Int. J. Curr. Res. Med. Sci. (2026). 12(6): 33-36

International Journal of Current Research in Medical Sciences

ISSN: 3107-3743 (Print), ISSN: 2454-5716 (Online)
(A Peer Reviewed, Indexed and Open Access Journal)
www.ijcrims.com

Original Research Article

Volume 12, Issue 6 -2026

DOI: http://dx.doi.org/10.22192/ijcrms.2026.12.06.004

A Preclinical study on the analgesic potential of *Devathaaru Kasayam* using hot plate method in Swiss albino mice

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Abstract

Background: Peripheral neuropathy is a chronic condition characterized by nerve damage leading to persistent pain and reduced quality of life. Conventional analgesics such as NSAIDs and opioids are associated with significant adverse effects during long-term use. *Devathaaru Kasayam*, a traditional herbal formulation used in Siddha medicine, has not been scientifically evaluated for its analgesic potential in experimental pain models. The present study was undertaken to assess the analgesic activity of Devathaaru Kasayam using the hot plate method in Swiss albino mice.

Methods: Swiss albino mice were used for this preclinical study and divided into three groups (n = 3): control, low dose (200 mg/kg), and high dose (400 mg/kg). The drug was administered orally for seven consecutive days. Analgesic activity was evaluated on the eighth day using the hot plate method by recording reaction time (latency) to thermal stimulus, with a predefined cut-off time to prevent tissue damage.

Results: The treated groups showed a significant increase in reaction time compared to the control group, indicating analgesic activity. The mean reaction time was 11.89 seconds in the control group, 16.89 seconds in the low-dose group, and 60.04 seconds in the high-dose group. A clear dose-dependent increase in latency was observed, with the high dose exhibiting a marked analgesic effect.

Conclusion: Devathaaru Kasayam demonstrated dose-dependent analgesic activity in the hot plate model, suggesting a possible central analgesic effect. Further studies with larger sample sizes and validated neuropathic pain models are required to confirm its efficacy and safety.

Keywords: Peripheral neuropathy, Devathaaru Kasayam, Analgesic activity, Hot plate method, Swiss albino mice.

1. Introduction

Peripheral neuropathy involves damage to peripheral nerves, leading to chronic pain and reduced quality of life(1).The Management of pain associated with such condition remains a significant challenge.Conventional treatments such as NSAIDs and opioids are associated with limitations, especially during long-term use(2). This has led to increasing interest in herbal medicines.

Devathaaru Kasayam, a traditional herbal formulation, its analgesic potential has not been sufficiently evaluated using a standard experimental model. Therefore, the present study was undertaken to assess the analgesic activity of devathaaru kasayam using the hot plate method in experimental animals.

IEC Approval: The Institutional Ethical Committee, Government Siddha Medical College, Chennai reviewed and approved the study.

IEC No: GSMC – CH – 1243/ME – II/091/2024

CTRI No: This trial was registered in Clinical Trial Registry India

CTRI No: CTRI/2025/05/087846

"Acute Oral Toxicity"

The Organization for Economic Co-operation and Development (OECD) guidelines for testing of chemicals, No 425(3).

IAEC No. MB/IAEC/25/01/05

2. Materials and Methods

2.1 Experimental Animals:

Swiss albino mice were used for the study. Animals were maintained under standard laboratory conditions (22±2°C,12-hour light/dark cycle) with free access to food and water.

2.2 Grouping of Animals:

The animals were divided into three groups (n = 3 per group):

- **Group I (Control):** Received Vehicle (Distilled water)
- **Group II (Low Dose):** Received *Devathaaru Kasayam* (200 mg/kg)
- **Group III (High Dose):** Received *Devathaaru Kasayam* (400 mg/kg)

The drug was administered orally for **7 consecutive days**.

2.3 Analgesic Activity – Hot Plate Method:

On the **8th day**, animals were subjected to the hot plate test to evaluate central analgesic activity.

