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Analgesic activity of *Justicia beddomei* leaf extract

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Abstract:

The analgesic activity of ethanolic extract of *Justicia beddomei* leaves (Family: Acanthaceae) was evaluated in albino rats using Eddy’s hot plate method. The extract at 50 and 100 mg/kg, (i.p), showed significant analgesic activity at 90 minutes of administration. The analgesic effect of the extract was comparable to that of morphine sulphate.

Introduction:

*Justicia beddomei* (Family: Acanthaceae) is a glabrous shrub and grows well in shadow and moist areas. The plant is widely distributed in Kerala, India. Leaves are opposite; short-petiolated upto 15 cm long, 3.75 cms broad, main nerves about 8 pairs. Flower heads short, dense or condensed spikes, fruits capsules with a long solid base. The leaves of the plant are reported to be useful in the traditional system of medicine as diuretic, antispasmodic, expectorant, anti-asthmatic, febrifuge, styptic and tonic. Leaves are also good for irritable cough and for blood mixed diarrhoea and especially in haemoptysis ⁵,⁶. However, no systematic study on phytochemical and analgesic activity has been reported in the literature so far. The present study is focused on evaluation of the analgesic activity of *Justicia beddomei* leaves.
Material And Methods:

The leaves of *Justicia beddomei* were collected from Katapadi, Onel Herbal Nursery, Udupi District, Karnataka in winter season and dried under shade. The Taxonomist Dr. P.M. Shivakumar, Department of Botany, DRM Science College, Kuvempu University, Karnataka identified the plant. A voucher specimen U.S-01 is preserved in our research laboratory for future reference.

Preparation of the Extract: The collected leaves were shade dried, coarsely powdered and subjected to successive solvent extraction by different solvents in ascending order of polarity i.e. petroleum ether (60-80°C), chloroform, ethanol (95%) and purified water in a Soxhlet Extractor\(^7,8\). The ethanolic extract was concentrated in vaccum under reduced pressure using rotary flash evaporator. It was further concentrated and dried in the dessicator for further studies.

Phytochemical Studies: The chemical constituents of the ethanolic extract of *Justicia beddomei* leaves were investigated. From preliminary phytochemical analysis, it was found that the extract showed the presence of alkaloids, tannins and reducing sugars, (Table-I).

Animals: The institutional animal’s ethical committee approved all the animal experiment protocol. Healthy Wister albino rats of either sex weighing about 150-200g were used to study analgesic activity. Healthy adult albino mice of either sex, weighing between 25-30grams were selected for the acute toxicity studies. They were fed with standard diet, water *ad libitum*.

Drugs: Morphine sulphate was used as standard analgesic drug. The drug was dissolved in water for injection and administered in a dose of 15 mg/kg (i.p) to rats.

Evaluation of Analgesic Activity: The ethanolic extract was evaluated for its analgesic activity by Eddy’s hot plate method.\(^1-4,10\) Albino rats (125-150 gms) were divided into four groups each consisting of 6 animals and they were fasted overnight but during the experiment had free access to water during the experiment. Group-I served as a negative control (received 1% of Tween-80, 5 ml/kg, i.p), Group-II served as a positive control (received Morphine sulphate 15 mg/kg, i.p), while the Group-III and IV received ethanolic extract of the *Justicia beddomei* (100 mg/kg and 50 mg/kg, body weight, i.p) respectively.

The Basel reaction time was noted before and 1, 2, 3 hours after the administration of the drugs and data were tabulated in Table-II.

Statistical Analysis: The values are expressed as mean ± SEM and data was analyzed by one-way ANOVA followed by student’s ‘t’ test. The treated groups are compared with Group-II (Standard) Morphine sulphate. The minimum level of significance was fixed at P < 0.001.
Results And Discussion:

The preliminary phytochemical investigation revealed the presence of alkaloids, carbohydrates in alcoholic extract and aqueous extract showed presence of carbohydrates and tannins, Table-I. On successive solvent extraction, the majority of phytoconstituents were extracted in ethanolic extract of Justicia beddomei. Hence the extract was screened for analgesic property.

The present results showed that the ethanolic extract of Justicia beddomei leaves possesses significant analgesic activity at 90 minutes of administration of test extracts and its effect is less than that of Morphine sulphate (Standard). The extract was found to produce marked analgesic effect due to the presence of alkaloids, carbohydrates etc. However, further studies are required to identify and characterize the responsible chemical constituent. The exact mode of action and biologically active constituents responsible for the effect have not been reported earlier.

Table-I  Preliminary Qualitative investigation of extracts of Justicia beddomei leaves.

| Phytoconstituents | Petroleum Extract | Chloroform Extract | Alcoholic Extract | Aqueous Extract |
|-------------------|-------------------|-------------------|------------------|-----------------|
| Alkaloids         | -                 | +                 | +                | -               |
| Amino acids       | -                 | -                 | -                | -               |
| Carbohydrates     | -                 | -                 | +                | +               |
| Fats & Oils       | -                 | -                 | -                | -               |
| Flavonoids        | -                 | -                 | -                | -               |
| Glycosides        | -                 | -                 | -                | -               |
| Saponins          | -                 | -                 | -                | -               |
| Tannins           | -                 | -                 | -                | +               |
| Triterpenoids     | -                 | -                 | -                | -               |

+ = Present,  - = Absent.
Table II: Analgesic activity of ethanolic extract *Justicia beddomei* leaves on albino rats

| Groups | Treatment (n=6) | Average reaction time (sec) ± SEM |
|--------|----------------|----------------------------------|
|        |                | 0 min  | 15 min | 30 min | 60 min | 90 min | 120 min | 180 min |
| I      | Control (Tween80) | 4.17±0.17 | 3.83±0.17 | 3.83±0.31 | 4.17±0.31 | 4.17±0.17 | 4.33±0.21 | 4.33±0.21 |
| II     | Morphine Sulphate (15 mg/kg, i.p.) JBL | (4.33±0.21) | 13.00±0.82 | 19.67±0.33 | 23.50±0.85 | 23.83±1.30 | 10.17±0.40 | 4.83±0.17 |
| III    | (100 mg/kg, i.p.) JBL | 4.67±0.21 | 6.33±0.42 | 9.00±0.37 | 11.17±0.75 | 15.50±0.56 | 5.67±0.21 | 4.83±0.17 |
| IV     | (50 mg/kg, i.p.) | 4.83±0.17 | 5.83±0.31 | 7.33±0.33 | 8.33±0.33 | 9.67±0.42 | 4.83±0.31 | 5.00±0.26 |

NB: JBL - Justica beddomei leaves
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