Vet.Med.J.,Giza. Vol.41,No.1.(1993):117-121.

PRELIMINARY INVESTIGATIONS ON SOME PHARMACODYNAMIC ACTIONS OF *CYNANCHUM ACUTUM* L.

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(Received :18.1.1993)

SUMMARY

Profile of some pharmacological actions of alcoholic and chloroformic extracts of the underground organs of Cynanchum acutum L. were experimentally investigated. The alcoholic and chloroformic extracts of the tested plant were non toxic (LD50 3900 and 3450 mg/kg b.w., respectively). Both extracts inhibited the spontaneous contractions of smooth muscles of isolated rabbits intestine and rats uterus. They produced a myocardial inhibition on isolated perfused rabbits heart and decreased the motility of Ascaridia galli worms. These effects appeared to be dose-dependent. Transient fall in blood pressure was observed following intravenous injection of both extracts into anaesthetized dogs. The alcoholic and chloroformic extracts of Cynanchum acutum L. were devoid of oestrogen, androgen and progesterone like actions.

INTRODUCTION

The use of medicinal plants in treatment of diseases was well known by old civilisations. Use of natural products is preferable than synthetic ones as the latters are associated with many side effects.

Family Asclepiadaceae is reputed to comprise several members which could be used as herbal medicines (Lewis and Lewis; 1977 and Trease and Evans; 1983). Among these plants are those belonging to the genus *Cynanchum* (Kendle , 1959). *Cynanchum* species were mentioned to be used in folk medicine as antifebrile, antitumour, antitussive, expectorant, diuretic, anticonvulsant, in treatment of epilepsy, insecticides and parasiticides (Chopra, 1958 and Hegnauer, 1964) *Cynanchum acutum* L. is very common in Egypt (Tackholm, 1974) and informations reported on its toxicological and pharmacological properties are scanty.

The present study elucidate the effect of the alcoholic and chloroformic extracts of *Cynanchum acutum* L. plant on some isolated organs, worms and systemic blood pressure of anaesthetized dogs . In addition , hormone-like actions of both extracts were also studied .

MATERIAL AND METHODS

Plant material :

Samples of *Cynanchum acutum* L. were obtained from plants growing in the gardens of the Faculty of Agriculture, Cairo University , Egypt, during the flowering stage.

Preperation of extracts:

1- Alcoholic extract was prepared by cold perco-

lation of the underground organs of *Cynanchum acutum* L. with 95% ethanol till exhaustion then evaporated under reduced pressure.

2- Chloroformic extract was prepared by defatting the alcoholic extract with petroleum ether, followed by extraction with ether then with chloroform. The solvents were evaporated under reduced pressure.

Toxicological studies:

Acute toxicity of alcoholic and chloroformic extracts of *Chnanchum acutum* L. plant was studied on 12 groups of 5 mature albino mice (20-25 g.b.wt) each. The extracts were given subcutaneously in graded increased dose to groups of mice in addition to a control one (given the solvent) . Animals were kept under observation for 24 hours during which symptoms of toxicity and rate of mortality in each group were recorded.

LD_{50} of alcoholic and chloroformic extracts of *Cynanchum acutum* L. plant was determined as described by **Kerber (1941)** For this purpose, 6 groups of 5 mice each were used for each extract in addition to a group used as control. The tested extracts were administered orally in doses of 2000-4500 mg/kg b.wt. The number of dead animals in each group was recorded during 24 hours.

Pharmacological studies :

I- In vitro studies

1- **Effect on isolated organs:**

The effect of the tested extracts on isolated rabbit's intestinal and uterine motillity of rats at various stages of sex cycle was investigated using glass jar bath apparatus as described by Staff of Department of Pharmacology, University of **Edinburgh (1970)**.

2- **Effect on isolated rabbit's heart:**

The effect of tested extracts on the contractions of isolated rabbit's heart was studied as explained by **Burn (1952)** using Gun's apparatus.

3- **Effect on motility of *Ascaridia galli* worms:**

The effect of either on motility of *Ascaridia galli* worms obtained from chickens was investigated using the glase jar bath apparatus **(Robella et al., 1928).**

II- In vivo studies:

1- **Hormone-like action :**

Oestrogen-like sction of the tested exteacts was studied qualitatively on 4 groups of 5 ovariectomised rats using vaginal smear technique **(Robson, 1947).**

Progesterone-like action was studied on 4 groups of 5 immature female rabbits each as proceeded by **Clauberg (1930)** .

The androgenic activity of the tested extracts was performed on 4 groups of castrated mature male rats. Weights of prostate and seminal vesicle glands were recorded and compared with those of control group.

