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Analgesic Effects of Roots of *Terminalia Pallida* and *Boswellia Ovalifoliolata*

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ABSTRACT

Terminalia pallida brandis and *Boswellia ovalifoliolata* most widely found plants in the India. Methanolic and n-Hexane extract of *Terminalia pallida* roots and *Boswellia ovalifoliolata* roots were analysed for analgesic activity. Acetic acid induced writhing in mice method is performed to study the analgesic effect of both the roots. The effect of methanolic and n-Hexane extracts of roots of *Terminalia pallida* Brandis and *Boswellia ovalifoliolata* in 200, 400 and 600 mg/kg p.o dosage, showed significant analgesic activity. Methanolic and n-Hexane extract of *Terminalia pallida* Brandis and *Boswellia ovalifoliolata* can be further studied to produce analgesic effect in humans.

Keywords: Methanol, n-Hexane, Acetic acid induced writhing.

ARTICLE INFO

CONTENTS

1. Introduction	942
2. Materials and Methods	943
3. Results and discussion	943
4. Conclusion	945
5. References	945

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1. Introduction

Terminalia pallida is herb belongs to the family Combretaceae. *Terminalia pallida* is semi-evergreen tree species (1). It is distributed in the tropical and subtropical regions of the world. It occurs in the rocky hilly areas of dry deciduous forests of Chittoor, Cuddapah and Kurnool, International Journal of Current Trends in Pharmaceutical Research

Tirumala Hills, India, China, Malaydia, Nepal, Pakistan, Srilanka, Myanmar and Thailand (2). *Boswellia ovalifoliolata* (Burseraceae) is a narrow endemic and endangered deciduous tree species (3). The herb *Boswellia ovalifoliolata* is widely distributed in the dry regions of

tropical Africa, Arabia and India. In Africa, it is distributed in Somalia, Ethiopia, Eritrea, Kenya, Sudan, Tanzania, Madagascar and some other countries. In Arabia, it is mainly restricted to Yemen, Oman and Socotra. In India, it is distributed in a few regions such as Rajasthan, southeast Punjab, Danwara and Madras (4,5). Both the plants lack literature about the pharmacological effect of roots. The proposed work reveals analgesic effect of methanolic and nHexane extract of roots of *Terminalia pallida* brandis and *Boswellia ovalifoliolata*.

2. Materials and Methods

Collection and Authentication

The roots of *Terminalia pallida* brandis and *Boswellia ovalifoliolata* most widely found in the India. The plant was collected from Ananthagiri forest region, Vishakhapatnam District, Andhra Pradesh, India. The plant species were authenticated by Dr. Madhava Chetty, Taxonomist, Department of Botany, Sri Venkateswara University, Tirupati, Andhra Pradesh, India. The voucher specimen numbers are 934 and 2231 for *Terminalia pallida* brandis and *Boswellia ovalifoliolata* Bal & Henry respectively.

Extraction

The fresh roots were collected, cleaned, shade dried at room temperature for a week and powdered using mixer grinder. 25 gms of the coarse powder was continuously extracted with 100 ml of methanol for 18 hrs at 60°C using Soxhlet apparatus. The powder was successively extracted with n-Hexane. All extracts were filtered through a Whatman no.1 filter paper. Thereafter, the extracts was concentrated using rotary flash evaporator (50°C) to 30ml volume. And finally 30 ml extracts were concentrated to constant weight in vacuum oven at 30 to 50°C. The evaporated residues with constant weight were stored prior to analysis in dark at 4°C. Methanolic residue of *Terminalia pallida* was given name as METP and n-Hexane residue of *Terminalia pallida* was given name as HETP. Methanolic residue of *Boswellia ovalifoliolata* was given name as MEBO and n-Hexane residue of *Boswellia ovalifoliolata* was given name as HEBO (6).

