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## EVALUATION OF ANTI-ULCER ACTIVITY OF ETHANOLIC EXTRACT OF *OECOPHYLLA SMARADINA* IN ALBINO RATS

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### Keywords:

*Oecophylla smaradina*,  
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**ABSTRACT: Objective:** *Oecophylla smaradina* (Formicidae) is an ant evaluated for its variety of medicinal uses. The objective of this study to evaluate the anti-ulcer activity using albino rats. **Methods:** The albino rats of either sex were divided into four groups. Ethanolic extract of *Oecophylla smaradina* (EEOS) was tested in the dose of 200 and 400 mg/kg p.o. respectively against by pylorus ligation induced ulcer models in albino rats. **Results:** Both the concentration (200 and 400 mg/kg p.o.) of extract have provided significant activity but EEOS 200 mg/kg, p.o, extracts were less effective when compared to EEOS 400 mg/kg, p.o. The antiulcer activity was accessed by evaluate the ulcer index in the test and standard drug treated group and also estimated the gastric volume, total acid, and free acid in the pylorus-ligated rats. **Conclusion:** The present study was revealed that ethanolic extract of *Oecophylla smaradina* have antiulcer activity.

**INTRODUCTION:** Peptic ulcer is a conglomerate of heterogeneous disorders, which manifests itself as a break in the lining of the gastrointestinal mucosa bathed by acid and pepsin <sup>1</sup>. It is characterized by the disruption of the mucosal integrity of the esophagus, stomach, or duodenum. As the most common gastrointestinal disturbance, it affects 10-15% of the population at any one time <sup>2</sup>. The *Helicobacter pylori* bacterium was discovered in 1980's. The many patients affected gastritis and peptic ulceration. The 50% of gastric cancer involved by infection of *H. pylori* <sup>3</sup>. Zoo-therapy is a form of therapy which is defined as "the healing of human diseases by use of therapeutic products obtained or ultimately derived from animal <sup>4</sup>.

Some article showed the animal-based medicine had been utilized in society <sup>5</sup>. For the religious purpose, the animals were sacrifices in magic ritual <sup>6</sup>. The focusing of the study is to identify the protection of ulcer using albino rats.

### MATERIALS AND METHODS:

**Ant:** The weaver ant *Oecophylla smaradina* (OS) (Family: Formicidae) was authenticated by Dr. K. Vasudevan, Associate Professor, Department of Zoology, Annamalai University, Chidambaram, Tamil Nadu, India. A voucher specimen no.: OS-001/2016.

**Extraction Method:** The ant of *Oecophylla smaradina* (OS) was collected and kept in the refrigerator for a freeze and dried. The dried ants were extracted under reflux for 2 h with 95% ethanol for three times successively <sup>7</sup>. The experiment was approved by IAEC (Ref no.: SBCEP/2015-16/CPCSEA/IAEC/II/I(c))

**Anti-Ulcer Activity: Pyloric Ligated (Shay) Rat Model:** The albino rats of either sex were divided

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into four groups of six animals each. Animals were fasted for 24 h before the study but had free access to water. The ethanolic extract at 200 and 400 mg/kg p.o. were given to the animals. Ranitidine (50 mg/kg) was used as a standard. After one hour, the animals were anesthetized using anesthetic ether. The abdomen was opened, and the pyloric portion was ligated. The abdominal wall was closed by sutures. The after four hours the animals were sacrificed the abdomen was opened, and the stomach was dissected out. The stomach juices were collected into a glass tube.

The volume of the gastric juice was measured and centrifuged at 2000 rpm for 10 min. From the supernatant, aliquots (1 ml of each) were taken for the determination of pH, total and free acidity. Each stomach was examined for lesions in the forestomach portion and indexed according to the severity of the animals treated as follows<sup>8</sup>.

**TABLE 1: TREATMENT PROTOCOL FOR ANTI-ULCER ACTIVITY**

Group	Drug and dose
Negative control	Normal saline (5 ml/kg, p.o)
Standard	Ranitidine 50 mg/kg p.o.
EEOS 200 mg/kg	Ethanolic extract of <i>Oecophylla smaragdina</i> (200 mg/kg, p.o)
EEOS 400 mg/kg	Ethanolic extract of <i>Oecophylla smaragdina</i> (400 mg/kg, p.o)

**Volume of Gastric Juice:** The volume of gastric juice was measured by the method described<sup>9</sup>. The resected stomach content was centrifuged, and the supernatant fluid was measured.

**Determination of pH:** An aliquot of 1 ml gastric juice was diluted with 1ml of distilled water and the pH of the solution was measured using a pH meter.

