

PHYTO-PHARMACOGNOSTICAL INVESTIGATION AND EVALUATION OF ANTI-INFLAMMATORY AND SEDATIVE HYPNOTIC ACTIVITY OF THE LEAVES OF *ERYTHRINA INDICA* Lam

S. M. Verma, Amrisha, J.Prakash, V.K.Sah
Department of Pharmaceutical Sciences, Birla Institute of Technology,
Mesra, Ranchi - 835215.

Received : 10-1-2005

Accepted : 10-6-2005

ABSTRACT

Pharmacognostical investigations were carried out on the *Erythrina indica* leaves, followed by phytochemical investigation. On the methanolic extract of leaves, TLC was performed and indole alkaloids were identified with selected solvent system. The UV analysis was also performed on the components confirming the presence of the indole nucleus. Anti-inflammatory activity was carried out on albino rats. Further, anti-inflammatory activity was compared to that of the standard drug indomethacin and percent inhibition of oedema was determined. Sedative hypnotic activity was also evaluated using pentobarbital which showed mild sedation.

INTRODUCTION

Traditional medicinal plants have been found to have gained significant importance in the present day scenario. *Erythrina indica* Lam. has been used for asthma, bronchitis, gingivitis and hepatitis. Many of its alkaloids have demonstrated piscicide, anti-inflammatory, cardioactive, narcotic and hypnotic activities^{3,4,5}. The plant is fairly large deciduous tree of rapid growth presenting a very striking appearance during summer when it is bare of leaves and of full bloom⁶. The alkaloidal compounds Erysodine, Erysopine, Erysonine, Trythraline, Erythratine etc. are isolated from the leaves of the plant⁷. The whole plant extract has been found to contain anti-inflammatory, hypnotic, sedative, hypotensive activity.

The present work involves the leaves, Pharmacognostical investigation, preliminary phytochemical investigation and anti-inflammatory activity of the methanolic

extract of the leaves of *Erythrina indica*. The plant was authenticated by the Department of Pharmaceutical Sciences, BIT, Mesra.

MATERIAL AND METHODS

The leaves of *Erythrina indica* was used for pharmacognostical investigation. Diagnostic characters, ash values and quantitative analysis were carried out. The evenly dried leaves of *Erythrina indica* was used. The methanolic extract was prepared using soxhlet apparatus. It was used for the TLC to determine the R_f values. The anti-inflammatory activity was determined using the methanolic extract.

A. Pharmacognostical Investigation^{8,9}

The dried, powdered drug was taken. A judicious quantity of powder was taken on glass slide to which few drops of chloral

hydrate was added and shaken for 2 minutes. Cover slip was placed to avoid air bubble. Similarly, phloroglucinol and safranin slides were prepared.

B. Phytochemical Investigation

Preliminary phytochemical investigation was done with the methanolic extract of leaves of *Erythrina indica*. Thin layer chromatography was performed and R_f was determined. A series of solvent system was taken and finally one was developed. Slurry of silica gel G with water (1:2 ratio) was prepared and thus the TLC plates were prepared. Using capillary tube, the methanolic extract was spotted. To determine the components, solvent system was developed, to get good resolution and R_f was determined. Similarly, a standard solvent system was used to find the R_f using that system.

C. Anti-inflammatory Activity¹⁰

The inflammation was induced by carrageen on albino rats by rat paw oedema method. The anti-inflammatory study was carried out by measuring the reduction in hind paw oedema by the methanolic extract of *Erythrina indica*. Albino rats of either sex weighing 150-200 gm were taken and maintained on standard diet then swelling of the paw caused by the carrageenan reached a peak in 3-5 hours, which retained for several hours. (Table A)

D. Sedative Hypnotic Activity^{11,12}

The sedation was induced by the standard drug, pentobarbital sodium injected intraperitoneally as well as the test drug and the righting reflex was observed. The onset and duration of sleep was observed for each case. By student t-test method, the sedative activity was evaluated.

Table A

Group 1	Standard	Indomethacin in the dose of 100mg / kg body weight injected intra- peritoneally
Group 2	Test	Methanolic extract of <i>Erythrina indica</i> at a dose of 100 mg/kg body weight
Group 3	Control	Distilled water was injected

Observation was made by measurement of paw circumference by screw gauge at 0 min., 15 min., 30 min., 60 min. The percent inhibition of oedema was found out.

RESULTS AND DISCUSSION

A. Pharmacognostical Observation

- a. Diagnostic characters : Unicellular trichomes, paracytic stomata.
- b. i. Vein islet number : 9
 ii. Stomatal index : 21.12 (upper)
 : 17.4 (lower)
 iii. Stomatal number : 6
 iv. Palisade ratio : 7.5

- c. Ash Values
- i. Total ash value : 15.09
 - ii. Water soluble ash : 20.265
 - iii. Acid insoluble ash : 22.585

2. Phytochemical Investigation

- I. Methanolic extract of the leaves of *Erythrina indica* was dark green in color.
- II. Qualitative analysis showed presence

Solvent system	Adsorbent	R _f
a) CH ₂ Cl ₂ : EtOAc : HCOOH (5:4:1)	Silica gel	(i) 0.7 (ii) 0.733
b) n-butanol : water: methanol (5:4:1)	Silica gel	(i) 0.4375 (ii) 0.645

IV Test for indole alkaloids confirmed, its presence.