2- **Effect on arterial blood pressure of anaesthetized dogs:** The effect of the extracts on arterial blood pressure of anaesthetized dogs was studied according to **Jackson (1939).**

RESULTS

Toxicological studies:

The results obtained showed that minimal lethal dose (MLD) and LD_{50} of the alcoholic extract of the underground organs of *Cynanchum acutum* L.are 3000 and 3900 mg/kg b.wt, respectively. Those of chloroformic extract are 2500 and 3450 mg/kg b.wt, respectively. The symptoms of toxicity were characterized by shallow and rapid respiration, muscular tremors and difficulty in movements of poisoned mice.

Pharmacological studies:

The alcoholic extract of *Cynanchum acutum* L. plant in concentrations more than 1 mg/ml stimulated them inhibited the intestinal motility of rab-

bits (Fig. 1,a) . The chloroformic extract of plant in the same concentrations inhibited the force of contractions of the intestinal strips (Fig. 1,b) . The intense of action is dose-dependent . Both extracts in concentration of 10 mg/ml produced complete relaxation of the intestinal muscle . The alcoholic and chloroformic extracts of the plant in a concentration of 0.1 mg/ml inhibited uterine contractions at various stages of sex cycle (Fig. 2) .

The alcoholic and chloroformic extracts of *Cynanchum acutum* L. plant in concentrations more than 0.01 mg/ml inhibited the force of contractions of rabbit's heart (Fig. 3). The cardio-inhibitory effect of the tested extracts was dose-dependent. Both extracts in concentrations more than 0.1 mg/ml caused slight inhibition in force and frequency of motility of *Ascaridia galli* worms. Concentrations higher than 4 mg/ml caused complete relaxation of the worm (Fig. 4).

The alcoholic and chloroformic extracts of the underground organs of *Cynanchum acutum* L. plant showed no oestrogen. progesterone and androgen like actions.

Intravenous injection of alcoholic and chloroformic extracts of the tested plant in doses more than 50 mg/kg b.wt, slightly decreased the arterial blood pressure without any effect on the rate of respiration of pentobarbital-anaesthetised dogs (Fig. 5).

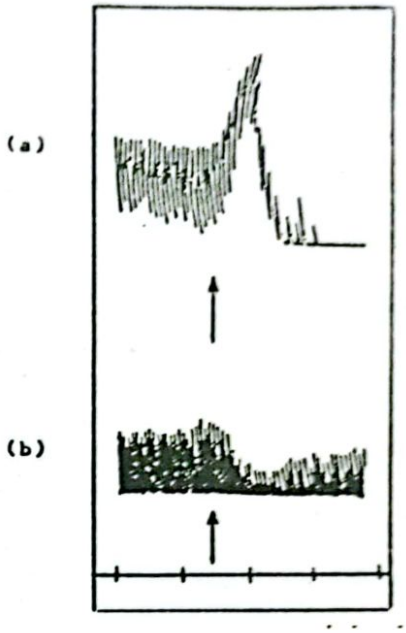

Fig.(1): Effect of 2 mg/ml of the alcoholic (a) & chloroform (b) extracts of *Cynanchum acutum* L. on isolated rabbit's intestine.

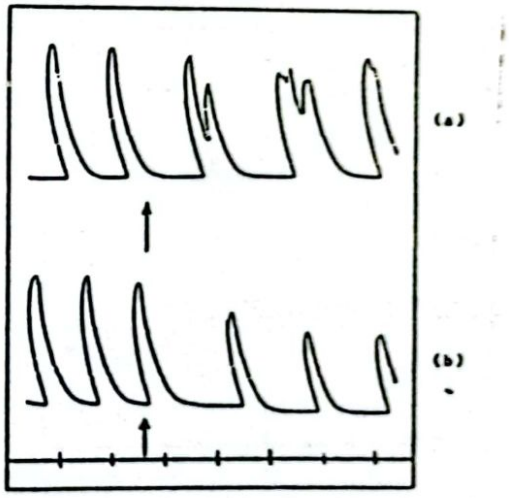

Fig.(2): Effect of 0.1 mg/ml of the alcoholic (a) & chloroform (b) extracts of *Cynanchum acutum* L. on oestrus rat's uterus.

