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Antiulcer activity of aqueous extract of *Musa paradisiaca*

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ABSTRACT

Musa paradisiaca (Family: Musaceae) is a perennial tree like herb. The aqueous extract of leaves of Musa paradisiaca was prepared by hot maceration and then it was subjected to priliminary phytochemical investigation.Then antiulcer efficacy of aqueous extract of leaves of Musa paradisiaca at 250 and 1000 mg/kg dose level was evaluated by aspirin induced model. The aqueous extract at both the dose levels was found to possess significant antiulcer activity in this model.

Key Words: *Musa paradisiaca*, aspirin induced method, ulcer.

INTRODUCTION

Numerous plants and herbs are used to treat gastrointestinal disorders in traditional medicine. Peptic ulcer is one of the major gastrointestinal disorder in clinical practice which occurs due to an imbalance between the offensive (gastric acid secretion) and defensive (gastric mucosal integrity) factors consequently, reduction of gastric acid production as well as re-inforcement of gastric nucosal production has been the major approaches for therapy of peptic ulcer disease. Considering the several side effects of modern medicine indigenous drugs with fewer side effects should be looked for as a better alternative for the treatment of peptic ulcer [1].

An estimated 15,000 deaths occur each year as a consequence of PUD. PUD is common in India, the Indian pharmaceutical industry have 6.2 billion rupees drugs share of antacids and antiulcer drugs and occupy 4.3% of the market share [2].

Musa paradisiaca (Family: Musaceae) is a perennial tree like herb. It is commonly known as banana or kela in Hindi and is widely found in northern India. The potential use of banana fruit pulp to treat ulcers has been explored by a number of investigators [3].

Musa paradisiaca is used to balance pitta and vata doshas. Raw flowers are treated as remedy for diabetes and ulcers. The juice of this plant works for fevers, hemorrhages, hysteria. Dysentery, digestive disorders, and diarrhea can also be cured by this plant. Anemia, blood pressure, constipation, depression can be controlled by this herb.

There are some reports showing the potential hypoglycemic, antioxidant, antimicrobial and hematological activity of *Musa paradisiaca* [4].

MATERIALS AND METHODS

Plant material

The leaves of *Musa paradisiaca* were collected from the local area of Meerut district and identified and authenticated by Dr. Anjula Pandey, Principal Scientist, National Herbarium of Cultivated Plants, New Delhi. Voucher specimens (NHCP/NBPGR/2011-18/7264**)** have been kept in National Herbarium of Cultivated Plants, New Delhi and Department of Pharmaceutical Technology, MIET for future reference.

Experimental animals

Male albino Wistar rats weighing between 200-250g and mice weighing between 25-30g were used. Institutional Animal Ethics Committee approved the experimental protocol. Animals were maintained under standard conditions in an animal house approved by Committee for the Purpose of Control and Supervision on Experiments on Animals (CPCSEA) (Approval No. 711/02/a/CPCSEA).

Extraction

The leaves were dried under shade, reduced to moderately coarse powder, and macerated with hot water for 48 hours to get aqueous extract of *Musa paradisiaca* leaves and the percentage yield of aqueous extract was found to be 8.69% w/v and preserved in a refrigerator. Aliquot portions of the aqueous extract of *Musa paradisiaca* were weighed and suspended in an appropriate volume of Tween 80 (2% v/v) for use on each day.

Preliminary Phytochemical Studies

The aqueous extract was then subjected to qualitative phytochemical screening for the identification of the carbohydrates, proteins, flavonoids and sterols. The anti-ulcer activity of the aqueous extract of the plant at 250, 1000 mg/kg dose level [5] is being reported here.

Antiulcer activity

Aspirin induced model is used to evaluate the antiulcer activity of aqueous extract of *Musa paradisiaca*.

Aspirin Induced Ulcers in Rats [6]

Albino Wistar rats were randomly divided into four groups of six animals each. Group 1 served as control. Group 2 received ranitidine 20 mg/kg b.w. p.o.for 5 days. Groups 3 and 4 received aqueous extract of *Musa paradisiaca* at 250 and 1000 mg/kg b.w. p.o. respectively for 5 days. On day 5, 1 h after administration of extract/ standard, aspirin 200 mg/kg b.w. was administered orally to all the animals. After 4 h, animals were sacrificed; stomach was removed and opened

along the greater curvature. The intensity of gastric lesions was assessed and ulcer index was calculated.

Statistical Analysis [7]
All the results obtained from various activities, as described above, were analyzed statistically by using Student's t test and $p<0.05$ were considered significant.
The results are summarized in the tables given below.

RESULTS

Table 1. Effects of aqueous extract of *Musa paradisiaca* leaves in aspirin induced ulcer model in rats

GROUPS	DOSE (mg/kg)	ULCER INDEX	% PROTECTION
CONTROL	-	21.83 ±0.7033	-
RANITIDINE	20	2.16 ±0.4777*****	90.10%
AEMP	250	5.66 ±0.7033*****	74.07%
AEMP	1000	3.16±0.4773*****	85.52%

Results are expressed as Mean ± SEM (n=6)
**p<0.001 as compared to control*
AEMP:- Aqueous extract of Musa paradisiaca

DISCUSSION

Aspirin causes mucosal damage by interfering with prostaglandin synthesis, increasing acid secretion, and back diffusion of H^+ ions [8]. In stomach, prostaglandins play a vital protective role by stimulating secretion of HCO^{-3} and mucous, maintaining mucosal blood flow and regulating mucosal cell turnover, and repair. Thus the suppression of prostaglandin synthesis by NSAIDs results in increased susceptibility to mucosal injury and gastro duodenal ulceration [9]. It is also shown that ROS (reactive oxygen species) plays an important role in pathogenesis of mucosal damage caused by aspirin besides inhibition of COX enzymes. Mucus secretion is a crucial factor in the protection of gastric mucosa from the gastric lesions and has been regarded as an important defensive factor in the gastric mucous barrier [10]. Prostaglandins are important cyclo protective agents in the gastro intestinal track because they increase mucous secretion, bicarbonate secretion and mucosal blood flow. Hydrophobic surfactant like phospholipids secretion in the gastric epithelial cells is also stimulated by the prostaglandin [11].They also stabilizes mucosal mast cells, lysosomal membranes and inhibits free radical production. Aspirin is a potent inhibitor of prostaglandin synthesis through its irreversible acetylisation of cyclooxygenase. This inhibition is one of the main reasons for mucosal injury in the stomach and duodenum. Aspirin also breaks the gastric mucosal barrier by non prostaglandin dependent mechanisms leading to a reduction in mucosal potential difference and back diffusion of hydrogen ions [12]. The present study observed that aqueous extract reduced aspirin induced ulcers suggesting possible involvement of prostaglandin and mucus.

CONCLUSION

From the above study, it can be concluded that the aqueous extract of *Musa paradisiaca* leaves possesses anti ulcer activity and it has shown dose dependent activity.

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