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Correlative Examination of Analgesic Activity by Using *Salacia Fruticosa*

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ABSTRACT

The present study aims to carry out the analgesic activity of the aqueous and methanolic extract of the salacia fruticosa in rats using eddy's hot plate method. The residue was administered sub cutaneously and through per oral routes. The methanol and aqeous extracts exhibited significant analgesic activity in single method by increasing the reaction time of the rats to 7.0 seconds at 30-90 minutes after treatment in comparsion to control. Here the standard drug used as Tramadol. The extract produced maximum possible analgesia. In conclusion, the methanolic extract of salacia fruticosa exposed analgesic activity.

Keywords: Analgesic activity; Salacia fruticosa; Therapeutic plants

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INTRODUCTION

From olden days, traditional systems of medicine are of global importance. Even today in many developing countries, majority of population relies greatly on traditional practioners and medicinal plants to meet primary health care needs, despite of availability of modern medicines. These home grown phytomedicines have turned out to be well known for authentic and social reasons. As of now numerous individuals in created nations have started to go to elective home grown medications.

Logical assessment of restorative herbs for their therapeutic worth and application is on rise. Security and viability of information of numerous herbs, their concentrates and dynamic fixings, and the arrangements containing them was entrenched. Anyway the market of natural medications is ineffectively managed and confirmation of security, viability and nature of such home grown items has now turned into a key issue in industrialized and creating countries [1].

Significant fundamental and clinical research are being completed on the helpful plants and their details, with the best in class strategies in various Universities. There are some genuine models. Numerous Indian therapeutic plants

give an abundant source to cell reinforcements that avert numerous ailing states. The cancer prevention agent insurance is seen at various levels. These plants likewise contain numerous significant mixes like elements for utilitarian sustenance. In the customary arrangement of prescription, the majority of the cures were taken from plants and they were demonstrated to be helpful through the levelheaded behind their utilization isn't settled through foundational pharmacological and clinical examinations with the exception of some composite natural medications and plants.

The plant kingdom still holds loads of types of plants having substances of various therapeutic worth which are yet to be found in many number of plants are always being shield for their conceivable pharmacological effects (Figure 1) [2].

Figure 1. Salacia fruticosa

Taxonomic classification [3]

Kingdom: Plantae

Subkingdom: tracheobionta

Division: Magnoliophyta

Class: Magnoliatae

Subclass: Rosidae

Order: Celastrales

Family: Hippocrateaceae

Genus: Salacia

Species: Fruticosa.

Vernacular names [4]

English: Common willow

Malayalam: Ponkarandi, Ekanayakam

Unani: Bedmushk, Bedsaada

Ayrvedic: Saptachakra, Swarnmula

Description

Salacia fruticosa grows from generally unbranched taproots and produces one to more than ten stems that are typically 5 to 40 cm tall but sometimes up to 70 cm tall. The stems can be tinted purplish, upright or lax, produced flower heads that are held as taller than the foliage. The foliage is upright growing or horizontally orientated, with leaves having narrowly winged petioles or being unwinged. The stems can be glabrous or sparsely covered with very short hairs.

The 5-45 cm long and 1-10 cm wide leaves are oblanceolate, oblong in shape with bases gradually narrowing to the petiole. The leaf margins are regularly shallowly lobed and deeply lobed and often lacerate or toothed with sharp or dull teeth. The calyculi (the cup like bracts that hold the florets) is composed of 12 to 18 segments: each segment is reflexed and sometimes glaucous. The lanceolate shaped bractlets are in 2 series with the apices acuminate in shape. The 14 to 25 mm wide involucres are green to dark green orthey may be brownish green with dark gray or purplish tips. The florets number 40 to over 100 per head, having corollas that are yellow or orange-yellow in color. The fruits, which are called cypselae, they range in color from olive-green or olive-brown to straw-colored to grayish mostly they are oblanceoloid in shape and 2 to 3 mm long with slender beaks. They are mostly white to silver-white in color and almost around 6 mm wide. Plants mostly have maximum of 24 or 40 pairs of chromosomes but in some plants they have 16 or 32 chromosomes. Plants mostly have milky sap and the leaves are all basal where each flowering stem lacks bracts and has atleast one single flower head.

Distribution

Salacia fruticosa is distributed in South-West India, Peninsula, Ceylon, Java, Thailand and Phelippines.

Within India, it is distributed in Karnataka (rare in semi evergreen forests of western Ghats of phanamthitta and Idukki districts, and southern Orissa [4-7].