**Free Acidity and Total Acidity:** The two drops of Topfer's reagent was added in a diluted supernatant of gastric juice in a conical flask. 0.01N NaOH was taken in a burette, and it was allowed to titrate till the contents of the flask changed to yellow color. Then two drops of phenolphthalein were added, and the titration continued till the solution reached a permanent pink color. The volume of 0.01N NaOH consumed was noted<sup>10</sup>. The total acidity and free acidity was expressed as mEq/L by the following formula:

$$\text{Acidity} = \text{Vol. of NaOH} \times N \times 100 \text{ mEq/L} / 0.1$$

**Ulcer Score:** The ulcer score was reworded as follows the incidence and grading of ulcer were done according to the method described. Necro hemorrhagic spots greater than 2 mm diameter was taken as ulcer these are graded as follows:

- 0- Normal colored stomach
- 0.5-Red coloration
- 1- Spot ulcers
- 1.5- Hemorrhagic streaks
- 2- Ulcer  $\geq 3$  but  $\leq 5$
- 3- Ulcers  $> 5$
- 4- Ulcer with bleeding

Ulcer index (UI) was measured by using the following formula:

$$\text{UI} = \text{UN} + \text{US} + \text{UP} \times 10^{-1}$$

Where, UI = Ulcer Index; UN = Average number of ulcers per animal; US = Average number of severity score; UP = Percentage of animals with ulcers

Percentage inhibition of ulceration was calculated as below:<sup>11</sup>

$$\% \text{ Inhibition of Ulceration} = (\text{Ulcer index Control} - \text{Ulcer index Test}) / \text{Ulcer index Control} \times 100$$

**RESULTS AND DISCUSSION:** Antiulcer effect of *Oecophylla smaragdina* extract was challenged against Pylorus ligation induced ulcers model, in this both the concentration of extract have provided significant activity as like that of standard but EEOS 200 mg/kg, p.o, extracts were less effective when compared to EEOS 400 mg/kg, p.o.

**TABLE 2: ANTIULCER ACTIVITY OF GASTRIC VOLUME AND pH LEVEL ON *OECOPHYLLA SMARAGDINA***

Group	Treatment & dose	Gastric volume (ml)	pH
I	Negative control	5.05±0.09	2.8±0.55
II	Ranitidine 50 mg/kg p.o	3.9±0.1***	4.83±0.06***
III	EEOS 200 mg/kg p.o	4.21±0.13***	4.08±0.08***
IV	EEOS 400 mg/kg p.o	3.9±0.06***	5.17±0.07***

n = 6, Data were expressed as Mean ± SEM, One way ANOVA followed by Dunnett's test, All groups were compared with Negative control, \*p<0.05, \*\*p<0.01, \*\*\*p<0.001

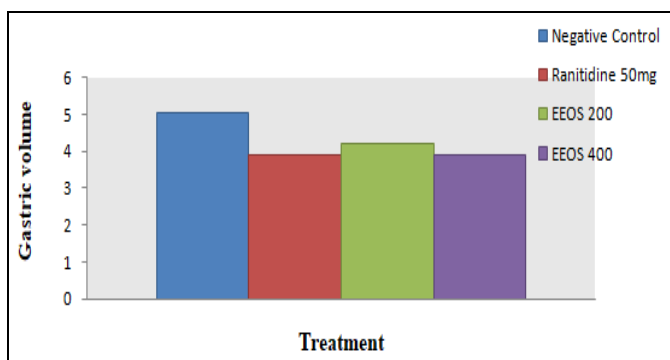
The evidence for its significant reduction of gastric volume, total acidity, free acidity, ulcer index and increase the volume of pH. The EEOS treated group significantly inhibited the formation of pylorus ulcer in the stomach and also decreased

acid concentration, gastric volume and increased the pH values. It is suggested that the EEOS at both the concentration has anti-ulcer potency. Results were shown in **Table 2** and **3**.

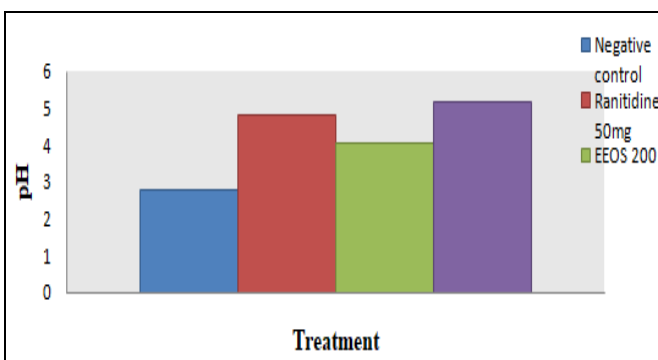
**TABLE 3: ANTIULCER ACTIVITY OF ACIDITY, ULCER INDEX AND % INHIBITION ON *OECOPHYLLA SMARAGDINA***