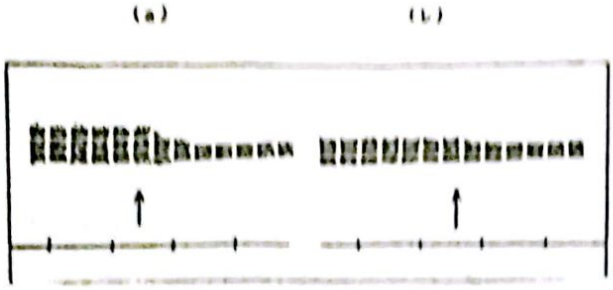

Fig.(3): Effect of 0.05 mg/ml of the alcoholic (a) & chloroform (b) extracts of *Cynanchum acutum* L. on isolated rabbit's heart.

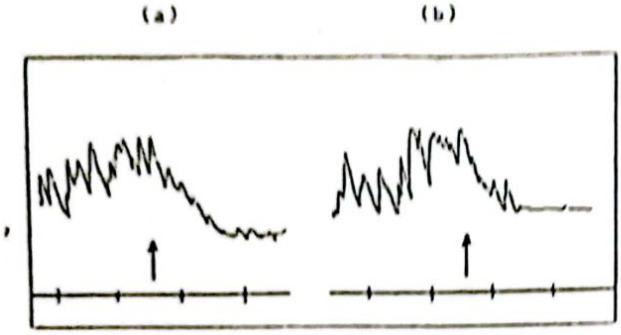

Fig.(4): Effect of 2 mg/ml of the alcoholic (a) & chloroform (b) extracts of *Cynanchum acutum* L. on the mortality of *Ascaridia galli* worms.

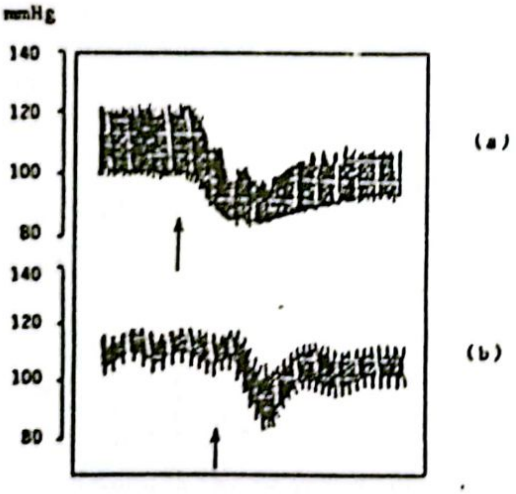

Fig.5): Effect of 60 mg/ml of the alcoholic (a) & chloroform (b) extracts of *Cynanchum acutum* L. on systemic blood pressure of anaesthetized dogs.

DISCUSSION

Family Asclepiadaceae comprises a large number of pharmacologically active plants which are used as antitumour, diuretic, expectorant and to... (Chopra, 1958 and Hegnauer, 1964). These ef... fects were attributed to a variety of active cons... ents including polyoxypregnanes, cardinolid... and alkaloids (Haznagy and Toth; 1967 an... Lee. 1967).

The present investigation revealed that the min... mal lethal dose (MLD) and LD_{50} of the alcoholi... and chloroformic extracts of under ground organ... of *Cynanchum acutum* L. plant are 3000 and 3... and 2500 and 3450 mg/kg b/wt, respectively... These values indicated that the tested extracts ar... non toxic in mice since Bunk et al. (1976) stat... that substances possessing LD_{50} bigger than 5... mg/kg b.wt, are considered non toxic.

The studied extracts inhibited the force and fre... quency of contractions of isolated organs such a... rabbit's intestine, rat's uterus, rabbit's heart an... Ascaridia galli worms. The inhibitory effect of th... tested extracts was dose-dependent. Massive co... centrations caused complete relaxation. These ef... fects may be attributed to the presence of polyo... ypregnanes, sterols and/or triterpens and este... and/or lactones present in the plant .The forement... tioned effects may encourage use of the tested ex... tracts as smooth muscle relaxant in case of intest... nal colic, uterine contractions during pregnancy... and as anthelmintic in case of *Ascaridia galli* in... festation .

Intravenous injection of the alcoholic and chlor... formic extracts of the tested plant produced tra... sient fall in arterial blood pressure in anaesthe... tized dogs. The intense and duration of actio... seemed to be dose-dependent. The hypotensiv... activity of these extracts may be attributed to the... cardio-inhibitory effect and peripheral vasodilat... tion due to vascular smooth muscle relaxati... (Pfeifer, 1954) .

Despite of the presence of steroidal substances i... the studied extracts, they exhibited no sex ho... mones-like effect. The absence of oestrogen, pr... gesterone and androgen like activities may be du... to the probable presence of substances with anti... hormonal action (Pfeifer, 1954).

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