Medicinal uses and indications

Traditionally salacia fruticosa is bitter, thermogenic, anti inflammatory, depurative, vulnary, livertonic, and stomachic, Analagesic. Salacia fruticosa is useful in hemorrhoids, inflammation, leucorrhoea, leprosy, skin diseases, amenorrhoea, dysmenorrhoea, wounds, ulcers, hyperhydrosis, hepatopathy, dyspepsia, flatulence [8].

Extraction

Pharmaceutically Extraction is the term used, it needs in the separation of therapeutically or very active portions of plant or the animal tissues from which the inactive or inert components by using many different selective solvents in standard extraction procedures.

Collection and authentication of plant material: The fresh leaves of Salacia fruticosa were collected from Thirupathi, Andhra pradesh, shade dried and ground powdered in a mechanical blender. The powdered is subjected to soxhlet extraction using methanol as solvent. A specimen of the plant is deposited in the herbarium of Vaageswari College of Pharmacy, Karimnagar identified and authenticated by Dr. K. Madhava Chetty, botanist of Sri Venkateswara University.

Preparation of Extracts

The dried and powdered leaves of Salacia *fruticosa* were extracted successively with of methanol and aqueous in soxhelt apparatus [9].

A greenish colored methanolic extract was obtained (5.6% with respect to dry powdered plant material), then, the same has been extracted with water to yield brownish green semisolid mass (yield 4.2% with respect to dry plant material). Two extraction procedures were carried out until the solvent system becomes a colorless. All the extracts were collected and concentrated by evaporating the solvent completely. These extracts were dried and stirred in refrigerator for the future use of various chemical group identification and pharmacological evaluation.

PHARMACOLOGICAL INVESTIGATION

Experimental Animals

Animals were procured from animal house, Vaageswari College of Pharmacy, Karimnagar (CPCSEA Reg. No: 1505/po/a/11). Male wistar albino rats weighing between 150 and 2000 g were selected for the study. Female albino mice weighing between 25 g and 30 g were selected for the acute oral toxicity studies. The were maintained on 12 h/12 h light and dark cycle at ambient room temperature and relative humidity (50%). They were kept in propylene cages in a well-ventilated room under hygienic conditions through the study. The animals were fed with commercial rst feed pellets and were given water ad libitum. Maintenance of animals was as per CPCSEA guidelines. All animals were carried out only after approval of IAEC [10-20].

Determination of LD50

The herbal preparation *Salacia fruticosa Wall* have been subjected to toxicity studies according to OECD guidelines and no death was found up to 3 g/kg body weight, so 10% and 20% of it i.e. 300 mg/kg and 600 mg/kg are taken for carrying pharmacological activities. The Results will be shown in Table 1.

Acute Oral Toxicity Study (Acute Toxic Class Method)

A preliminary pharmacological study was conducted to assess the acute pharmacological effects and safety of the drug. Acute toxicity was conducted to determine the median lethal dose (LD_{50}) of the methanolic extracts of the leaves of *Salacia fruticosa*. The procedure was followed by OECD (organization for ethical and cooperative development) guidelines, 423(acute toxic class method). The acute toxic class method was step wise procedure with 3 animals of a single sex per step. The different method uses different defined doses they always vary (5, 50, 300, 2000 mg/kg body weight) [21-25].

Table 1. Acute toxic class method

Group	Dose (mg/kg)	Number of animals used	Number of dead animals
1	5	3	0
2	50	3	0
3	300	3	0
4	2000	3	0

It was observed that the extract was not mortal for mice even at 2000 mg/kg dose. Hence one tenth $1/10^{th}$ of the dose (200 mg/kg) and one fifth $1/5^{th}$ of the dose (400 mg/kg) selected for further study.

ANALGESIC ACTIVITY

Priniciple

Pain is emotional experience and troublesome associated with real and potential tissue destruction. Various types of pain are seen in humans for example somatic pain, visceral pain referred pain, cancer pain etc. Chemical mediators

of pain are numerous. These mediators come from sources intrinsic to the neuron, including neurotransmitters such as 5-HT, Substance-P and extrinsic to the nervous system, including substances from inflammatory immune cells and red blood cells such as Prostaglandins, Kinins, cytokinins, chemokinins and ATP that are released following injury to the tissue. Pain is produced by the excitation of particular receptors, the nociceptors or of their afferent fibers. These remarkable cells respond to broad spectrum of physical or chemical noxious stimuli.

Pain can be classified as acute or chronic. The divergence between acute and chronic pain is not at all based on its period of sensation but the nature of the pain itself. The primary distinction is: acute pain serves to protect one after an injury whereas chronic pain does not serve this or any other purpose. Acute pain is the symptom of pain. Chronic pain was originally defined as pain that lasts for long time. The most common causes of chronic pain include cancer pain, neuropathic pain and arthritic pain.

