p < 0.05$ was considered statistically significant.

RESULT

Anti-pyretic activity of EELLI at different time intervals by Baker's Yeast induced pyrexia in Wistar albino rats

Groups	Drugs	BBT	Time interval 0 min	Time interval 30 min	Time interval 60 min	Time interval 90 min	Time interval 120 min	Time interval 180 min	Time interval 240 min
		Rectal temperature (°C)	Rectal temperature (°C)	Rectal temperature (°C)	Rectal temperature (°C)	Rectal temperature (°C)	Rectal temperature (°C)	Rectal temperature (°C)	Rectal temperature (°C)
I	Control (1 % Gum acacia) 10 ml/kg, p.o	37.69 ±0.19	38.37 ±0.13	38.46 ±0.25	38.81 ±0.27	38.48± 0.11	38.35± 0.15	38.35 ±0.16	38.35 ±0.14
II	Standard (Paracetamol) 100mg /kg p.o)	37.58 ±0.13	38.16 ±0.18	37.35 ±0.14 (p<0.01)	36.83 ±0.16 (p<0.01)	37.19± 0.04 (p<0.01)	37.27± 0.07 (p<0.01)	37.35 ±0.13 (p<0.01)	37.37 ±0.31 (p<0.01)
III	EELLI 75 mg/kg p.o	37.82 ±0.14	38.76 ±0.19	38.32 ±0.23 (p>0.05)	38.18 ±0.16 (p>0.05)	38.49± 0.15 (p>0.05)	38.47± 0.08 (p>0.05)	38.53 ±0.07 (p>0.05)	38.27 ±0.16 (p>0.05)
IV	EELLI 150mg / kg p.o	37.38 ±0.08	38.58 ±0.29	38.26 ±0.14 (p>0.05)	37.81 ±0.12 (p<0.01)	37.74± 0.17 (p<0.01)	37.36± 0.09 (p<0.01)	37.25 ±0.35 (p<0.01)	37.45 ±0.08 (p<0.01)
V	EELLI 300 mg/kg p.o	37.23 ±0.15	37.76 ±0.24 (p>0.05)	37.76 ±0.24 (p>0.05)	37.7± 0.17 (p<0.01)	37.89± 0.18 (p<0.05)	37.86± 0.15 (p<0.05)	37.55 ±0.09 (p<0.05)	38.37 ±0.10 (p>0.05)

The observations are mean ± S.E.M. p> 0.05-Not Significant, p<0.05- Significant, p< 0.01-Highly Significant as compared to control
(ANOVA followed by Dunnett's multiple comparison test)
EELLI- Ethanolic Extract of the leaves of Leucas indica, BBT-Basal Body Temperature, p.o-per oral

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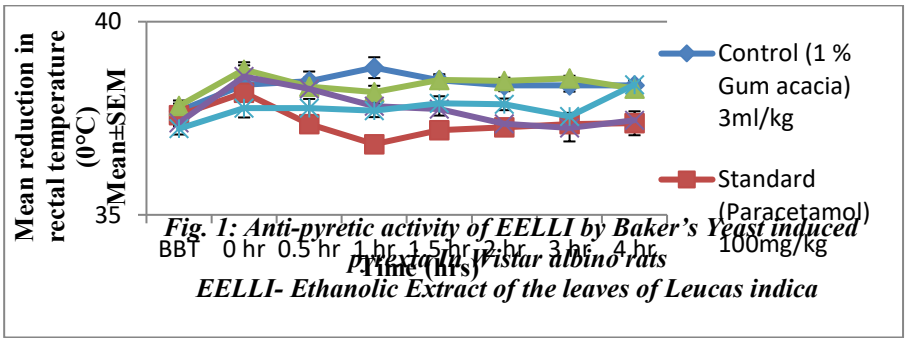

Fig. 1: Anti-pyretic activity of EELLI by Baker's Yeast induced pyrexia in Wistar albino rats

EELLI- Ethanolic Extract of the leaves of Leucas indica

The standard group (paracetamol) showed a significant temperature reduction starting from 60 minutes ($p<0.01$). EELLI at 150 mg/kg showed significant reduction of body temperature beginning at 90 minutes and continued until 240 minutes. The 300 mg/kg group also showed statistically significant reduction from 90 minutes onward. The 75 mg/kg group failed to demonstrate significant antipyretic response. These findings indicate a clear dose-dependent antipyretic action.

DISCUSSION

Baker's yeast induces pyrexia by increasing inflammatory mediators including cytokines and prostaglandins in peripheral circulation[6], [16]. The significant reduction in rectal temperature in EELLI-treated groups suggests possible inhibition of cyclooxygenase activity and PGE_2 synthesis similar to NSAIDs[17]. The presence of flavonoids and triterpenoids—compounds known to modulate inflammation and oxidative stress—may contribute to this effect[10], [11].

The results corroborate earlier studies demonstrating anti-inflammatory and antipyretic activities in related species[3], [9], [12]. The delayed onset of action compared to paracetamol may be attributed to slower absorption and bioavailability of phytoconstituents.

CONCLUSION

Ethanolic extract of Leucas indica leaves possesses significant dose-dependent antipyretic activity at 150 mg/kg and 300 mg/kg, supporting its traditional medicinal use. Further studies are required for phytochemical isolation and identification of active constituents.

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