VOLUME-7, ISSUE-6, JUNE-2018 • PRINT ISSN No 2277 - 8160

Original Research Paper

Pharmacology

ANTI - INFLAMMATORY ACTIVITY OF SIDDHA PREPARATION *KANDU PAARANGI CHOORANAM* (*PYGMAEOPREMNA HERBACEA* (ROXB.) MOLDENKE POWDER)

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ABSTRACT

Objective: To evaluate the anti-inflammatory activity of the aqueous extract of *Chooranam* (root powder) of *Kandu paarangi* (*Pygmaeopremna herbacea* (Roxb.) Moldenke), a Siddha formulation.

Method: *Pygmaeopremna herbacea* of the family Verbenaceae is a small shrub with its knot roots, grown in many types of grassland and also in various parts of India. The plant roots have been used in the treatment of sinusitis, various respiratory ailments, pyrexia, chronic rheumatic disorders etc. The present study intended at the evaluation of anti-inflammatory activity of the aqueous extracts of the root powder by *in vivo* method estimated on the Carrageenan induced paw oedema.

Result: The method showed significant ($p < 0.01$) anti-inflammatory property of the different concentration of extracts tested with 63.75% as the highest inhibition.

Conclusion: The aqueous extract of *Kandupaarangi Chooranam* (AEKC) at the concentration of 400 mg/ kg showed potent activity, compared with the standard drug Diclofenac sodium.

KEYWORDS : *Pygmaeopremna herbacea* (Roxb.) Moldenke, *Kandupaarangi Chooranam*, Anti-inflammatory, Carrageenan.

Introduction

Kandupaarangi also known as Huniyan (Buk.) (*Sirutheeku*; *Pygmaeopremna herbacea* (Roxb.) Moldenke) is a small, inconspicuous under shrub growing up to 15 centimetres in height, produced from stout, elongated, woody roots, with hardly many stems, which is an important less known medicinal plant of old forests of India [1][2][3][4]. Roots are about as thick as a crow quill with numerous, almost-globular, woody knots [3]. In Siddha, these knot roots are given for the treatment of Asthma, pyrexia, mental illness, chronic rheumatism, sinusitis, fever with rigor, generalized body pain and burning sensation [1]. In order to validate their efficacy on anti-inflammatory activity, this present study is carried out in experimental models using Carrageenan - induced paw oedema method in rats.

Materials and Methods

a) Collection and identification of plant material

Kandupaarangi roots were collected at Tirunelveli, Tamil Nadu and are identified and authenticated by Department of Medicinal Botany, Government Siddha Medical College, Tirunelveli, Tamil Nadu. The dried roots were cleaned to remove dust & impurities, and are made into fine powder.

b) Requirements

Animal: Albino rats (180-200 g) of either sex were isolated and maintained at the temperature of 25±1° C with 12 Hours of light in the animal house, one week former to the experimentation for accommodation. Animals were fed with food and water ad libitum.

Drugs and chemicals: Carrageenan (1%w/v), Diclofenac sodium (standard), Carboxy methyl cellulose (CMC) (1%w/v)

Apparatus: Digital plethysmometer [U G O Basile (Italy)]
Test compound : Siddha preparation *Kandupaarangi chooranam*

c) Preparation of plant root extract

The plant root powder (about 1 kg) was saturated in distilled water (1:10 w/v) for 0.5 h. Then it was filtered and concentrated to dryness under reduced pressure at 65 °C in a rotary evaporator. Eventually, the aqueous extract obtained was dissolved in distilled water for use on the day of the experiment for evaluating the anti - inflammatory activity.

This experiment was performed according to ethical guidelines of experiment pain in conscious animals in the laboratory with IAEC approval No. KMCP/228/CPCSEA (2015-2016).

Carrageenan - induced paw oedema method in rats (Bhandri *et al*)

The animals were divided into 4 groups each having six animals. The inflammation was readily produced in the form of oedema with the help of irritant such as Carrageenan. Carrageenan is a sulphated polysaccharide obtained from sea weed (Rhodophyceae) and when injected cause the release of prostaglandins by the way it produces inflammation and oedema. Freshly prepared suspension of Carrageenan (1% CMC w/v, 0.1 ml) was injected to the plantar region of right hind paw of each rat.

