

TABLE 1: ANTIBACTERIAL ACTIVITIES OF *C.SERRATUM* (CS) AND *P.HERBACEA* (PH) ROOT EXTRACTS

Organisms	CS	PH	Standards	
			Ampicillin	Tetracycline
<i>Streptococcus pyogenes-A</i>	1.91	-	1.26	3.42
<i>Proteus mirabilis</i>	3.90	-	2.52	3.91
<i>Staphylococcus aureus</i>	-	4.01	1.26	0.63
<i>Pseudomonas aeruginosa</i>	-	7.81	2.52	3.91

*MIC values in µg/ml.

pyogenes-A was comparable to that of ampicillin and lower than that of tetracycline, whereas against *P. mirabilis* the extract's activity was comparable to that of tetracycline and lower than that of ampicillin, thus revealing a potent antibacterial activity for CS against the above two organisms (Table 1).

Though PH inhibited the growth of *S. aureus* and *P. aeruginosa*, the MIC values against the above strains were much lower compared to either ampicillin or tetracycline, indicating a lesser activity. Earlier studies on the ethanolic root extracts of *C. serratum* and *P. herbacea* have shown that the former possesses the biological activities ascribed to *Sirutekku* in Siddha literature². The present investigation has further revealed that it has significant antibacterial activity also.

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Phytochemical And Pharmacological Studies on The Roots of *Capparis Sepiaria*

S. R. CHAUDHARI*, M. J. CHAVAN AND R. S. GAUD'

Pravara Rural College of Pharmacy, Loni-413716. F. shata Taluka, Ahmednagar Dist.

*AICTE, I. P. Estate, I. G. Sports Complex, New Delhi-110002.

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The objective of the present study was to investigate the phytochemical constituents and pharmacological properties of the roots of *Capparis sepaiaria* of genus *Capparis*. The roots powder was extracted with petroleum ether, methanol and water. Chemical constituents were isolated from petroleum ether extract and methanol extract using column chromatography, which were further studied by spectroscopic methods. In pharmacological evaluation, all these extracts showed significant anti-inflammatory and analgesic activities.

*For correspondence

The genus *Capparis* includes 250 species and falls under family Capparidaceae¹. The plants of genus *Capparis* are trees or shrubs, unarmed or with stipular thorns. Leaves are simple, flowers are white or coloured² leaf extract of *Capparis sepiaria* found to have alkaloids, glycosides, carbohydrates, terpenes and sterols³. The other species of genus *Capparis* i.e. *C. deciduas*, *C. grandis* and *C. aphylla* have been reported for alkaloids^{4,5}, isothiocyanate⁶, flavonoids and sterols⁷.

The plant *Capparis sepiaria* is used as stomachic, tonic appetizer, removes *Kapha* and *Vata*, cures fever, blood purifier, tumours, inflammation and diseases of the muscles. The ground root as an errhine is a cure for the snake bite, the plant also possess febrifuge properties and useful in skin diseases⁸.

The fresh roots of *Capparis sepiaria* were collected, dried and powdered. Powdered drug (100 g) was extracted with petroleum ether (60-80°), methanol and water. The extracts were dried under reduced pressure and controlled temperature (40-50°). Preliminary chemical tests were carried on the crude extracts. The methenolic extract showed positive test for alkaloids. The extract was chromatographed over silica gel column. A highly hygroscopic, crystalline alkaloid was isolated in chloroform:methanol (2:3) elute. This compound was further characterized by spectroscopic methods⁹.

The crude plant extracts were screened using the carrageenan-induced rat paw oedema method¹⁰. The experimental protocol has been approved by Institutional Animal Ethics Committee (CPCSEA Registration No.448/01/c). Male Wistar rats (125-150 g) were housed in groups of five each. They were fasted overnight and during the experiment but had free to access to water. The extract were suspended in 0.5% acacia and administered orally, in dose of 30 mg/Kg, 1 h before the subplanter injection of carrageenan (0.1 ml of 1% solution). Paw volumes were measured plethysmometrically at 0, 1, 2 and 3 h after carrageenan and compared with the Ibuprofen treated groups.

The analgesic activity was tested using the tail flick method¹¹. Tail flick response was evoked by placing rat tail over the wire heated electrically. The intensity of heat was adjusted (current 3.0 A) so that the baseline tail flick latency averaged 3-4 s in all the animals, cut of time 20 s in order to avoid injury to the tail. The percentage of analgesia was calculated. The standard drug used was pentazocin.

