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Original Research Article

ANTI-EMETIC ACTIVITY OF ROOT EXTRACT OF *ACALYPHA ORNATA* HOCHST

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ABSTRACT

The current study was designed to explore the anti-emetic effect of the methanolic extract of *Acalypha ornata* Hochst., roots using chick emesis model. Emesis was induced by the oral administration of copper sulfate to male chicks. *Acalypha ornata* root extract (150 mg/kg orally) showed anti-emetic effect and compared with reference drug chlorpromazine.

Key words: Anti-emetic; *Acalypha ornata* ; chick emesis model ; natural anti-emetics.

INTRODUCTION

Acalypha is the fourth largest genus of Euphorbiaceae, comprises of fast growing, evergreen shrubs, trees and annuals from tropical to subtropical regions particularly in the tropics of Africa, America and Asia. A large proportion of genus *Acalypha* is weed while others are ornamental plants[1,2]. *Acalypha ornate* Hochst., is used as an ornamental garden plant as well as a medicinal plant[3,4] . Boiled water extract of this plant is used to treat skin infections in children[5]. Plant ash is rubbed on the chest to treat pain. Leaves are used for the relief of postpartum pain[7], hemorrhoids, leprosy and scabies[6]. Powdered leaves together with powdered flowers of *Psorospermum febrifugum* Spach., are sprinkled on circumcision wounds[6]. The smoke of burnt stem bark is inhaled to treat epilepsy [8]. An infusion of aerial parts is applied locally to an infected navel in newborn babies. Root decoction taken as a laxative, to cure hemorrhoids, menstrual[6] and postpartum pain[7]. It is used as wash to treat leprosy, scabies[6] and applied for local healing in nervous discomfort of feet[9]. Leaves contain flavonoids and phenols [10]. The principal constituents of leaf essential oil are isopulegly acetate, valenchi, vividiflorene, α –muurolene, 2-hexyne, 6-methyl – α – ionone, γ-elemene, (E) -2-methyl-4-undecene, ledol, cis-3-hexynyl benzoate, 2-methyl -1- octadecene, apiole, oplopanone and γ-endesmol[11]. Leaves of *Acalypha ornata* possess antimicrobial and antioxidant activity[5]. Leaf and root extracts showed slight molluscicidal activity[6]. Copper sulfate induced chick emesis model is very simple and easy way to evaluate natural anti-emetics. Number of terrestrial[12-14] and marine[15] natural products has demonstrated antiemetic activity by using chick emesis model. The anti-emetic potential of aerial parts of *Acalypha ornata*[16] has already studied by using chick emesis model. The presented study is further attempting to evaluate the anti-emetic effect of their roots using the same model.

MATERIALS AND METHODS

Collection of Plant material and identification

The roots of *Acalypha ornata* Hochst., were collected from the forest of Ibadan, Nigeria and compared with the already deposited voucher specimen No. 107320.

Preparation of the plant extracts

Root (2 kg) of *Acalypha ornata* was soaked separately in methanol for a week and the extracts were condensed to dryness by evaporation using a rotary evaporator at 40°C. The concentrated methanol extract was used for bioassay.

Animals

Young male chicks, 4 days of age, weighing from 32-52 g were taken from local market. After 24 hrs fasting, the antiemetic activity was evaluated. All chicks were kept under

laboratory conditions at room temperature with 12h light and dark cycles and were allowed free access to food and water. Permission and approval from animal studies were obtained from Board of Advanced Studies and Research, University of Karachi [BASR. Res. No.09 (46) -2006].

Drugs and Chemicals

Copper sulfate (Scharlau Chemie S.A. Barcelona, Spain), chlorpromazine (ICN, USA), Dimethyl sulfoxide (DMSO); methanol and polyoxyethylene Sorbitan monooleate (Tween 80) (Merck, Darmstadt, Germany) was used in the experiment.

ANTI-EMETIC ACTIVITY

The anti-emetic activity was determined by following the protocols of Akita *et al.,* 1998[17]. Each chick was set aside in a large beaker for 10 minutes to stabilize. Chlorpromazine and the extract were dissolved in 0.9 % saline containing 5 % DMSO and 1 % tween 80 and administered abdominally at a dose of 150 mg/kg B.w., to the test animal. After 10 minutes copper sulfate was administered orally at 50 mg/kg B.w., to each cheek, then the number of retches was observed during the next 10 minutes.