Group – I was kept as control and are given normal saline (10 ml/kg) orally, Group - II as standard received 10 mg /kg of Diclofenac sodium intra peritonially and the animals of the groups - III & IV were pre-treated with the aqueous extract of Siddha formulation *kandu paarangi chooranam* test compounds dissolved with 2 ml sterile water given through orally 1 hour before the Carrageenan treatment at the dose of 200 and 400mg/kg respectively.

The paw volumes of the test compounds, standard and control groups were measured at 1, 2, 3 hours of Carrageenan treatment with the help of Digital plethysmometer (Ugo basile, Italy). Mean increase in paw volume due to mercury displacement was measured in millilitres and the percentage of inhibition was calculated

% Anti-inflammatory activity = (Vc-Vt / Vc) x 100, where **Vt** - mean increase in paw volume in rats treated with test compounds, **Vc** - mean increase in paw volume in control group of rats.

Statistical analysis

Results were expressed as Mean ± S.E.M. Data were analyzed by one way ANOVA followed by Newman's keul's multiple range tests, to determine the significance of the difference between the control group and rats treated with the test compounds. $P < 0.01$ was considered statistically significant.

TABLE – 1 Effect of *Kandu paarangi chooranam* aqueous extract on the percentage inhibition of Carrageenan induced hind paw oedema

Treatment Groups	Dose (mg/kg)	Mean increase of paw volume (ml)	Percentage inhibition of paw oedema
Group I – Normal saline	10 ml/kg orally	5.35±0.82	-

Group II –Standard I.P. Diclofenac Sodium	10 mg/kg	1.75±0.60	67.50%*a
Group III – Test compound AEKC	200 mg/kg orally	2.15±0.50	60.64%*a
Group IV – Test compound AEKC	400 mg/kg orally	1.94±0.52	63.75%*a

* Data are expressed as Mean ± S.E.M. Data were analyzed by one way ANOVA followed by Newman's keul's multiple range tests, to determine the significance of the difference between the control group and rats treated with the test compounds. (n = 6 in each group)

*[a]Values were significantly different from normal control at P< 0.01.

AEKC = Aqueous extract of *Kandu paarangi Chooranam*; SEM = Standard error of the mean; ANOVA = Analysis of variance.

Results and Discussion

Aqueous extract of the Siddha formulation *kandu paarangi chooranam* at 200mg/kg and 400 mg/kg reveals significant anti-inflammatory activity in a dose dependent manner as compared to control group at $p < 0.01$ from 1 – 3 hours following the drug administration. The percentage of inhibition exhibited by 200 mg / kg of AEKC was observed as 60.64% and that of 400 mg /kg of AEKC was 63.75%, as the maximum inhibition. While diclofenac Sodium (10mg /kg) showed the maximum inhibition of 67.50% at the mean of 3 hours after its administration (Table – 1).

Edema induced by Carrageenan is believed to be biphasic. The first phase (1 hour) involves the trauma of injection and the release of serotonin and histamine and the second phase (> 1 hour) is mediated by cyclo - oxygenase products. Continuity between the two phases is provided by kinin [5] [6]. Carrageenan-induced paw edema model in rats is known to be sensitive to cyclo-oxygenase inhibitors and has been used to evaluate the effect of non-steroidal anti-inflammatory agents, which primarily inhibit the cyclo-oxygenase involved in prostaglandin synthesis. It plays a major role in the development of the second phase of inflammatory reaction, which is measured at the 3rd hour [6]. As noticed, there is no inhibition of the histamine and serotonin (First phase). Therefore maximum inhibition of AEKC was 60.64% for 200 mg /kg and 63.75% 400 mg /kg at the total end of third hours, justifying its anti – inflammatory potential by inhibiting the cyclo – oxygenaseand partly by inhibiting kinin (Second Phase). This may be due to the bitter principle, Sirutekkone - a diterpenoid, strong presence of triterpenoids and alkaloids, with traces of flavonoids like Scutellarein (a 5,6,7,4'-tetrahydroxy flavone) present in the roots [3][4].

Conclusion

In conclusion, we confirm that the Aqueous extract of *Kandu paarangi Chooranam* at 400 mg /kg has got the wide therapeutic property as described earlier due to its potent anti – inflammatory property when compared with the standard drug Diclofenac sodium.

ACKNOWLEDGEMENT

We thank Dr.N.Chidambaranathan, K.M. College of Pharmacy, Uttankudi, Madurai for his guidance and kind work regarding with the Pharmacological procedures.

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