METHODS

Eddy's Hot Plate Method

Animals: Studies were carried out using Wistar albino tats of both sexes weighing 175-200 g. They were obtained from the Mahaveer enterprises, Hyderabad. All animal experiments strictly complied with the approval of Institutional Animal Ethical Committee (1505/PO/a/11/CPCSEA). The animals were grouped and housed in polyacrylic cages (38 cm × 23 cm × 10 cm) with not more than six animals per cage and maintained under standard laboratory condition (temp. 25°C) with dark and light cycle (12/12 h). They were allowed free access to standard dry pellet diet and water *ad libitum*. The rats were acclimatized to laboratory condition for 10 days before commencement of experiment. The Results were shown in Table 2 and Figure 2.

Requirements

Animals: Albino mice (18-22 g)

Drugs: Tramadol (10 mg/kg)

Methanolic and aqueous extracts of *Salacia fruticosa* Wall (50 mg and 100 mg/kg)

Equipment: Eddy's hot plate

Treatment protocol: The animals were numbered, weighed and then divided into six groups with six animals in each as follows.

Group-1: Control (CMC10 ml/kg.p.o.).

Group-2: Standard (Tramadol 10 mg/kg.p.o).

Group-3: MESF-methanolic extract of Salacia fruticosa (50 mg/kg) is suspended with CMC (0.5%w/v)..

Group-4: MESF-methanolic extract of Salacia fruticosa (100 mg/kg) is suspended with CMC (0.5%w/v).

Group-5: AESF-Aqueous extract of Salacia fruticosa (50 mg/kg) is suspended with CMC (0.5%w/v).

Group-6: AESF-Aqueous extract of Salacia fruticose (100 mg/kg) is suspended with CMC (0.5%w/v).

Procedure

Animals were derived into six groups. Each group consisting of six animals, one group served as Negative control (CMC 10 ml/kg) and second groups served as positive control (received Tramadol 10 mg/kg) by oral route. Third group received Methanolic extract of *Salacia fruticosa* (50 mg/kg) by oral route. Fourth group received methanolic

extract of *Salacia fruticosa* (100 mg/kg) by oral route. Fifth group received aqueous extract of *Salacia fruticosa* (50 mg/kg) by oral route and the sixth group received aqueous extract of *Salacia fruticosa* (100 mg/kg) by oral route (Table 3).

RESULTS

Results are shown in the below Tables 2, 3 and Figure 2.

Table 2. Mean reaction time in mice by Eddy's Hot Plate method, Before administration of drug

Group	Response Time (in seconds)			
	0 min	10 min	20 min	30 min
Group I	10.25 ± 0.22	10.43 ± 0.15	10.26 ± 0.11	10.31 ± 0.14
Group II	9.9 ± 0.2	10.2 ± 0.08	10.35 ± 0.15	10.6 ± 0.16
Group III	10.28 ± 0.1	10.53 ± 0.18	10.46 ± 0.16	10.43 ± 0.22
Group IV	10.2 ± 0.1	10.41 ± 0.14	10.48 ± 0.17	10.55 ± 0.16
Group V	10.41 ± 0.2	10.4 ± 0.14	10.7 ± 0.15	10.55 ± 0.18
Group VI	10.43 ± 0.15	10.46 ± 0.16	10.5 ± 0.17	10.56 ± 0.18

Table 3. After administration of drugs

Group	0 min	30 min	60 min	90 min
Group I	10.38 ± 0.09	10.58 ± 0.2	10.48 ± 0.18	10.55 ± 0.2
Group II	10.28 ± 0.16	15.11 ± 0.2(42.8%)	15.73 ± 0.11 (51%)	11.66 ± 0.22
Group III	10.7 ± 0.16	11.41 ± 0.21*(68.8%)	13.11 ± 0.1 (76.9%)	10.98 ± 0.24
Group IV	10.5 ± 0.18	13.35 ± 0.17**(81.7%)	13.76 ± 0.18 (81.1%)	11.43 ± 0.15
Group V	10.48 ± 0.18	13.05 ± 0.19(79.7%)	11.53 ± 0.14 (66.9%)	10.55 ± 0.14
Group VI	10.53 ± 0.15	13.8 ± 0.16*(84.7%)	12.78 ± 0.19 (74.8%)	10.59 ± 0.18

Values are expressed as mean ± S.E.M. (n=6); $^{*}p<0.05$, $^{**}p<0.01$ vs. control. one way ANOVA followed by Dunnets't' test. METT: methanolic extract; AETT: aqueous extract of *Salacia fruticosa Wall*. ( ):Parenthesis indicates the percentage of Inhibition.

