EFFECT OF *AMARANTHUS SPINOSUS* LEAF EXTRACT ON GASTROINTESTINAL TRACT

Ashok Kumar, B.S[1*]., Lakshman, K[2]., and Jayaveera,K.N[3].

1. **Department of Pharmacognosy, Sri K.V.College of Pharmacy, Chickballapur, Karnataka (India).**
2. **Department of Pharmacognosy, P. E.S. College of Pharmacy, Bangaluru, Karnataka (India).**
3. **Department of Chemistry, Jawaharlal Nehru Technological University of College of Engineering, Anantapur, Andhra Pradesh (India).**

Summary

Aqueous extract of *Amaranthus spinosus* was evaluated for its effect on gastrointestinal tract in mice by using charcoal meal method. Healthy Swiss albino mice were divided into 5 groups of 6 animals each. First group served as control, second group served as standard (Senna) while 3-5 groups were treated with aqueous extract of *Amaranthus spinosus* (50, 100 and 200 mg/kg body weight) respectively. Gastrointestinal tract motility was carried. Results showed gastrointestinal motility at 100 mg/kg dose of *A. spinosus.*

Keywords: *Amaranthus spinosus*, Senna, Gastrointestinal motility, Charcoal meal.

Introduction

Amaranthus spinosus Linn., (Amaranthaceae), commonly known as Spiny amaranth or Pig weed, is an annual or perennial herb, native to tropical America and found throughout India as a weed in cultivated as well as fallow lands (1). Though whole plant is used as laxative (2, 3), the root are regarded as highly specific for colic by Hindu physicians (4) and in Madagascar they are considered as laxative (5), traditionally boiled leaves and roots of *Amaranthus spinosus* are given to children as laxative However the drug is also used traditionally as diuretic, antidiabetic, antipyretic, anti-snake venum, antileprotic, and anti-gonorrheal (2,5). The *A. spinosus* is reported for its anti-inflammatory properties (6), Effect on hematology (7), immunomodulatory activity (8), Anthelmintic properties, Antiandrogenic activity (9), Effect on Biochemical changes in Epididymis (10). *Amaranthus muricatus* commonly known in Argentina and is used in popular medicine as diuretic, laxative, emollient etc, (11). Phytochemicals reported are anthraquinone, cardiac glycosides (12). The main aim of the study the effect on gastrointestinal tract, to provide scientific evidence for traditional claims.

Materials and methods

Collection of plant and preparation of extract

The fresh plant of *A.spinosus* was collected from B. Kotha Kota, Andhra Pradesh (India) in the month of March 2005, and was authenticated by Botanist, Govt. Arts College, Ootacamund, Tamil Nadu. The leaves were separated, shade dried and coarsely powdered. The coarse powder (100 g) was exhaustively extracted with 400 ml of distilled water using soxhlet apparatus and percentage of yield of the crude extract was recorded.

Animals

Swiss albino mice weighing about 15-25 g of either sex were acclimatized to the experimental room at temperature 23 ± 2 °C, controlled humidity conditions (50-55%) and 12 h light and12 h dark cycle. They were caged with a maximum of two animals in polypropylene cage and were fed with standard food pellets (Kamadenu Enterprises, Bangalore) and water *ad libitum.* The study was conducted after obtaining ethical committee clearance from the institutional animal ethical committee of S.K.V.C.P.

Effect on gastrointestinal motility

The method described by Akah et al.,[13] was used to test the effect of the extract on gastrointestinal motility. Swiss albino mice were divided into four groups (of six mice per group). The animals were starved for 24 h prior to the experiment, but were allowed access to water. The first group was given control CMC .0.5% (0.2 ml/10 gm), while group 2 received standard- Senna (30 mg/kg) and group 3 received aqueous extract (100 mg/kg) by oral route respectively. After 40 min 0.2 ml of 10% charcoal suspension in 5% acacia solution was administered to each mouse orally. The animals were sacrificed after 20 min the abdomen opened. The small intestines were dissected out and placed on a clean surface. The distance traveled by the charcoal meal from the pylorus was measured. The entire length of the small intestine was also measured for percentage distance traveled by the charcoal plug along the small intestine (from the pylorus to the caecum) was then estimated for both the extract, control and the standard.

Acute toxicity (*OECD guidelines 423 adoption)*

Thirty Swiss albino mice of either sex divided into five groups of six animals each. Group one received 0.5% CMC (02 ml/kg, orally) and served as control, while other four groups received aqueous extract of *A. spinosus* of at 2000 mg/kg body

weight respectively. Immediately the animals were observed for 6 h for continuously for behavior and thereafter daily for 14 days for mortality.

Statistical analysis

The Data were expressed as mean ± SEM. The differences were compared using one-way ANOVA followed by Dennett's test using PRISM software (version 4). The results were considered significant when $p<0.05$.

Results and discussion

The oral administration of aqueous extract *A. spinosus* at 2000 mg/kg caused neither any behavioral change nor mortality. The LD_{50} of *A. spinosus* was thus found to be more than 2000 mg/kg body weight.

Gastrointestinal motility was assessed by calculating the percentage of distance traveled by charcoal meal through small intestine after administration of extracts. *Senna* is known to contain anthraquinone glycoside sennosides (A, B, C and D) which are gastric irritants (14). The intestinal motility is stimulated because of irritant action of sennosides present in *Senna* thereby justifying action of *Senna* in small intestine transit time which showed a significant motility. The aqueous extract of *A. spinosus* at 100 mg/kg body weight also showed similar and comparable motility as that of *Senna*. The results of gastrointestinal motility test were reported in Table No.1. The mechanism of action for this activity of *A. spinosus* may be similar to that of *Senna*, due to presence of anthraquinone derivatives. By the phytochemical analysis aqueous extract of *A. spinosus* showed the presence containing anthraquinone glycosides (9). However *A. spinosus* anthraquinone derivatives content might have induced increase in motility.

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Treatment	Dose mg/kg	Mean length of G.I.T	Mean distance by marker	% distance traveled
Control	-	45.3± 1.8	23.5± 1.1	52± 2.6
Senna	30	45.52 ±1.73	32.35± 1.37	71.7± 4.6**
A. spinosus	50	48.2±1.48	26±2.01	54.2±1.3
A. spinosus	100	44.3±1.4	32.6± 2.29	67.6± 2.8**

Table No. 1. Effect of aqueous extract of *A.spinosus* on gastrointestinal motility in mice (P<0.01 mean±SEM, n=6)**

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