Group	Treatment & Dose	Acidity		Ulcer index	% inhibition of ulcer
		Free	Total		
I	Negative control	38.73±0.43	80.63±0.49	3.54±0.07	----
II	Ranitidine 50 mg/kg p.o	21.28±0.45***	32.19±0.28***	1.62±0.02***	54.23%
III	EEOS 200 mg/kg p.o	32.18±0.49***	50.59±0.32***	2.33±0.06***	34.18%
IV	EEOS 400 mg/kg p.o	21.64±0.35***	33.55±0.45***	1.64±0.03***	53.67%

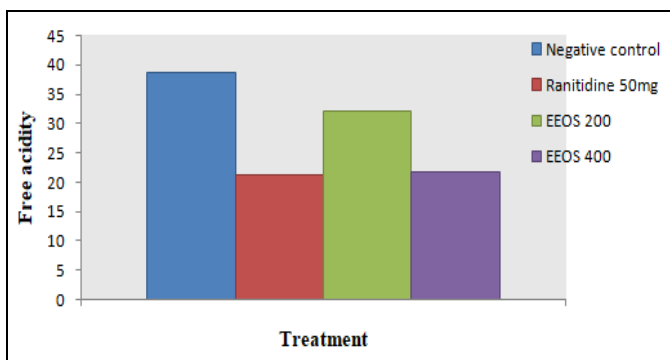
n = 6, Data were expressed as Mean ± SEM, One way ANOVA followed by Dunnett’s test, All groups were compared with Negative control, \*p<0.05, \*\*p<0.01, \*\*\*p<0.001



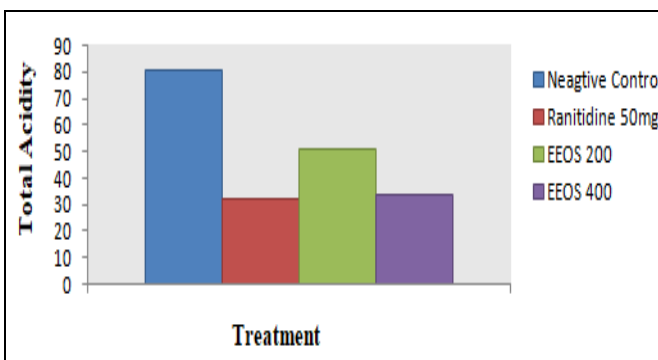
**FIG. 1: EFFECT OF *OECOPHYLLA SMARAGDINA* ON GASTRIC VOLUME LEVELS**



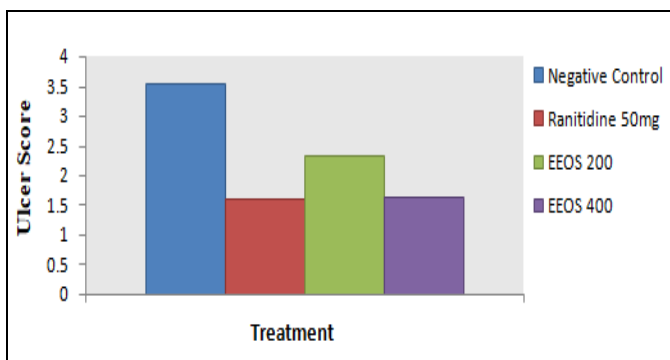
**FIG. 2: EFFECT OF *OECOPHYLLA SMARAGDINA* ON pH LEVELS**



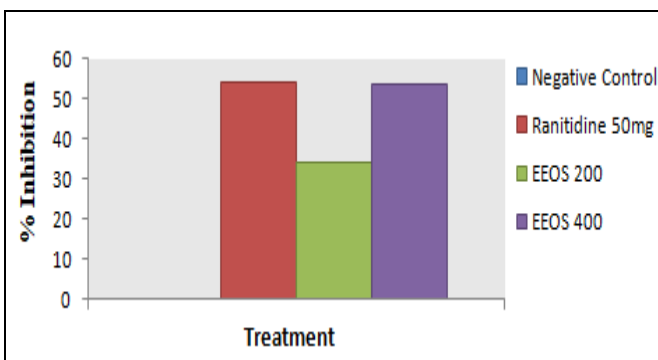
**FIG. 3: EFFECT OF *OECOPHYLLA SMARAGDINA* ON FREE ACIDITY**



