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Research Article

To Estimate the Antiulcer Activity of Leaves of *Musa sapientum* Linn. by Ethanol Induced Method in Rats.

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ABSTRACT

Musa sapientum linn. commonly known as kela (English-Banana), belonging to Musaceae family, is extensively cultivated throughout India. By literature survey different parts of *Musa sapientum* have been studied for antiestrogenic, hypolipidemic, antihypertensive, wound healing, antacid, hypoglycemic, diuretic activities. The pill, stem and leaves extract of banana was found to have analgesic property. But, there is no evidence in literature for antiulcer activity of leaves of *Musa sapientum linn*. by ethanol induced method. Hence the present investigation was undertaken to study antiulcer activity of chloroform extract (CEMS) and ethanolic extract (EEMS) of leaves of *Musa sapientum linn*. by ethanol induced method. CEMS and EEMS (200mg/kg and 400mg/kg, orally) significantly ($P<0.05$) reduction in the number of ulcer and ulcer index as compared to ranitidine.

Key words: *Musa sapientum linn.*, Antiulcer activity, Ethanol induced method, CEMS, EEMS, Ranitidine.

INTRODUCTION

Musa sapientum linn. is a medicinal plant which belonging to the family Musaceae. The plant is extensively cultivated throughout India. The leaves are used by the tribals of Western Ghats in India for bandaging cuts [(1)]. They concluded that wound healing which could be due to its antioxidant effect and on various wound healing biochemical parameters present in plantain banana [(2)]. Methanolic extract of *M. sapientum var. paradisiaca* showed antiulcer and mucosal defensive factors in normal and non-insulin dependent diabetes mellitus rats. They concluded that ulcer protective effect of the extract could be due to its predominant effect on mucosal glycoprotein, cell proliferation, free radicals and antioxidant systems [(3)]. Studies with plantain banana (*M. sapientum var. paradisiaca*) have indicated its ulcer protective and healing activities through its predominant effect on various mucosal defensive factors and they concluded that its antioxidant activity may be involved in its ulcer protective activity[(4)]. Previous study reported that dried unripe plantain banana powder contain flavanoid leucocyanidin and demonstrated a significant protective effect against aspirin-induced erosions [(5)]. Besides, soluble and insoluble components of dietary fiber participate in the hypocholesterolaemic effect of banana pulp present in banana fruit [(6)]. Hence, the present study was undertaken to study antiulcer activity of leaves of Musa sapientum linn. by ethanol induced method [(7)].

MATERIALS AND METHODS

Plant material: The fresh banana leaves were collected from local farmers in the Rohilkhand region and identified correctly by Dr. Alok Khare, Botany Department, Bareilly College, Bareilly 243001, (UP) India. (ref-Bareilly College Herbarium, BHRK-592).The leaves were dried in shed and powdered using laboratory grinder.

Animals: Adult male albino rats weighing about 200-220g were used for study. The animal room was well ventilated with a 12h light/ dark cycle throughout the experimental period. They were maintained in clean, polypropylene cages and fed with Mona Laboratory animal feeds for rats/mice (Manufactured by Raman Dairy Vikash Udyog and Marketed by Pashu Aahar Kendra, Varanasi, UP, India) and water ad libitum [(8)]. Institutional Animals Ethics Committee (IAEC) approved the experimental protocol and care of animals was taken as per guidelines of CPCSEA, Department of Animal Welfare and Government of India [(9)].

Preparation of extract: For chloroform and ethanol extract (CEMS & EEMS), 500gm of dried and powdered stem was subjected to soxhlet extraction with ethanol for about 48 hrs. The extract was filtered and concentrated in vacuum under reduced pressure and dried in desiccators.

Drugs and Chemicals: All the drugs and chemicals were of analytical grade, Ranitidine (Osaka), Ethanol (Research Lab) were used.

Acute toxicity study (LD_{50}): Acute toxicity studies were carried out on wistar rats by the oral route at dose levels upto 2000mg/kg ethanol extract of Musa sapientum leaves as per organization for economic co-operation and development (OECD) guidelines No 423 [(10)]. Animals

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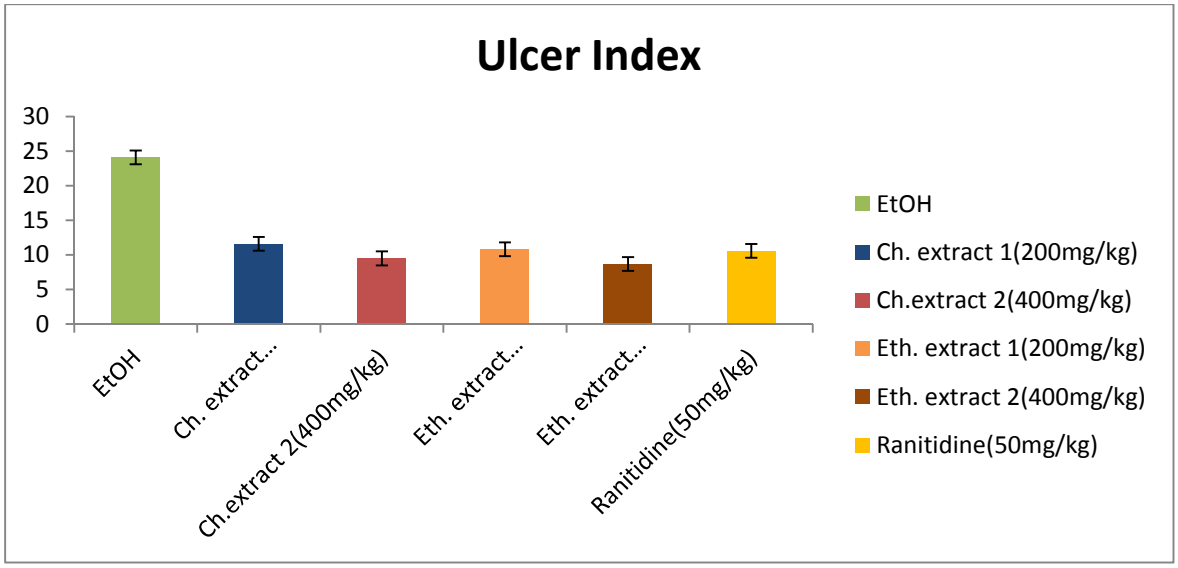
Table 1: Effect of chloroform and ethanol extracts of *Musa sapientum* leaves on ethanol induced ulcers in rats

