



ANTI-INFLAMMATORY ACTIVITY OF EXTRACTED EUGENOL FROM *OCIMUM SANCTUM* L. LEAVES

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ABSTRACT

Anti-inflammatory activity of essential oil extract of *Ocimum sanctum* L. leaf (Eugenol) was studied in wistar rats by using carrageenan induced Hind paw edema method. The extract was administered 100 mg/kg body weight per intraperitoneally (i.p.) and the standard paracetamol was also administered 5 mg/kg body weight per intraperitoneally (i.p.). The extracted Eugenol and paracetamol exhibited significant ($p < 0.05\%$) activity when compare with carrageenan control.

Keywords: *Ocimum sanctum* L.; Eugenol; Carrageenan

INTRODUCTION

Eugenol (4-allyl 2-methoxyphenol) a naturally occurring phenolic compound is a major component of basil oil¹ and exists to a lesser extent in oil of several other plants². It possesses antiseptic, analgesic, antibacterial³ anti-inflammatory and antianaphylactic properties. Tulsi leaves contain a bright yellow volatile oil, which is useful against insects and bacteria. The principal constituents of this Essential oil are Eugenol, methyl eugenol, carvacrol, caryophyllene⁴, and they also yield other substances such as ursolic acid⁵ and apigenin. This plant has been evaluated pharmologically for immunomodulatory, antistress, antimicrobial, anti-inflammatory antiasthmatic, hypoglycemic, hypotensive and analgesic activities and found to be effective in varying degrees in the animal models⁵. The plant has also shown significant anti-oxidant activity⁶. Traditionally, the fresh fruits and leaves/leaf juice were commonly used in the treatment of cough as demulcent, mild upper respiratory tract infection, general stress syndrome, warm infestations, superficial fungal infection and also as a diuretic⁷. A review of literature did not reveal any information on the Anti-inflammatory studies. Hence in the present wok Anti-inflammatory activity of the Eugenol a leaf extract of *Ocimum sanctum* L. was studied.

Extraction of essential oils:

Apparatus was assembled for steam distillation using a 500 ml round bottom flask. The collection flask was in the form of a burette. Heat source was a Bunsen flame. 50 g of the ground samples (basil leaves) was placed into the flask and 150 ml of water was added to it. The liquid in the flask was heated, so as to provide a slow but steady rate of distillation. Apparatus was so arranged that during distillation water was continued to add at a rate which just maintain the original level of liquid in the distilling flask. Distillation was continued until 10 ml of distillate was collected then the aqueous layer was discarded. The distillate was then transferred to a separating funnel, extracted with 3x50 ml dichloromethane. The combined dichloromethane portion was dried over anhydrous granular sodium sulphate and decanted. The solvent was removed on a steam bath. Pure Eugenol was obtained as pale yellow oil.

EXPERIMENTAL

The anti-inflammatory activity of *Ocimum sanctum* Linn. leaf extract or essential oil extract was determined by Hind paw edema method⁸ utilizing carrageenan as phlogistic agent. Healthy

Albino wistar rats of either sex between 100-150 g were selected for the studies. Rats were allowed to take standard lab feed, water and *ad libitum* in the animal house and were maintained in clean and hygienic conditions. For carrageenan induced hind paw edema model, rats were divided into three groups containing six animals per group. The control group was given a 50% solvent (alcohol), Group II of animal received 5 mg/kg of paracetamol, which was considered as standard. The experimental group III was treated with 100 mg/kg of essential oil extract dissolved in ethanol and water (1:1 v/v). Doses were given intraperitoneally⁹. 0.1 ml of 1% solution of carrageenan was administered to the rats into the planter surface of the right hind limb to induce paw edema. Paw volume was measured plethysmographically after 30 min, 60 min, 90 min, 120 minutes of carrageenan injection and paw swelling in animal groups of drug treated were compared with control. Percentage inhibition of edema was calculated by using the following formula¹⁰.

$$\% \text{ Inhibition} = \left(\frac{V_c - V_t}{V_c} \right) \times 100$$

where V_t = Increase in paw volume in rats treated with test compound and V_c = Increase in paw volume in control group of rats.