Solvent system	Component 1	Component 2	Confirmatory test for indole nucleus
a) Methanol	212nm; 663nm	665,401,272,200nm	(274) Indole 3 acetic acid, Indole 3 lactic acid (275)
b) Chloroform	491.5nm	489nm,241.5 nm	

3. Anti-inflammatory Activity

Control group

Sl.No.	0min		15min		30min		60min	
	Right	Left	Right	Left	Right	Left	Right	Left
1	0.9	0.9	0.9	1.2	0.9	1.1	0.9	1
2	0.91	0.91	0.91	1.4	0.91	1.4	0.91	1.3
3	0.85	0.85	0.85	0.98	0.85	0.98	0.85	0.91
4	0.92	0.92	0.92	1.4	0.92	1.4	0.92	1.3
Mean(mm)	0.89	0.89	0.89	1.22	0.89	1.21	0.89	1.01
%diff.	0		23.5		19		13.4	

Indomethacin (Standard)

SI.No.	0min		15min		30min		60min	
	Right	Left	Right	Left	Right	Left	Right	Left
1	0.9	0.9	0.9	0.95	0.9	0.93	0.9	0.93
2	0.91	0.91	0.91	1.8	0.91	0.94	0.91	0.95
3	0.78	0.78	0.78	0.94	0.78	0.89	0.78	0.87
4	0.94	0.94	0.94	1.2	0.94	0.98	0.94	0.84
Mean(mm)	0.88	0.88	0.88	1.05	0.88	0.93	0.88	0.91
%diff.	0		19.3		5.6		3.4	

Plant Extract (Test) – 300mg/kg

SI.No.	0min		15min		30min		60min	
	Right	Left	Right	Left	Right	Left	Right	Left
1	0.96	0.96	0.96	0.9	0.96	0.86	0.96	0.95
2	0.91	0.91	0.91	0.99	0.91	0.96	0.91	1.2
3	0.86	0.86	0.86	0.95	0.86	0.92	0.86	0.95
4	0.6	0.6	0.6	0.97	0.6	0.93	0.6	0.85
Mean(mm)	0.83	0.83	0.83	0.94	0.83	0.91	0.83	0.98
%diff.	0		13.2		9.6		18	

Statistical Analysis

Group	Paw Volume (mm ³)	%oedema Inhibition
Control	33.3 ± 2.19	-
Indomethacin	9.4 ± 4.1	71
Plant Extract (300 mg/kg)	13.6 ± 1.96	59

4. Sedative hypnotic activity

S.no.	Sample	Onset of action(min)	Duration of action (min)
1	Pentobarbital Na	6.4	190.6
2	Pentobarbital Na+ extract	4.0	204.0
3	Control (distilled water)	-	-

CONCLUSION

Erythrina indica was identified pharmacognostically. The methanolic extract of the leaves (soxhlet extraction) was characterized and indole alkaloids was found. The anti-

inflammatory activity was observed by reduction of the paw oedema by the methanolic extract. By the student t-test method, the sedative activity was found to be mild.

REFERENCES

- 1) Cruz, G.L., *Dicionario Das Plantas Uteis Do Brasil*, 5th edition, Rio de Janeiro, Brazil, Bertrand **1995**.
- 2) de Almeida, E. R., *Plantas Mediciniais rasileiras, conhecimentos Populares E Cientificos*, Hemus Editorai Ltda. Sau Paulo, Brazil, **1993**.
- 3) Schultes, R.E., and Raffauf, *The healing Forest. Medicinal and Toxic Plants of the North west Amazonia*, R.F.Dioacorides Press, **1990**.
- 4) Santos, W.O., et al, *Pesquisas de Substancias Cadioativas em Plantas Xerofilas Mediciniais*, IX, Simposio de Plantas Mediciniaisplol. Brasil, Rio De Janeiro - RL, Brasil, P-45, Sept 1-3, **1986**.
- 5) Pohill, R. M., & Raven, P. B., *Advances in Legume Systematics*, Part 2, Royal Botanic Gardens, Kew, England, **1981**.
- 6) *The Wealth of India*, Vol-III, D- - E, 'SRI', New Delhi, pg-102-109, **1959**.
- 7) Kirtikar, K.R., and Basu, B.D, *Indian Medicinal Plants*, 2nd Edition, Vol. III, Pg-1926-1931, **1980**.
- 8) Kokatte, CK., *Practical Pharmacognosy*, 2nd Edition, Vallabh Prakashan, Pg-II1-115, **1998**.
- 9) Trease and Evans, *Pharmacognosy*, 15th Edition, W. B. Saunders, Pg-546- 547, **2002**.
- 10) Kulkarni, S. K., *Handbook of Experimental Pharmacology*, Vallabh Prakashan, pg-III-115, **1998**.
- 11) Kulkarni, S.K., *Handbook of Experimental Pharmacology*, Vallabh Prakashan, pg-115- 116, **1998**.
- 12) Davidson, *Principles and practice of medicine*, 1 Othedition, ELBS publication, **1996**