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ANTI–INFLAMMATORY AND ANTI–NOCICEPTIVE EVALUATION OF FLOWER EXTRACTS OF *COUROUPITA GUIANENSIS*

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ABSTRACT

The flower extracts of *Couroupita guianensis* was investigated for anti–inflammatory and anti–nociceptive activity by carrageenan induced paw oedema and eddy's hot plate method, respectively. The percentage reduction in the paw volume and increase in reaction time from hot plate was observed in alcoholic extract treated animals. The anti–inflammatory and anti–nociceptive activity produced by the flower extracts of *Couroupita guianensis* was evaluated statistically by student's "*t*" test.

Key words : Anti–inflammatory, Anti–nociceptive, *Couroupita guianesis*

INTRODUCTION

The plant *Couroupita guianensis* belongs to the family lecythidaceae, which possesses a variety of uses in the traditional system of medicine. In Indian ethno medicine, the flower is locally known as Nagalinga Puspam in Tamil, Kailaspathi in Hindi and Cannon ball tree in English.[1–5] The entire plant has been used for the treatment of various skin diseases.[6] The leaf extracts possess antibacterial activity.[7] Earlier chemical work on *Couroupita guianensis* has shown that the plant contains oils, phenols, keto steroids like couxoupitone, β–sitosterol, indirobcin, eugenol, linalool, farnesol, nerol, typtanthrine, indigo, isatin, linoleic acid, α, β–amyrins and carotenoids.[8–12] In recent years, there is an increasing interest in the research of natural anti–inflammatory and anti–nociceptive activities. Hence, this study is aimed to find out the anti–inflammatory and anti–nociceptive activity of the flower extracts of *Couroupita guianensis* in comparison with indomethacin (20 mg/kg) and paracetamol (10 mg/kg), respectively.

EXPERIMENTAL

Preparation of the extracts

The flowers of *Couroupita guianensis* were collecetd in Tamilnadu, Virudhunagar district and were dried in the shade. Then the shade dried flowers were made into coarse powder. About

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500 g of coarse powder of shade dried flowers of *Couroupita guianensis* was extracted with chloroform, acetone and alcohol (all from s.d. fine chemicals Ltd, Mumbai) in a successive manner for 72 hr each. All these extracts were concentrated under reduced pressure. The preliminary phytochemical investigation[13–16] of chloroform extract shows the presence of flavanoids and saponins, acetone extract shows the presence of saponins and alcoholic extract shows the presence of flavanoids, saponins and terpenoids and were tabulated in Table 1.

Table 1. Phytochemical analysis of flower extracts of *Couroupita guianensis*

S. No.	Constituents	Extracts		
		Chloroform	Acetone	Alcohol
1.	Carbohydrates	–	–	–
2.	Proteins	+	–	–
3.	Tannins	–	–	–
4.	Alkaloids	–	–	–
5.	Sterols	–	–	–
6.	Flavanoids	–	–	+
7.	Saponins	–	+	+
8.	Terpenoids	–	–	+

– Absent.; + Present.

Anti–inflammatory activity

Albino rats of either sex weighing between 150–200 g were used for the study. They were provided with standard diet and water *ad libitum*. The rats were divided into five groups, each consists of six animals. Acute inflammation was induced by injecting 0.1 mL of 1% w/v solution of carrageenan as a phlogisic agent into the sub–plantar aponeurosis of the right hind paw of rats[17–24]. First group received normal saline (control), the second group received indomethacin as standard (20 mg/kg, i.p), the third group received alcoholic extract (100 mg/kg, i.p), the fourth group received chloroform extract (100 mg/kg, i.p) and fifth group received acetone extract (100 mg/kg, i.p), 45 minutes before carrageenin injection. Paw volume was measured with a plethysmometer at time interval of 0, 1, 2, and 3 hr after the carrageenin injection. Results were expressed as percentage inhibition of inflammation in the treated groups compared to control groups and were tabulated in Table 2.

Anti–nociceptive activity

Albino mice of either sex weighing between 20 – 30 g were used for the study. The animals were provided with standard diet and water *ad libitum*. The anti–nociceptive activity was

Table 2. Anti–inflammatory activity of flower extracts of *Couroupita guianensis*

Treatment	Dose (mg/kg)	Paw Volume (Mean ± SEM)				% inhibition
		0 h	1 h	2 h	3 h	
Vehicle Control	–	3.18 ± 0.009	4.38 ± 0.012	4.60 ± 0.018	4.71 ± 0.028	–
Indomethacin Standard	20	3.12 ± 0.009	4.12 ± 0.012	4.16 ± 0.018*	3.46 ± 0.028*	26.54
Alcoholic extract	100	2.96 ± 0.012	4.26 ± 0.024	4.44 ± 0.032*	4.00 ± 0.040*	15.07
Chloroform extract	100	2.98 ± 0.008	4.34 ± 0.018	4.49 ± 0.028	4.40 ± 0.032	6.58
Acetone extract	100	3.12 ± 0.010	4.32 ± 0.018	4.52 ± 0.024	4.60 ± 0.034	2.33

*p < 0.001 Vs Control.

studied by Eddy's hot plate method.[25–29] The rats were divided into five groups, each consists of six animals. The first group received normal saline (saline), the second group received paracetamol as standard (10 mg /kg, i.p), the third, fourth and fifth group received alcoholic extract (100 mg /kg, i.p), chloroform extract (100 mg /kg, i.p), and acetone extract (100 mg /kg, i.p), respectively. The time of reaction to pain stimulus of the rat placed on the plate heated at 55^{o} C ± 0.5^{o} C was recorded at 1, 2 and 3 hr after the administration of the drug and extracts. The increase in the reaction time against control group was calculated and tabulated in Table 3.

Table 3. Anti–nociceptive activity of flower extracts of *Couroupita guianensis*

Treatment	Dose (mg/kg)	Reaction Time in Sec (Mean ± SEM)		
		1 h	2 h	3 h
Vehicle Control	–	18.00 ± 1.20	18.30± 1.0	18.40± 0.8
Paracetamol Standard	10	23.45 ± 1.1	25.78 ± 1.3	28.39 ± 1.20
Alcoholic extract	50	21.30 ± 0.8	25.10 ± 1.0*	27.4 ± 0.30
Chloroform extract	50	19.30 ± 0.8	21.20 ± 0.3*	24.5 ± 0.40
Acetone extract	50	19.10 ± 0.6	20.60 ± 0.5	23.4 ± 1.0

* p < 0.001 Vs Control.

Statistical analysis

Results were expressed as mean ± SEM and student's "*t*" test was used to assess statistical significance.

RESULTS AND DISCUSSION

Present study shows that the maximum reduction of carrageenin induced paw oedema in rats was observed following the administration of the alcoholic extract than other extracts of *Couroupita guianensis,* but it was less than standard drug indomethacin. Table 2 suggests that the alcoholic extract of *Couroupita guianensis* possesses a moderate anti–inflammatory activity.

The alcoholic extract of *Couroupita guianensis* shows significant analgesic activity when compared with other extracts, but it was less than standard drug paracetamol. This may be due to the presence of stigmasterol and other phytosterols in the chloroform extracts. This stigmasterol is known as an ant–stiffness factor.[30]

Further study is required to find out the mechanism of the anti–inflammatory and anti–nociceptive activity of *Couroupita guianensis.*

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