the routine determination of CXB and TZN in bulk as well as in pharmaceutical preparations.

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Antiinflammatory Activity of *Elephantopus scaber* in Albino Rats

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To study the antiinflammatory activity of *Elephantopus scaber* in acute, sub-acute and chronic experimental models in albino rats, aerial parts of *Elephantopus scaber* were extracted with hydroalcoholic solvent and purified by chromatographic procedure. The compound separated was studied by carrageenan-induced hind paw oedema in rats and the paw volume was measured plethysmometrically at 0 and 3 h after injection. The compound was also subjected to turpentine oil induced granuloma pouch in rats. The pouch was opened on day 7 under anaesthesia and the exudates collected by a syringe was measured The compound was also investigated in formalin-induced oedema models in rats. Degree of inflammation was measured plethysmometrically on day 1 and 7 and compared with control and standard, diclofenac. All the drugs were administered orally. The higher dose of compound significantly reduced carrageenan-induced pedal oedema (57%) and formalin-induced pedal oedema in rats (58%). The compound also decreased exudate volume (36%) in turpentine oil-induced granuloma formation compared to control.

The roots of *Elephantopus scaber* Linn (Family Compositae) were widely used as an antipyretic, cardiatonic and diuretic. The leaves are used as an antidote for snakebite and antidiarrhoeal[1]. In the present study, we assessed the antiinflammatory activity of a compound isolated from hydroalcoholic extraction using *in vivo* pharmacological models. The aerial parts of fresh unadultred *Elephantopus scaber* were collected, identified and authenticated by comparing with a voucher specimen. The air dried and powdered aerial parts of *Elephantopus scaber* were successively extracted with hydroalcoholic solvent in a Soxhlet. The extract obtained was made free of solvent by distillation. Then it was purified by silica gel chromatography[2]. The compound was used as an emulsion in 5% suspension with gum acacia and administered orally at the dose of 30 and 60 mg/kg.

In vivo antiinflammatory activity of the compound from *Elephantopus scaber* was assessed using adult male Wistar rats (150±5 g). The animals were fed with standard laboratory feed and water *ad libitum*. They were segregated into groups of 10 for different experimental schedules (acute, sub-acute and chronic). Animals were divided into four groups comprising 10 animals in each

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group. In all groups, acute inflammation was produced by sub plantar injection of 0.1 ml of 1% suspension of carrageenan in normal saline in the right hind paw of the rats and paw volume was measured plethysmometrically at 0 and 3 h after carrageenan injection[3]. Animals pretreated either with vehicle (5% gum acacia) or compound (30 and 60 mg/kg) or diclofenac (10 mg/kg) orally[4] 2 h before injection. Mean increase in paw volume was measured and percent inhibition was calculated.

Subcutaneous dorsal granuloma pouch was made in either anaesthetised rats by injecting 2 ml of air, followed by injection of 0.5 ml of turpentine oil into it[5,6]. All drugs were administered orally 1 h prior to turpentine oil injection and continued for 7 consecutive days. On day 7, the pouch was opened under anaesthesia, the amount of exudates was taken out with a syringe, the volume was measured and compared with those of the control and standard groups.

About 0.1 ml of 2% formalin was injected into the subplantar area of right hind paw of ether anaesthetised rat[7]. All drugs were given orally 1 h prior to formalin injection and continued for 7 consecutive days[8]. Degree of inflammation was measured plethysmometrically on days 1 and 7.

Acute toxicity study was also carried out since inflammatory responses may be sensitive to the toxicological doses of the compound[14]. Animals were divided into 5 groups comprising 6 animals in each group. Group 1 was kept as control and groups 2, 3, 4 and 5 were administered orally the extract in the doses of 0.25, 0.75, 1.5 and 3.0 g/kg body weight. Toxic manifestations like abnormal motor activity, alteration in water or food intake, respiration, lacrimation and diarrhoea were observed for 6 h and the mortality for 24 h. The statistical analysis was performed using student's unpaired 't' test[9] and P values less than 0.05 were considered significant, Data are represented as mean ± SEM.

