PHARMACOLOGICAL STUDIES ON *LEPIDIUM SATIVUM*, LINN.

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Summary: Pharmacological studies on *Lepidium sativum* suggested in it the presence of a cardio-active substance, which is unstable in solution, shows tachyphylaxis and probably exerts its actions through adrenergic mechanisms.

Key words : *Lepidium sativum* cardio-active agents Halun

INTRODUCTION

Lepidium sativum, Linn. (HALUN) is claimed to possess varied medicinal properties (1,2,4) but these claims have not been investigated. The botanical identity of 'HALUN' was disputed and has recently been established (3). In an earlier study (5), we screened this plant for possible anti-ovulatory effects and found no such activity in the ethanolic extract of seeds. The general pharmacodynamic effects are now reported.

MATERIALS AND METHODS

Authenticated samples of the seeds of *L. sativum* were exhaustively extracted with 70% ethanol (yield: 13.56%). As the extract was only slightly soluble in water, a 10% emulsion was prepared with 1% gum acacia for pharmacodynamic and toxicity studies. The parameters of study were carotid or femoral blood pressure, E.C.G. (Lead II) and open chest heart preparations of anaesthetised (Nembutal, 40-60 *mg/kg*, i.p.) cats and dogs, isolated tissue preparations e.g. perfused frog hearts, rabbit auricles, rat ilia, rat uteri and frog rectus; general behavioral and toxicity studies in albino mice.

RESULTS AND DISCUSSION

Cardio-vascular and respiratory system :

Ethanolic extract of the seeds of *L. sativum* (10-20 *mg/kg*, i.v.) caused marked rise in B.P. (40-80 mm. Hg., 5-15 min) of anaesthetised cats and dogs. The hypertensive effect was associated with slight respiratory stimulation but this effect was of transient duration (0.5—1.0 min) (6 experiments). Equivalent volume of the vehicle (1% gum suspension) elicited no such effect. It was further observed that the activity gradually decreased if the emulsion was stored even under refrigeration. The extract did not potentiate or depress the pressor responses of adrenaline (2 *mcg/kg*, i.v.) and carotid occlusion (45 seconds). The hypertensive effect of the extract was completely blocked by pre-treatment of the animals with 5 *mg/kg*, i.v. of priscoline (2 experiments, Fig.1). The 15 min post-treatement extract 10 *mg/kg* iv) ECG record of anaesthetised cats exhibited rhythm disturbances, inversion of T-wave and QRS-complex (2 experiments, Fig.2).

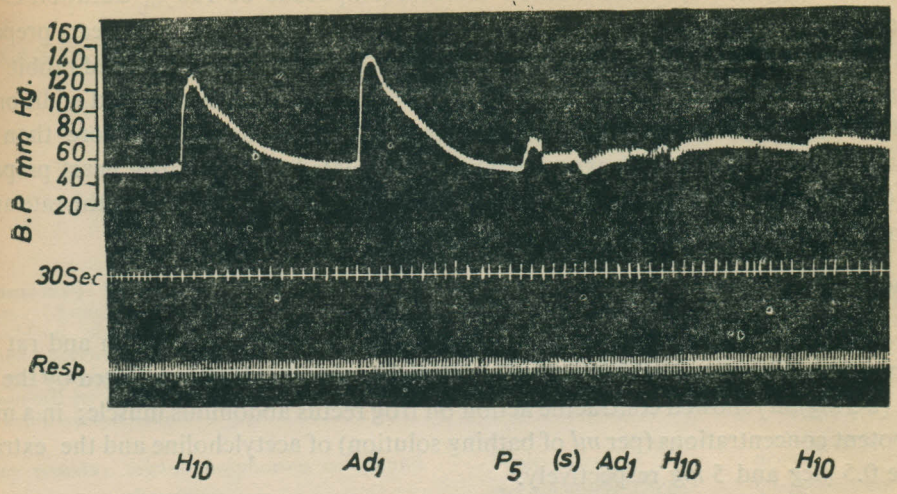

Fig. 1: Showing the effect of *L. sativum*, Linn. and adrenaline on carotid blood pressure and respiration of anaesthetised cat.

H10 — 'Halun' 10 *mg/kg*, i.v.

Ad1 — Adrenaline 1 *mcg/kg*, i.v.

P5 — Priscoline 5 *mg/kg*, i.v.

(S) — Drum stopped for 15 min.