Treatment	Dose	Ulcer index	%Ulcer inhibition
Control	10ml/kg	0.0 ± 0.0	-
EtOH	5ml/kg	24.1 ± 5.1	-
Chloroform Extract	200mg/kg	11.6 ± 4.2	51.87
	400mg/kg	9.5 ± 2.7*	60.58
Ethanol Extract	200mg/kg	10.8 ± 3.6	55.19
	400mg/kg	8.7 ± 1.9*	63.9
Ranitidine	50mg/kg	10.6 ± 2.4*	56.01

*Value are expressed as (Mean± S.E.M.), n=6, *p<0.05 when compared with control group. (Statistically analysed by One - way analysis of variance (ANOVA) followed by Dunnet's t-test)*



Graph -1: Effects of Musa sapientum leaves chloroform & ethanol extract, control and standard group on ulcer index by ethanol induced method

were divided in groups (n=3). The animals were fasted for 4h with free access to water only. The ethanol extracts of Musa sapientum leaves were administered orally in doses of 200mg/kg and 400mg/kg to different groups of rats and observed over 14 days for mortality and physical/behavioral changes.

Anti-ulcer activity through Ethanol (EtOH) induced ulcer in rats: Intragastric application of absolute ethanol is reproducible method to produce gastric lesions in experimental animals [(11)]. These lesions lest partially inhibited by various drugs, such as some prostaglandins. The protective effect against various irritants has been called cytoprotective activity. In this four groups each of six albino rats were taken randomly and designated as Group I to Group IV.

Group I: Rats were given 0.025% CMC suspension (10ml/Kg) orally for 14 consecutive days.

Group II: Rats were given the suspension of chloroform extract of *Musa sapientum* leaves (200 and 400mg/kg) orally for 14 consecutive days.

Group III: Rats were given the suspension of ethanol extract of *Musa sapientum* leaves (200 and 400mg/kg) orally for 14 consecutive days.

Group IV: Rats were given the suspension of Ranitidine (50mg/Kg) as a Standard.

Rats were deprived from food (but not from water) on day 4 of the experiment. On the last day of experiment (day15) rats were given absolute ethanol (90%) (1ml/200g) by gastric intubation[(12)] 1hr before sacrificing, except for rats in group IV which consisted of six rats that were fasted for 24 hrs, administered orally with ranitidine, and was given 90% ethanol as above 8 hrs there after. Rats were sacrificed after one hrs of ethanol administration. Stomach was removed and incised along the greater curvature and ulceration will be scored.

RESULTS AND DISCUSSION

Acute oral toxicity was carried out by up-down regulation method. It is found that chloroform and ethanol extracts of *Musa sapientum* leaves were safe at limit dose 2000mg/kg and 4000mg/kg with no mortality in studied subjects.1/10th of these doses i.e.200mg/kg and 400mg/kg were used in the subsequent study respectively. Ethanol at dose of 5ml/kg showed superficial, deep ulcers and perforations in the control animals (Table 1). However, animals treated with chloroform and ethanol extract of *Musa sapientum* leaves at 200 and 400mg/kg doses showed significant (P<0.05) reduction in the number of ulcer and ulcer index (Table1). It showed 51.87, 60.58, 55.19 and 63.9% ulceration inhibition at the dose of 200 and 400mg/kg respectively where as ranitidine showed 56.01%ulceration inhibition. Anti-ulcerogenic effect of *Musa sapientum* leaves in ethanol induced ulcers was comparable to that of ranitidine 50mg/kg. The preliminary phytochemical analysis of *Musa sapientum* leaves extract shows the presence of alkaloids, flavonoids, carbohydrates and

glycosides. The significant increase in the antiulcer activity of *Musa sapientum* leaves could be attributed to the presence of flavonoids, alkaloids and saponin glycoside. Flavonoids are among the cytoprotective materials for which antiulcerogenic efficacy has been extensively confirmed. It is suggested that, these active compounds would be able to stimulate mucus, bicarbonate and the prostaglandin secretion and counteract with the deteriorating effects of reactive oxidants in gastrointestinal lumen. So the antiulcer activity of *Musa sapientum* leaves may be attributed to its flavonoids content. The results of the present study suggest that the chloroform and ethanol extract of *Musa sapientum* leaves may be beneficial in the treatment of gastric lesions.

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