The development of carrageenan-induced oedema is biphasic, the first phase is attributed to the relase of histamine, 5-hydroxy tryptamine and kinins, while the second phase is related to the release of prostaglandins[10-12]. The isolated compound is highly effective in inhibiting carragenan-induced oedema formation in rats. Antiinflammatory effect of compound against carrageenan-induced inflammation is shown in Table 1. It significantly reduced the paw volume ($P<0.05$) as compared to control rats. Diclofenac also showed similar type of reduction ($P<0.05$). Granuloma pouch technique was modified[6] using terpentine oil as an irritant. An aseptic inflammation resulting in large volume of haemorrhage exudate is elicited which resembles the sub acute type of inflammation. The isolated compound has shown potential inhibitory action on exudate formation. Kinin formation is implicated in endotoxin shock, anaphylaxis, arthiritis and acute pancreatitis[13]. Gene sequence identity between a portion of this kininogen molecule, a major acute phase protein and a proteinase inhibitor suggests that kininogen inhibits acid proteases in an area of inflammation and may prolong the actions of the kinins. Based on all this view the isolated compound may possess antikinin-like activity. The compound significantly reduced the exudates volume ($P<0.05$) in turpentine oil induced granuloma pouch dose dependently (Table 2), which was comparable with the effect of diclofenac ($p<0.05$). Injection of formalin subcutaneously into hind paw of rats produced localized inflammation and pain. The nociceptive effective of formalin is biphasic. Thus formalin-induced arithritis is a model used for the evalution of an agent with probable anti proliferative activity. The isolated compound is quite compatible with those of the standard drug diclofenac. Therefore the drug appears to be effective against formalin induced arthritis. Table 3

TABLE 1: EFFECT OF COMPOUND IN CARRAGEENAN-INDUCED RAT HIND PAW OEDEMA

Treatment	Oral dose (mg/kg)	Paw volume increase after 3 h (ml)	Percent inhibition
Control	—	0.68 ± 0.04	—
Compound	30	0.41 ± 0.01*	22
Compound	60	0.26 ± 0.06*	57
Diclofenac	10	0.22 ± 0.02*	63

Values are expressed as mean ± SEM. Number of animals used were 10 in each group; *$P<0.05$

TABLE 2: EFFECT OF COMPOUND IN TURPENTINE OIL-INDUCED GRANULOMA POUCH IN RAT

Treatment	Oral dose (mg/kg)	Volume of exudate (ml)	Percent of inhibition
Control	—	2.30 ± 0.07	—
Compound	30	2.00 ± 0.09*	17
Compound	60	1.58 ± 0.12*	36
Diclofenac	10	0.91 ± 0.08*	58

Values are expressed as mean ± SEM. Number of animals used were 10 in each group; *P<0.05

TABLE 3: EFFECT OF COMPOUND IN FORMALIN-INDUCED RAT HIND PAW OEDEMA

Treatment	Oral dose (mg/kg)	Paw volume increase on day 7 (ml)	Percent inhibition
Control	—	1.23 ± 0.11	—
Compound	30	0.92 ± 0.18*	27
Compound	60	0.57 ± 0.15*	58
Diclofenac	10	0.42 ± 0.12*	59

Values are expressed as mean ± SEM. Number of animals used are 10 in each group; *P<0.05

shows that the compound was also effective in chronic inflammation. Formalin induced pedal oedema was inhibited significantly (P<0.05) as compared to the control rats. Diclofenac also exerted similar inhibitory action on oedema formation.

During acute toxicity study the higher dose neither produced any abnormal effect for 6 h nor any mortality within 24 h more over, no death was observed for next two days among these animals. It is concluded that the isolated compound possesses significant antiinflammatory activity, which is comparable to diclofenac.

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