In the phytochemical investigation, a colourless, crys-

talline hygroscopic (190-191°), alkaloid was isolated from the fraction number (38-49) with Rf value 0.4, in the solvent system methanol:glacial acetic acid:water (09:0.5:0.5). The UV spectrum has shown the absorption maxima at 243 ppm for (α - β unsaturated amide and at 315 ppm for aromatic compound. The IR spectrum showed -NH stretching vibration band at 3647 cm⁻¹, aromatic CH stretching at 3003 cm⁻¹, the vibration band at 2664 cm⁻¹ indicated for aliphatic CH stretching and amide band I and II at 1733 cm⁻¹ and 1716 cm⁻¹, respectively.

The ¹H NMR spectrum the peak of δ 0.8 to 1.5 assigned for aliphatic chain, the peak at δ 1.75 assigned for amine linkage. The peak at δ 3.5 to 3.8 for aliphatic chain, while the peak at δ 4.15 indicated 6 protons of methoxy group i.e. two methoxy groups presents in the skeleton. ¹H NMR spectra also showed peak at δ 7.4 for protons of aromatic ring. The mass spectrum of the isolated component showed different fragments, which are presented in fig. 1. From the spectroscopic studies the compound appear to be a complex alkaloid. The structure of compound may be assigned as one shown in fig. 2.

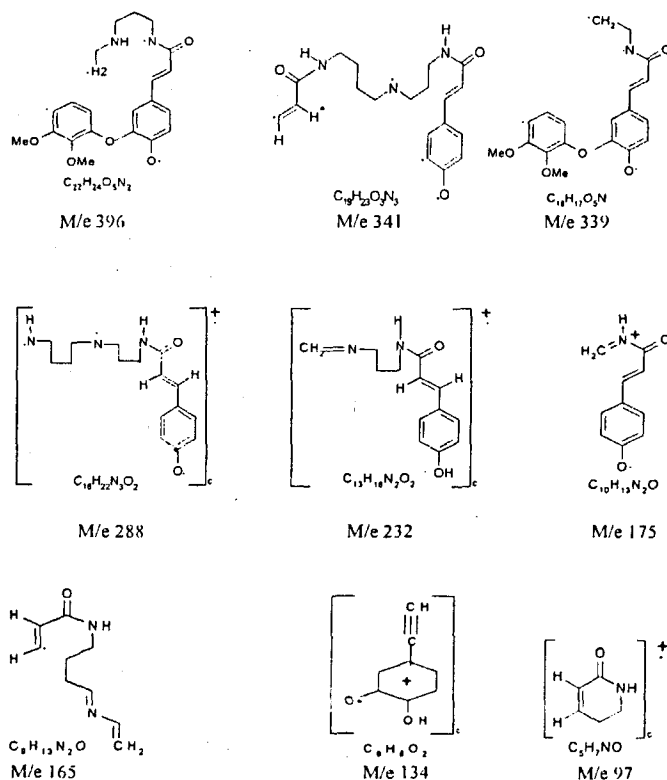


Fig. 1: Fragments of the isolated component in mass spectrum analysis.

In pharmacological screening all extracts showed significant ($P < 0.01$) anti-inflammatory activity. Petroleum ether, methanol and water extracts in 30 mg/Kg dose reduced inflammation by 32.6%, 41.3%, and 37% respectively as compared with standard groups (Table 1). Furthermore these extracts also produced significant ($P < 0.01$) analgesia in 30

mg/kg dose in a manner similar to that showed by the group treats with standard (Table 2).

It is worth mentioning that although different constituents are extracted in different solvents as per polarity, in present protocol nonpolar as well as polar fractions exhibited analgesic and anti-inflammatory effects. Analgesic ef-

TABLE 1: EFFECTS OF TOTAL EXTRACTS OF *CAPPARIS SEPIARIA* ROOT ON CARRAGEENAN INDUCED RAT PAW OEDEMA.