The hot plate was maintained at a constant temperature(55±1°C). Each animal was placed individually on the hot plate, and the **reaction time (latency)** was recorded as the time taken to exhibit pain responses such as

- Paw licking
- Paw withdrawal
- Jumping

A **cut-off time of 10–15 seconds** was fixed to prevent tissue damage.

3. Observations

Baseline latency was recorded before drug administration, and post-treatment latency was recorded after drug administration.

- Control group showed minimal change in latency
- Treated groups showed increased latency period.
- Increase in latency indicates analgesic activity.

Figure 1: analgesic test

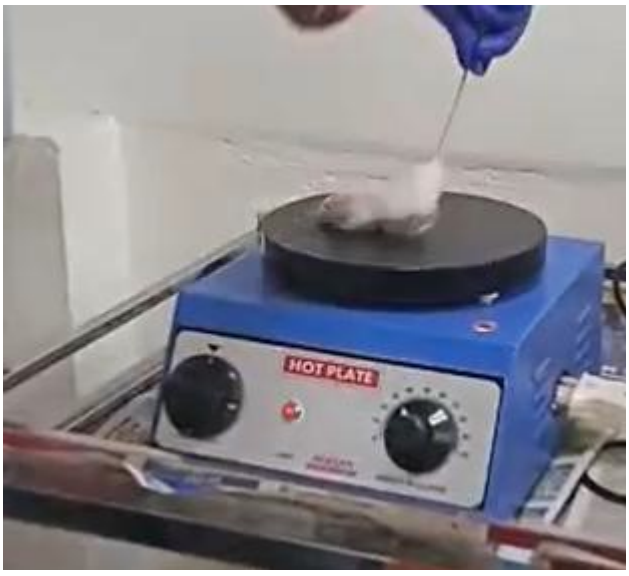

Figure 2: analgesic reaction

4. Results

The results clearly show a **dose-dependent increase in reaction time**, confirming the analgesic potential of the drug.

Percentage analgesic activity calculation:

$$\text{Analgesic Activiy (\%)} = \frac{\text{(Post-drug latency – pre-drug latency) X 100}}{\text{Cut-off time – Pre-drug latency}}$$

Table 1: Effect on Reaction Time (Pre- and Post- Treatment)

Group	Mice	Post Drug Latency Time (S)	Pre Drug Latency Time (S)	Post Drug Latency - Pre Drug Latency)*100 / (Cut Off Time - Pre Drug Latency)	Average
Control	1	17	10	17.5	11.8
	2	9	9	0	
	3	14	6	18.1	
Low Dose	1	21	5	35.5	16.8
	2	9	4	10.8	
	3	5	3	4.2	
High Dose	1	28	6	50	60
	2	31	4	58.6	
	3	38	8	71.4	

5. Discussion

The hot plate method is standard experimental model used to evaluate centrally acting analgesic agents. The significant increase in latency observed in treated groups suggests that *Devathaaru Kasayam* may possess central analgesic activity.

The higher dose (400 mg/kg) produced a greater increase in reaction time compared to the lower dose, indicating dose-dependent effect. These findings support the traditional use of *Devathaaru Kasayam* in pain management, especially in conditions like peripheral neuropathy.

6. Conclusion

The present study demonstrates that *Devathaaru Kasayam* exhibits analgesic activity in a hot plate model in experimental animals. The effect appears to be dose-dependent.

Further studies are required to explore the underlying mechanisms and to validate these findings using additional experimental models.

7. References

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Website: www.ijcrims.com

Subject: Siddha Medicine

Quick Response Code

DOI: 10.22192/ijcrms.2026.12.06.004

How to cite this article:
A.Kavipriya, P.Praveenashri, T.R.Siddique Ali, D.Sasikumar. (2026). A Preclinical study on the analgesic potential of *Devathaaru Kasayam* using hot plate method in Swiss albino mice. Int. J. Curr. Res. Med. Sci. 12(6): 33-36.
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