**FIG. 4: EFFECT OF *OECOPHYLLA SMARAGDINA* ON FREE ACIDITY**

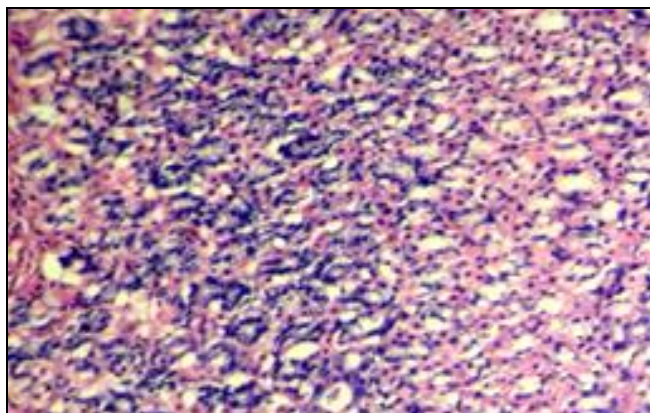


**FIG. 5: EFFECT OF *OECOPHYLLA SMARAGDINA* ON FREE ACIDITY**

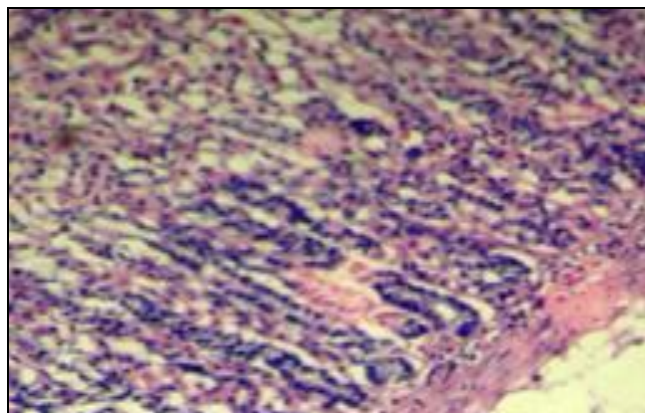


**FIG. 6: EFFECT OF *OECOPHYLLA SMARAGDINA* ON % INHIBITION**

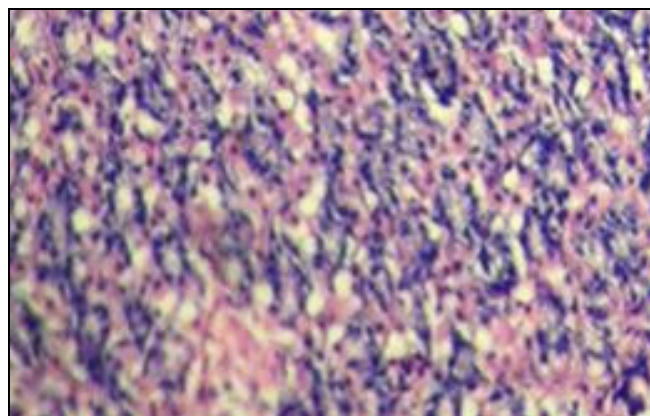


**Histopathology Studies:**

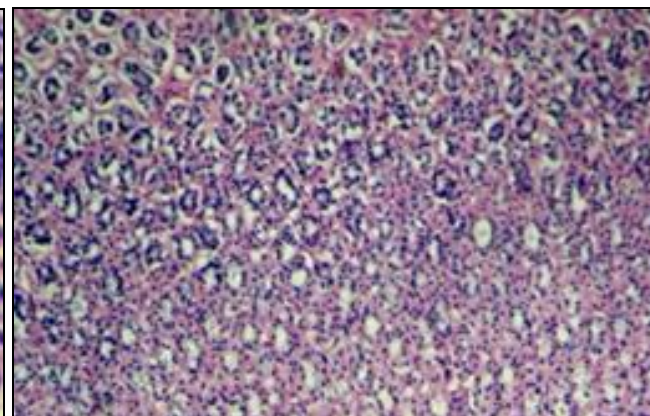
**GROUP I: NEGATIVE CONTROL PYLORUS LIGATION GROUPS SHOWS MUCOSAL ULCERATION WITH LOSS EPITHELIUM CELLS AND INFLAMMATION**



**GROUP II: RANITIDINE 50 mg/kg HISTOPATHOLOGY SHOWS NORMAL APPEARANCE OF STOMACH**



**GROUP III: EEOS 200 mg/kg p.o. HISTOPATHOLOGY SECTIONS SHOWS NORMAL APPEARANCE OF GLAND AND MOCOSA CELLS**



**GROUP IV: EEOS 400 mg/kg p.o. SHOWS NORMAL MUSCULARIS MUCOSA AND BLOOD IN MUCOSA CELL**

**CONCLUSION:** From the discussion part it is clear that the EEOS extract at both the concentration (200 and 400 mg/kg, p.o) have anti-inflammatory, anti-arthritic, antiulcer and cardioprotective activity, But EEOS 400 mg/kg, p.o was more potent than EEOS 200 mg/kg, p.o. From this data, we can conclude that the effect produced by the extract was dose-dependent.

Thereby deep focus should be taken in part to identify and isolate the active constituent for future studies. So, that the active benefit from the weaver ant *Oecophylla smaragdina* will access as a pharmaceutical dosage form to mankind.

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**CONFLICT OF INTEREST:** Nil

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