Treatment	Dose	0 h	1 h	2 h	3 h	% Inhibition of paw oedema at 3 h
Control	-	0.36±0.021	0.48±0.017	0.64±0.034	1.28±0.033	-
Standard	30	0.36±0.021	0.46±0.021	0.54±0.021	0.84±0.021*	47.8
PE	30	0.36±0.021	0.46±0.021	0.56±0.021	0.98±0.033*	32.6
ME	30	0.40±0.028	0.50±0.040	0.58±0.033	0.94±0.021*	41.3
WE	30	0.40±0.028	0.48±0.017	0.56±0.021	0.98±0.033*	37.0

Each group consisted of 5 animals. PE denotes petroleum ether extract, ME denotes methanol extract and WE stands for water extract. Ibuprofen is standard. *denotes significant difference from control at ($P < 0.01$).

TABLE 2: ANALGESIC ACTIVITY OF TOTAL EXTRACTS OF *CAPPARIS SEPIARIA* ROOT BY TAIL FLICK RESPONSE.

Time min	Control	Standard (30 mg/Kg) (% analgesia)	PE (30 mg/kg) (% analgesia)	ME (30 mg/Kg) (% analgesia)	WE (30 mg/Kg) (% analgesia)
0	2.87±0.272	2.12±0.11 (0%)	2.75±0.28 (0%)	2.8±0.18 (0%)	2.5±0.11 (0%)
30	3.37±0.108	6.75±0.13 (20.32%)	5.37±0.21 (12.02%)	6.12±0.37 (16.53%)	4.5±0.23 (06.79%)
60	2.75±0.297	13.6±0.21* (63.01%)	5.87±0.11* (18.08%)	7.75±0.13* (28.98%)	7.37±0.32* (26.78%)
90	2.37±0.108	9.75±0.13* (41.46%)	7.62±0.11* (29.77%)	9.12±0.21* (38.28%)	7.5±0.31* (29.00%)
120	2.75±0.216	7.25±0.28* (26.08%)	5.75±0.22 (17.39%)	6.62±0.32* (22.43%)	6.5±0.25* (21.73%)
180	2.62±0.108	6.25±0.28* (17.39%)	5.00±0.18 (13.69%)	5.87±0.11 (18.69%)	5.25±0.28 (15.13%)

Each group consisted of 5 animals. PE denotes petroleum ether extract, ME denotes methanol extract and WE stands for water extract. Ibuprofen is standard. *denotes significant difference from control at ($P < 0.01$).

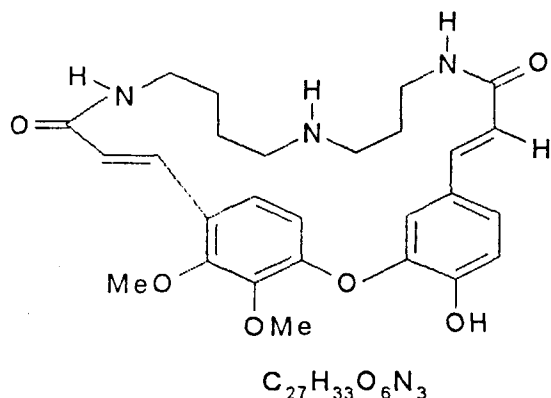


Fig. 2: The structure of the compound isolated from the methanol extract of *Capparis sepiaria* root.

fect against thermal noxious stimuli may be elicited through opoid receptors¹² or through modulation several neurotransmitters involved in the relevant phenomena¹³, similarly the inhibition of carrageenan-induced rat paw oedema indicates anti-inflammatory activity. Serotonin, histamine, bradykinin, prostaglandins have been identified as mediators for carrageenan-induced hindpaw oedema¹⁴. The mechanism of anti-inflammatory action of *Capparis sepiaria* may be related to the inhibition of enzymes responsible for prostaglandin biosynthesis, increase vascular permeability or inhibition of degranulation of mast cells.

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Spectrophotometric Determination of Fluoxetine Hydrochloride

K. SUJATHA*, K. CHITRA, P. ASHOK KUMAR, K. KIRANBABU AND J. VASANTHA.

Sri Ramachandra College of Pharmacy, Sri Ramachandra Medical College and Research Institute (DU), Porur, Chennai-600116.

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A new, simple, sensitive spectrophotometric method in ultraviolet region has been developed for the determination of fluoxetine hydrochloride in bulk and in dosage form. Fluoxetine hydrochloride shows maximum absorbance at 225 nm with apparent molar absorptivity of 1.2388×10^4 l/mol.cm Beer's law was obeyed in the concentration range of 2.5-25 μ g/ml. Results of the analysis were validated statistically and by recovery studies.

*For correspondence

E-mail: ulagaimano@yahoo.com