ANALGESIC ACTIVITY OF STEM BARK OF *CAESARIA ESCULENTA*

Kopal[1], Pankaj kumar[2*], S.Jayalakshmi[1], Bharti Mittu[3], Vivek Patel[1]

[1]College of Pharmacy, Institute of Foreign Trade and Management, Lodhipur-Rajput, Moradabad,Uttar Pradesh- 244001
[2] Department of Pharmacy, Sri Ram Murti Smarak College of Engineering and Technology, Bhojipura, Bareilly, Uttar Pradesh - 243001
[3] Training Cell, National Institute of Pharmaceutical Education and Research, SAS Nagar, Punjab.

* Author for Correspondence : Mr. Pankaj Patel, Lecturer, Department of Pharmacy, Sri Ram Murti Smarak College of Engineering and Technology, Bhojipura, Bareilly, Uttar Pradesh - 243001
E-mail- kannojiya_pankaj@rediffmail.com

Summary

The present study was designed to investigate the analgesic activity of *Caesaria esculenta* vent. stem bark extracts (40% ethyl alcohol, petroleum ether, chloroform and methanol) using tail flick method and hot plate method. Except petroleum ether extract, other extracts produced significant tail flick (sec) and licking of paw (min) response ($p<0.05$, and $p<.001$) i.e. increase in tail flick and increase in the reaction time in the hot plate test.

Keywords: *Caesaria esculenta,* Analgesic activity, Tail Flick Method, Hot Plate Method.

Introduction

Casearia esculenta (L.), Flacourtiaceae or Samydaceae, locally called "Chilla/Pimpri" is a widely growing plant found in Eastern and Western Ghats upto 1200 m in the coastal pains in the hills of north – eastern India for the treatment of diarrhea, stomach ulcers, inflammation, viral infection, fevers and snakebites[1-3].

The aqueous extract of roots is traditionally used for the treatment of diabetes [4-6] and skin diseases[7], anticancer[8-9], antifungal, anti-inflammatory and analgesic activities have also been reported. Research also suggests the role of *Casearia esculenta* roots as anti oxidant[10], hypolipidemic [11], and a remedy for chronic enlargement of liver [12]. The plant contains flavanoids, alkaloids, triterpenes and glycosides responsible for various effects.

As the root of this plant shows analgesic activity there is a good probability that stem also shows the presence
of analgesic activity. Therefore it was thought of interest to obtain extract from *Casearia esculenta* stem and test the extract for the presence of analgesic activity.

Materials and Methods

Collection:
The stem bark of *Casearia esculenta* was collected from the forest of Kaladungi, district Nainital, Uttarakhand and authenticated by Dr.H.D Pandey, Botanist of Jim Corbett Jadi Buti Udyan, Kaladungi.

Preparation of extract:
About 200 g of coarsely powered drug was successively extracted with petroleum ether, chloroform and methanol. Separately 200g of drug was extracted with 40% ethyl alcohol. All the extracts were filtered and dried in reduced pressure (40˚C) and used for present investigation.

Phytochemical Studies:

Standard phytochemical screening tests were carried out for aqueous extract of leaves of *Casearia esculenta* according to the method of Trease and Evans[13]. The presence or absence of various phytoconstituents like carbohydrate, alkaloids, steroid, triterpene, tannins, glycosides and coumarins were observed by preliminary phytochemical screening.

Acute Oral Toxicity Study:

Swiss albino mice of either sex (18 – 25 gms) were given various extracts of *Caesaria esculenta* and were observed for any symptoms of toxicity for 48 hrs as per OECD guidelines 425and LD_{50} estimated using AOT 425 software (Westat, EPA, USA). Based on the results obtained from this study, the further pharmacological studies were fixed.

EVALUATION OF ANALGESIC ACTIVITY

Animals used:
Albino rats of either sex weighing between 120 to150 grams and male albino mice weighing between 20 to25 grams from Animal House, College of Pharmacy, IFTM, Moradabad, were divided in six groups of six animals each. The animals were kept in polypropylene cages, under standard condition of 12hrs light and dark cycle, over night fasting, water *at libitium* before starting the experiment. The animal experiments were approved by Animal Ethical Committee of Institute (Reg.No.837/ac/04/CPCEA)