RESULTS AND DISCUSSION

Anti-inflammatory activity of *Ocimum sanctum* Linn leaf extract or essential oil extract or Eugenol against carrageenan induced paw volume is shown in Table 1. The essential oil extract at the dose level of 100 mg/kg body weight and standard paracetamol at the dose of 5 mg/kg exhibited significant ($P < 0.05$) anti-inflammatory activity. In Indian system of medicine certain herbs are claimed to provide relief of pain and inflammation. In the present study one such drug essential oil extract (Eugenol) was taken. Carrageenan induced inflammation is a useful model to detect action of anti-inflammatory agents. The development of edema¹¹ in the paw of the rat after the injection of carrageenan is due to release of histamine, serotonin and prostaglandin like substance¹². The significant activity of the extract and the standard drug observed in the present study may be due to the inhibition of mediators of inflammation such as histamine, serotonin and prostaglandin. The maximum effect 33% was exhibited by extracted Eugenol. The results of anti-inflammatory activity have been shown in Table 1. The observed activity has been reported as mean \pm SE of six animals in each group statistically significant from control $P < 0.05\%$, inhibition given in parenthesis. The statistical analysis was carried by ANOVA¹³ followed by Dunnet's t-test.

Table-1: Screening data of Anti-inflammatory activity of Eugenol present in *Ocimum sanctum* Linn., essential oil extract against carrageenan induced paw edema in rats

S.No.	Group	Dose	Paw volume in ml (mean \pm S.E.)					Total increase in paw volume after 120 min	Percent inhibition (I)
			(Before dose)	30 min	60 min	90 min	120 min		
1	Control (Solvent)	-	0.9 \pm 0.04	1.13 \pm 0.06	1.24 \pm 0.03	1.37 \pm 0.01	1.47 \pm 0.06	0.57	-
2	Standard (Paracetamol)	5 mg/kg	1.00 \pm 0.01	1.10 \pm 0.01	1.28 \pm 0.05	1.31 \pm 0.07	1.44 \pm 0.02	0.44	22.8%
3.	Extract (Eugenol)	100 mg/kg	0.85 \pm 0.07	0.98 \pm 0.08	1.17 \pm 0.05	1.2 \pm 0.03	1.23 \pm 0.01	0.38	33.3%

REFERENCES

1. A.C. Reddy and B.R. Lokesh, *Toxicol.*, **107**, 39 (1996).
2. E. Nagababu, B. Sikeran and N. Lakshmaiah, *Free Radic. Ros.*, **23**, 617 (1995).
3. T. Katayama and I. Nagai, *Nippon Suisan Gakkaishi*, **26**, 29 (1990).
4. R.N. Chopra, S.L. Nayar and I.C. Chopra, *Glossary of Indian Medicinal plants*, 1st ed., CSIR-New Delhi, 179 (1956).
5. E.M. Williamson, *Ocimum sanctum*, In *major herbs of Ayurveda*, Churchill Living stone publication, London, 201-205 (2002).
6. S.U. Yanpallewar, S. Rai, M. Kumar and S.B. Acharya, *Hypoperfusion*, **79**, 153 (2004).
7. A.K. Nadkarni, *Indian material medica*, Vol. I; Popular prakashan, Bombay, 865-866 (1993).
8. N.B. Eddy, D. Leimback, *J. Pharmacol. Exp. Ther.*, **107**, 385 (1953).
9. A. Hulya, T. Birsen, E. Mevlut, A. Fazilet and M. Salim, *Arzneim-Forsch/Drug Res.*, **46**, 891 (1996).
10. A. Mohammed and S. Kumar, *Indian drugs*, **42**, 75 (2005).
11. R. Vinegar, W. Schreiber and R. Hugo, *J. of Pharm. Exp. Therap.*, **166**, 96 (1969).
12. M. Saba, P. Aravanan and R. Ilavarasan, *Indian drugs*, **44**, 224 (2007).
13. P. Armillage and G. Berry, *Statistical methods in medical research*, 2nd ed., Blackwell scientific publication, Oxford, 186-190 (1985).

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