In-vivo Analgesic Activity (Acetic acid Induced Writhing in Mice)

Animals were maintained under controlled condition of temperature at $27^{\circ} \pm 2^{\circ}$ C and 12-h light-dark cycles and relative humidity of $50 \pm 15\%$. All the studies conducted were approved by the Institutional Animal Ethical Committee (IAEC) of according to prescribed guidelines of Committee for the Purpose of Control and Supervision of Experiments on Animals, Govt. of India. (Regd no. 769/2011/CPCSEA) They were housed in polypropylene

cages and had a free access to standard pellets (Supplied by Ratan Brothers) and water *ad libitum*. Albino mice weighing 20-30 mg/kg were divided into six groups of six in each group. One hour after the administration of the test drug and diclofenac (10 mg/kg i.p), the mice were given intraperitoneal injection of 0.7%v/v acetic acid solution (volume of injection 0.1ml 10g), the mice were placed individually into glass beakers and 5min, were allowed to elapse. The number of writhes produced in these animals was counted for 15 minutes. For scoring purposes, a writhe is indicated by stretching of the abdomen with simultaneous stretching of at least one hind limb (7). The formula for computing present inhibition was;

$$\text{Percent inhibition} = 100 * (1 - Tt/Tc)$$

Where, Tt and Tc are the average increase in writhes of drug treated and control group respectively.

Group-I: Distilled water was supplied and served as control.

Group-II: Animals received a dose of 10 mg/kg of Diclofenac sodium i.p. and served as standard

Group-III: Animals received a dose of 200 mg/kg of METP / MEBO p.o.

Group-IV: Animals received a dose of 400 mg/kg of METP / MEBO p.o.

Group-V: Animals received a dose of 600 mg/kg of METP / MEBO p.o.

Group-VI: Animals received a dose of 200 mg/kg of HETP / HEBO p.o.

Group-VII: Animals received a dose of 400 mg/kg of HETP / HEBO p.o.

Group-VIII: Animals received a dose of 600 mg/kg of HETP / HEBO p.o.

3. Results and Discussion

Control and various treated groups were tested for analgesic activity against acetic acid induced writhing, which is nothing but the painful reaction. The number of abdominal constrictions was cumulatively counted from 0 - 10 minutes. Acetic acid-induced writhing model represents pain sensation by triggering localized inflammatory response. Such pain stimulus leads to the release of free arachidonic acid from tissue phospholipids. The acetic acid induced writhing response is a sensitive procedure to evaluate peripherally acting analgesics. The response is thought to be mediated by peritoneal mast cells acid sensing ion channels and the prostaglandin pathway. The results revealed that all the test compounds METP, HETP, MEBO and HEBO has significant analgesic activity as compared to standard. The values are tabulated in the Table 1 and 2 and represented graphically in fig.1 and 2.

Table 1: Effect of METP and HETP on Acetic acid Induced Writhing in Mice

Groups	Treatment	Mean no of writhing ±SEM	% Inhibition of writhes
Group-I	Saline	46.33 ± 3.712	-
Group-II	Diclofenac sodium (10mg/kg i.p.)	18.50 ± 1.335***	60.07%
Group-III	METP (200mg/kg p.o.)	31.83 ± 2.455***	31.30%
Group-IV	METP (400mg/kg p.o.)	26.33 ± 1.085***	43.17%
Group-V	METP (600mg/kg p.o.)	21.17 ± 1.108***	54.31%

Group-VI	HETP (200mg/kg p.o.)	34.17 ± 2.088***	26.25%
Group-VII	HETP (400mg/kg p.o.)	29.67 ± 1.498***	35.96%
Group-VIII	HETP (600mg/kg p.o.)	24.50 ± 1.544***	47.12%

Values are Mean ± SEM (n=6) one way ANOVA followed by Tukey-Karmer’s test. Where, *** P<0.001, ** P<0.01, * P<0.05 and ns represents Not significant. METP- Methanolic extract of *Terminalia pallida*, HETP: n-Hexane extract of *Terminalia pallid*