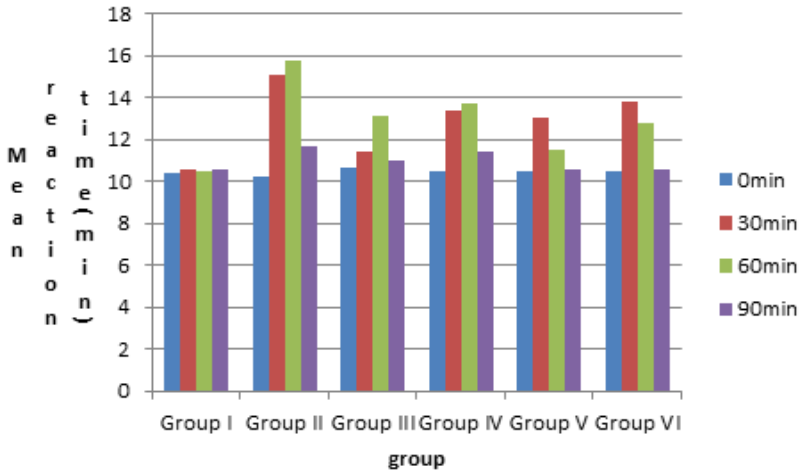

Figure 2. Effect of different leaf extracts of *Salacia fruticosa* on reaction time of mice by Eddy's Hot plate method

CONCLUSION

The methanolic extract of leaves of the plant has shown significant analgesic than the other extracts. While aqueous extract have shown moderate analgesic activity when compared to that of control. There was increase in the reaction time of rats on hot plate in methanolic group when compared to control group.

REFERENCES

1. WHO Monographs on selected medicinal plants, Geneva. **1999**, 1:1.
2. AD Vaidya; TP Devasagayam. Current status of Herbal drugs in India, **2007**, 41, 1-11.
3. PK Warrier; CR Ramamurthy; R VasudevanNair; VPK Nambiar. Indian Medicinal plants,**1996**. 510-520.
4. Arya vaidyasala, Indian medicinal plants, **1994**. vol I.
5. Morley TI, Spring Flors of Minnesota, **1974**, 255.
6. Rose; Francis; Federic Warne and co, The Wild Flower Key, 388-391.
7. Atlas of seeds and fruits of Central and East-European Flora: The Carpathian Moutains Regions.
8. Clorke; Charlotte Bringle, Edible and useful plants of California, **1977**, 191-192.
9. Sevugan Arumugan Antidiabetic activity of leaf and callus extracts of *Salacia fruticosa* in Rabbit 10.2036/ scienceasia 1513-1874, **2008**.
10. RA Turner. Screening Methods in pharmacology. **1965**, 302-304.
11. MN Ghosh. Fundamentals of Experimental pharmacology, **2005**, 190-197.
12. FD Bainton; LE Glynn; C Jhon; Houck; G Weissmann. Handbook of inflammation, **1980**, 1-3.
13. GA Gilman; EL Limbird; GJ Hardman. Pharmacological basis of therapeutics. **2001**, 686-690.
14. F Selotti; S Laufter. Anti-inflammatory drugs, new multi target drugs to face an old problem. The dual inhibition concept. **2001**, 429-450.
15. RM Kandoi. The Basics of Arthritis. (1stedn), **2003**, 1-3.
16. Hamda R. *The National Med J*. **2004**, 143-157.
17. C Page; M Curtis; M Suter; M Walker; B Hoffman. Integrated pharmacology (2ndedn), **2002**, 327-341.
18. AJ Hilson; F Pel-Ebstein, *N Engl J Med*. **1995**, 66-67.

19. JB Harborne. A guide to modern techniques of plant analysis, (3rdedn), **1998**, 6.
20. CK Kokate; Khandenwal; SB Gokhale. Practical Pharmacognosy, (2ndedn), **1996**, 165-166.
21. KR Khandelwal. Practical Pharmacognosy, (11thedn), **2004**, 149-155.
22. RJ Tuticorin; SP Manakkal. Some alkaloids from *Salacia fruticosa* phytochemistry. **1983**, 755-757.
23. Sharma BR; Raffan RK; sharma P, An alkaloid and other components of unripe fruits of *Salacia fruticosa*. **1981**, 2606-2607.
24. MD Manandhar; A Shock; RS Kapil; SP Popil, new alkaloids from *Salacia fruticosa*, **1978**,1814-1815.
25. Wagner H. Phytochemistry of Medicinal plants. **1995**, 1-18.