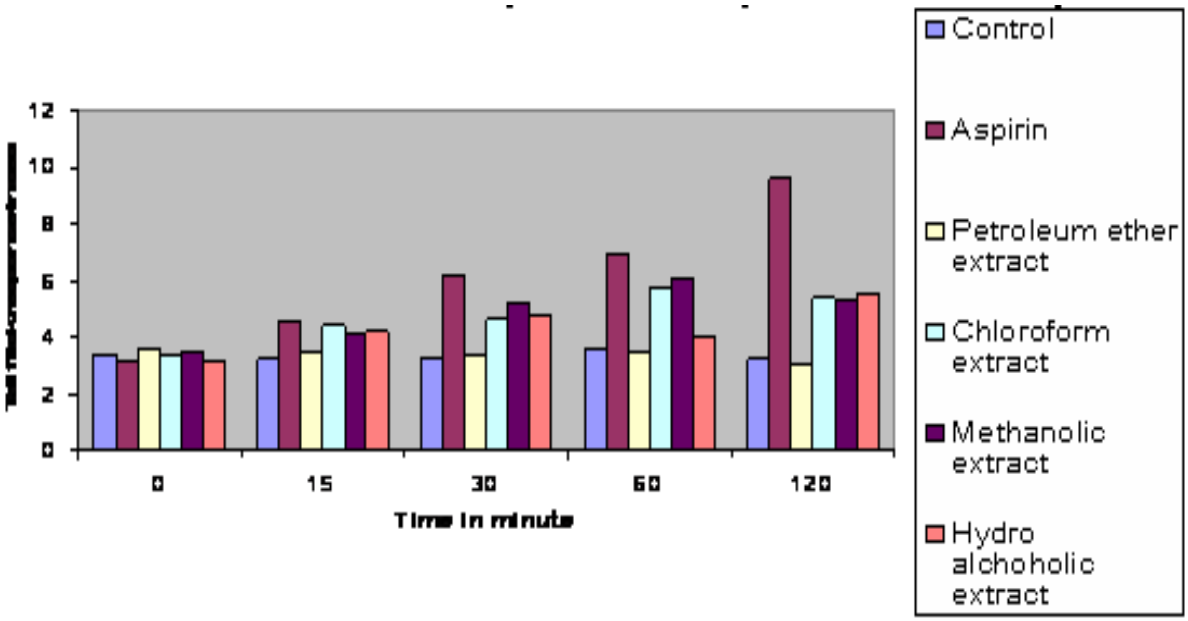
Tail flick test:
Experimental analgesia was produced by placing the tip (last 1-2 cm) of the tail over radiant heat, 50ºC; withdrawal of the tail from the heat (flicking response) was taken as the end point. Normally a mouse withdraws its tail in 3-5 seconds. A cut- off period of 10-12 seconds was observed to prevent damage to the tail.
The prepared drug samples whose appropriate dose ranges to elicit the desired response have been determined by consulting the literature and effective dose of each drug were administered 15 min before the reaction time and response was measured after 15, 30,60,120 min.

Table.1: Effect of various extracts of stem bark of *Caesaria esculenta* on thermic Stimulus-induced Pain in mice (Tail flick method)

Treatment	Dose mg/kg	Tail flick (sec)± SEM				
		Time in minute				
		0.0	15.0	30.0	60.0	120.0
Control	——	3.404 ±0.3401	3.25 ±0.1136	3.32 ±0.1828	3.57 ±0.1951	3.25 ±0.2536
Aspirin	50	3.16 ±0.1691	4.62 ±0.5545	6.2 ±03.95**	6.99 ±0.5833*	9.62 ±0.4042**
Petroleum ether Extract	50	3.588 ±0.1321	3.514 ±0.4073*	3.37 ±0.3498	3.5 ±0.2608	3.12 ±0.1803
Chloroform Extract	50	3.42 ±0.1200	4.42 ±0.07348*	4.64 ±0.1568**	5.78 ±0.1428*	5.39 ±0.1235**
Methanolic Extr	50	3.5414 ±0.1700	4.168 ±0.2150*	5.2 ±0.1975**	6.116 ±0.2188*	5.36 ±0.1122**
40%Hydroalcoh Extract	50	3.174 ±0.1785	4.234 ±0.1796*	4.78 ±0.3470**	4082 ±0.1428*	5.58 ±0.1715**

All values are expressed as mean±SEM; n=5, * P<0.05, **P<0.01 significant compared to control. (Dunnets t- test).All extracts (p.o) and Aspirin (i.p) were administered

Fig.1 Effect of various extracts of *Caesaria esculenta* on thermic stimulation of pain in mice (Tail Flick Method)



Hot plate test:

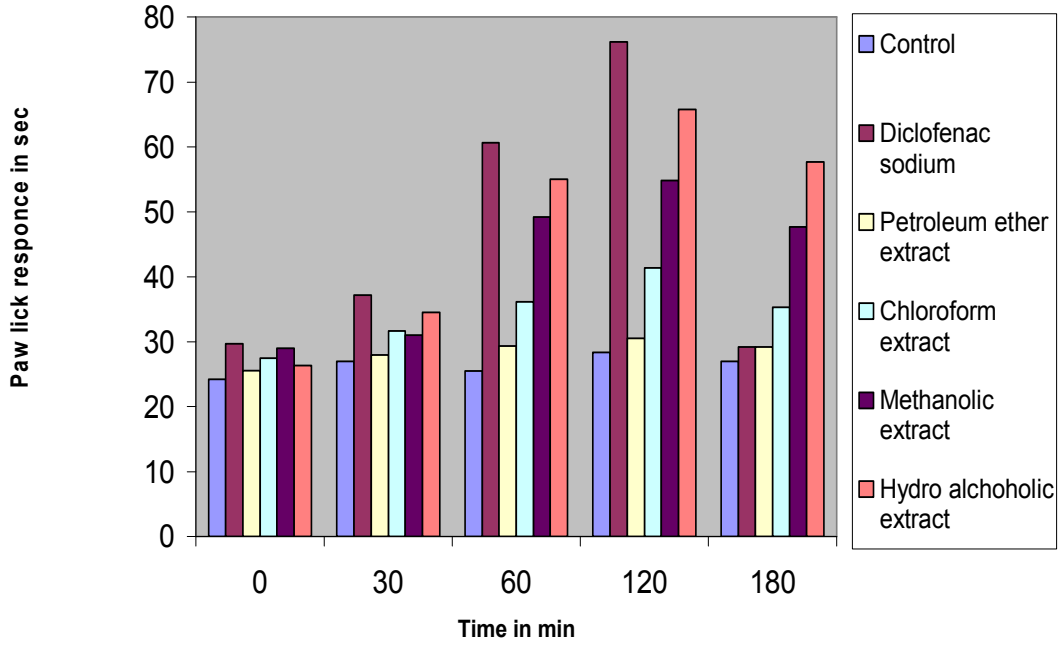
Experimental analgesia was produced by paw placed on a hot plate maintained at constant temperature (55ºC) and the reaction of rats, such as paw lick or jump response was taken as the end point. Dose of some analgesic increases the reaction time. Normally basal reaction was taken by observing jump response when placed on the hot plate maintained at a constant temperature (55ºC).The prepared drug sample whose appropriate dose ranges to elicit the desired response have been determined by consulting the literature and effective dose of each drug were administered 30 min before the reaction time and noted the latency to lick paws at 30, 60,120,180 min. Zero min reading was the pre drug reaction time.[14, 15]

Table 2: Effect of various extract of *Caesaria esculenta (*stem bark*)* on Thermic Stimulus-induced pain in rat paw (Hot plate method).

Treatment	Dose mg/kg	**Latency to lick the paw (sec)± SEM**				
		Time in minute				
		0.00	30.0	60.0	120.0	180.0
Control		24.17 ±0.600	27 ±0.9700	25.5 ±0.514	28.33 ±0.56	27 ±0.73
Diclofenac sodium	20	29.67 0.4900**	37.17 ±0.600	60.67 ±1.52**	76.16 ±0.6**	29.17 ±0.5700*
Petroleum ether extract	50	25.56 ±0.4200	28.0 ±0.57	29.33 ±1.2*	30.5 ±1.06	29.17 ±0.4800
Chloroform extract	-do-	27.5 ±0.7600**	31.67 ±0.67	36.16 ±0.600**	41.33 ±1.88**	35.33 ±0.7100**
Methanolic extract	-do-	29 ±0.6800**	31±0.57	49.16 ±0.600**	54.83 ±0.8300**	47.67 ±0.8800**
40%Hydroalcoholic extr	-do-	26.33 ±0.6700	34.5 ±1.23	55 ±1.032**	65.8 ±1.010**	57.67 ±1.6300**

All values are expressed as Mean±SEM; n=6, * P<0.05, ** P<0.01 Significant as compared to control(Dunnets t-test). All extract were administered orally, diclofenac sodium (i.p).

Fig. 2 Effect of various extracts of *Caesaria esculenta* on thermic stimulation of pain in mice (Hot Plate Method)



Statistical analysis:

Results of all above methods are expressed as Mean±SEM. Total variation present in a set of data was estimated through significant compared to control (Dunnets t- test)[16].

Results and Discussion

Results of petroleum ether, chloroform, methanol and 40% ethyl alcohol extracts of *Casearia esculenta* by tail flick method are shown in Table 1, Except petroleum ether, all the extracts and standard drug produced significant tail flick (Time in sec) response ($p<0.05$,and $p<.001$) as compared to control. Therefore, *Casearia esculenta* extract might inhibit the synthesis and/ or release of endogenous substances.In the Hot plate method it was observed that except petroleum ether, all the extracts and standard drug produced significant lick of paw (Time in min) response ($p<0.05$,and $p<.001$) as compared to control(Table 2)

Conclusion

This study establishes the peripheral analgesic activity of *Casearia esculenta* stem bark extracts. The activity may be attributed due to the presence of flavones and other bioactive compounds. In conclusion, the present study demonstrated that chloroform, methanol and 40% ethyl alcohol extracts of *Casearia esculenta* stem bark have analgesic activity, which needs to be investigated further.

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