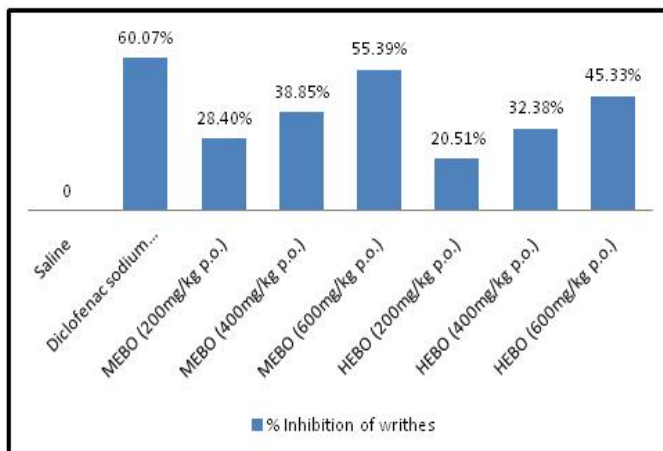


Figure1: Effect of METP and HETP on Acetic acid Induced Writhing in Mice

Table 2: Effect of MEBO and HEBO on Acetic acid Induced Writhing in Mice

Groups	Treatment	Mean no of writhing ±SEM	% Inhibition of writhes
Group-I	Saline	46.33 ± 3.712	-
Group-II	Diclofenac sodium (10mg/kg i.p.)	18.50 ± 1.335***	60.07%
Group-III	MEBO (200mg/kg p.o.)	33.17 ± 1.621**	28.40%
Group-IV	MEBO (400mg/kg p.o.)	28.33 ± 1.783***	38.85%
Group-V	MEBO (600mg/kg p.o.)	20.67 ± 1.116***	55.39%
Group-VI	HEBO (200mg/kg p.o.)	36.83 ± 2.822 ^{ns}	20.51%
Group-VII	HEBO (400mg/kg p.o.)	31.33 ± 2.275***	32.38%
Group-VIII	HEBO (600mg/kg p.o.)	25.33 ± 1.542***	45.33%

Values are Mean ± SEM (n=6) one way ANOVA followed by Tukey-Karmer’s test. Where, *** P<0.001, ** P<0.01, * P<0.05 and ns represents Not significant. MEBO- Methanolic extract of *Boswellia ovalifoliolata*, HEBO: n-Hexane extract of *Boswellia ovalifoliolata*

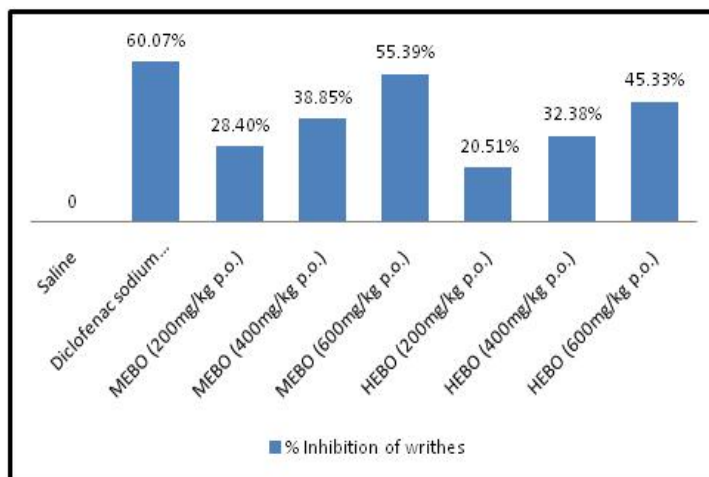


Figure 2: Effect of MEBO and HEBO on Acetic acid Induced Writhing in Mice

Statistical Analysis

The values are expressed as Mean ± SEM. The data was analysed by using one way ANOVA followed by Tukey

multiple comparison tests using Graph pad prism software. Statistical significance was set at P 0.05.

4. Conclusion

Terminalia pallida roots and *Boswellia ovalifoliolata* roots in methanolic and nHexane extract posse's analgesic activity. This activity can be further evaluated in humans.

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