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

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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. 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 bloom. The alkaloidal compounds Erysodine, Erysopine, Erysonine, Trythraline, Erythratine etc. are isolated from the leaves of the plant. 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

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 Activity**

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 carragenan reached a peak in 3-5 hours, which retained for several hours. (Table A)

**D. Sedative Hypnotic Activity**

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 *Erythrina indica* 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) CHCH₃ :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; 663mm| 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 Right | 0min Left | 15min Right | 15min Left | 30min Right | 30min Left | 60min Right | 60min Left |
|--------|------------|-----------|-------------|------------|-------------|------------|-------------|------------|
| 1      | 0.9        | 0.9       | 0.9         | 1.2        | 0.9         | 1.1        | 0.9         | 1.1        |
| 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  | 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 (mm3) | %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.

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