The percent inhibition was calculated by the following formula:

Inhibition (%) = [(A-B)/A] x 100

Where A = Frequency of retching in the control group

B = Frequency of retching in test groups

STATISTICAL ANALYSIS

All data were expressed as the mean ± S. E. M. The data were analyzed by using unpaired Student's *t*-test and $P < 0.05$, $P < 0.01$ vs. control shows significant and highly significant values respectively.

RESULTS AND DISCUSSION

The results of anti-emetic effect of *Acalypha ornate* Hochst., roots are shown in the table.1. The methanol extract of *Acalypha ornata* showed 83.54 % and standard drug chlorpromazine 32.99 % inhibition of retches. The observed number of retches was control (69.28), chlorpromazine (46.42) and *Acalypha ornate* Hochst., root extract (11.40) (fig.1.). The methanol extract of *Acalypha ornata* Hochst., roots showed significant ($p < 0.01$) anti-emetic effect in young chicks. The protective effect of the extracts against copper sulfate induced retching in young chicks is possible by peripheral action as the oral copper sulfate induces emesis by peripheral action through excitation of visceral afferent nerve fibers of the GIT. It has also been established that the peripheral 5-HT_3, 5-HT_4 or NK_1 receptors are involved in emesis[18]. Therefore, it may be said that the methanol extract of *Acalypha ornata* Hochst., root produced anti-emetic activity by receptor antagonism and has peripheral anti-emetic action. Anti-emetic activity by using copper sulfate proposed 5-HT_3, 5-HT_4 or NK_1 receptors antagonism[18]. Therefore it may be said that the extract was able to effectively

Prevent its effect and has a peripheral anti-emetic action.

Table .1.The anti-emetic effect of *Acalypha ornata* root extract

Treatments	Number of Retches (Mean ± SEM)	%Inhibition of retches
Control (Normal saline solution)	69.28 ± 4.28	---
CPZ	46.42 ±3.40*	32.99
AOR	11.4 ± 3.12 **	83.54

CPZ = Chlorpromazine; AOR = *Acalypha ornata* roots extract; N=6; Dose=150 mg/kg orally ; SEM= Standard Error of Mean; *P < 0.05, ** P < 0.01 Vs. control shows significant and highly significant values using student's *t*-test.

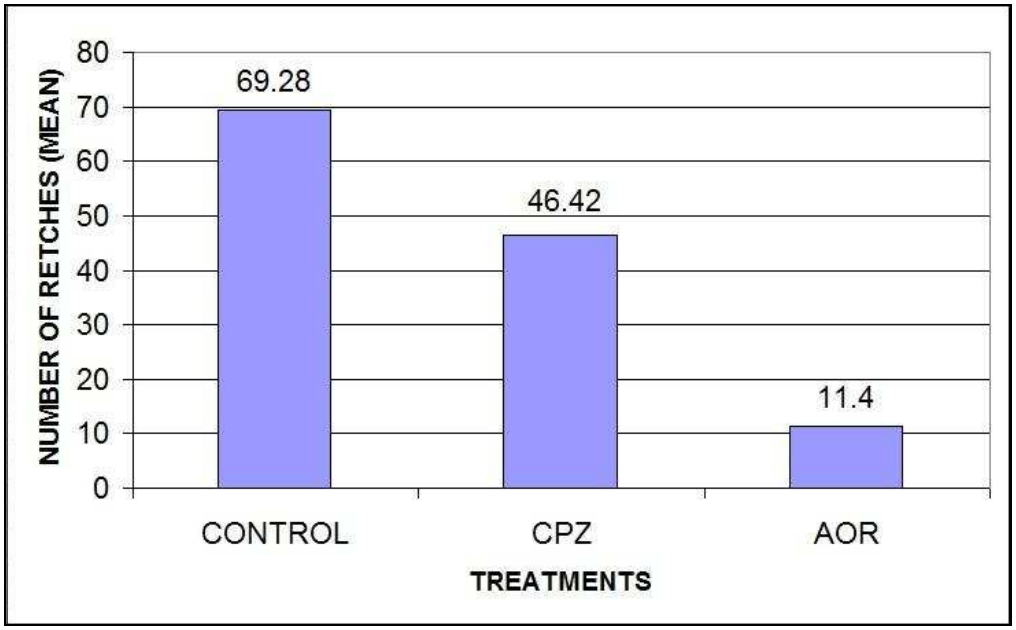

Fig.1.The anti-emetic effect of *Acalypha ornata* root extract

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