Time mark—30 seconds.

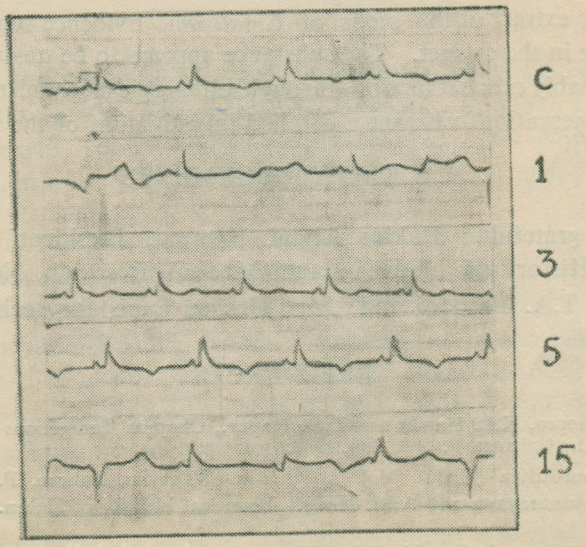

Fig. 2: Showing the effect of *L. sativum*, Linn. on ECG (Lead II) of anaesthetised cat. From above downwards control. 1,3,5 and 15 min post-treatment records. Paper speed: 25 mm. per mt.

The extract (10-20 *mg/kg*, i.v.) caused marked increase (amplitude 50-100%, duration 15-45 min) in the rate and force of auricular and ventricular movements of open chest cat heart preparations *in situ* (2 experiments). The cardio-stimulant action was also observed on isolated rabbit auricles (0.5—1.0 *mg/ml*). It was noted that the effect progressively diminished on repeated additions of the extract. If, however, the interval between the two successive doses was more than 30 min, tachyphylaxis was not observed (4 experiments). On isolated perfused frog heart preparations the extract (2-20 *mg* spot doses), caused cardiac arrest in diastole for 30 sec; the rate and force returned to normal after this period (2 experiments).

Smooth and skeletal muscles:

The extract (1-5 *mg/ml*) elicited no action on smooth muscles (rat ileum and rat uterus). The response to acetylcholine (0.5-2.0 *mcg/ml*) of these tissues was also not affected by the extract. The extract (2-5 *mg/ml*) showed contractile action on frog rectus abdominis muscle; in a matching assay equipotent concentrations (per *ml* of bathing solution) of acetylcholine and the extract were found to be 0.5 *mcg* and 5 *mg* respectively.

General behavioral/toxic effects:

The extract was given in doses of 100,200,500, 750 and 1000 *mg/kg*, i.p. (volume: 1 *ml*/100 *gm* to groups of 5 albino mice (20-30 *gm*) of either sex. The injected mice were observed continuously for 1 hr and intermittently for further 3 hrs. None of the mice showed any gross behavioral effects and there was no mortality upto a 48 hr period of observation.

A perusal of the results of those expriments shows cardiac and skeletal muscle stimulant actions in the ethanolic extract of the seeds of *L. sativum*. Evidence suggests the presence of a cardio-active substance in the extract. The substance appears to be unstable in solution, shows tachyphylaxis and probably exerts its actions through adrenergic mechanisms. The extract is non-toxic. Preliminary observations warrant a detailed investigation of the plant.

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REFERENCES

1. Chopra, R.N., I.C. Chopra, K.L. Handa and L.D. Kapur., Chopras' Indigenous Drugs of India, ed. 2, U.N. Dhar & Sons Pvt. Ltd., Calcutta P. 568, 598, 1958.
2. Khan, N.G. Khawas-ul-Advia (Urdu), Vol. 2, Khadim-ul-Taleem, Lahore, P. 502, 1911.
3. Khan, M.S.Y., N. Satyanarayana and A.M. Khan. Botanical identity of Halun. *J. Res. Indian Med.*, **11**:128, 1976
4. Kirtikar, K.R. and B.D. Basu. Indian Medicinal Plants, Vol., 1, ed. 2, Lalit Mohan Basu, Allahabad, P. 179, 1935.
5. Vohora, S.B., M.S.Y. Khan and S.H. Afaq. Antifertility studies on Unani Herbs. (Part III). Antiovulatory effects of 'Hanzal', 'Kalonji', 'Halun' and 'Sambhalu', *Ind. J. Pharm.*, **35**: 100, 1973.