Pharmacological Screening of Medicinal Plants

Pages with reference to book, From 103 To 105

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Abstract

The effects of alcoholic extracts of fifteen mcdicinal plants on the isolated guinea-pig ileum, blood glucose and inflnnmatory reaction in rats were studied. Blood glucose was estimated beibre, 21_2 and 3 hours after the administration of a single 500 mg/kg oral (lose. In case of inflammation this dose was given for three successive days, and for experimentsm ileurn 100-800 ug/mI concentrations were USed. Eleven extracts produced a spasmogenic effect on ilcum and four extracts depicted antispasmogenic effect against acetyicholine on this preparation. N9ne of the extracts produced a significant effect on blood sugar and infi amma tory reaction (JPMA 32:103, 1982).

Introduction

In Pakistan, besides a well established modern system of medicine, flakims, the practitioners of the indigenous system of medicine are also authorized to treat patients with the help of crude preparations obtained from medicinal plants. The Government is, however, aware of the importance of research On medicinal plants on modern scientific lines, and in special laboratories and research organizations of the country work is in progress on the identification, pharmacologicaI screening, chemical evaluation and standardization of these plants. The present work is based on the pharmacological screening of the alcoholic extracts of 15 indigenous plants for their anti inflammatory, hvpoglyeaemic, spasmogenic and antispasmogenic activities.

Material and Methods

(a) Preparation of Plant Extracts:

One hundred grams of the dried powdered plant material was extracted three times with alcohol in a percolator. The alcoholic extract obtained after removal of solvent under vacuum was triturated with petroleum-ether (40-60°) a sullicient number of times until a fresh addition of petroleumether failed to remove significant colouring material. This petroleumether treated alcoholic extract was charcoaled, filtered, dried under vacuum and weighed (Table I).

Table I

Description of the Plants.

S. No.	Name of Plant	Family	Part	Wt. of Extract (gm/100 gm)
1.	Adhatoda vasica	Acanthaceae	L	4.1
2.	Aerua scandens	Amaranthaceae	A	5.0
3.	Boerhaavia coccinea	Nyctaginaceae	W	26.5
4.	Coriaria nepalensis	Coriariaceae	W	5.7
5.	Dalbergia sissoc	Papilionoidea	L	7.5
6.	Euphorbia helioscopia	Euphorbiaceae	W	6.4
7.	Gymnema sylvestre	Asolepiadaceae	L	5.0
8.	Lactuca scariola	Compositae	W	12.0
9.	Melia azedarach	Meliaceae	S	2.6
10.	Punica granatum	Pnuicaceae	P	8.5
11.	Solanum xanthocarpum	Solanaceae	L	6.0
12.	Tamarix troupii	Tamaricaceae	A	5.5
13.	Tecoma stans	Bignoniaceae	A	6.0
14.	Trianthema portulacastrum	Alzoaceae	W	10.0
15.	Verbascum thapsus	Scrophulariaceae	L	15.0

A :- Aerial part,
L :- Leaves,
P :- Peels,
S :- Seeds,
W:- Whole plant.

(b) Experimental Procedures

(i) Isu/ait'g/ Guinea-Pig J/eiiin Preparation

The preparation was set up, according to the procedure adapted by Barlow and Khan (1959), in an organ bath of 10 ml capacity contaming oxygenated Tyrodc solution. The contractions were recorded on a revolving smoked drum with the help of a frontal writing point lever. The sensitiv itv of each preparation was tested with graded doses of acetylcholine, before starting experiments with the extract. A 10 mg/mI stock solution/suspension of the extraU concerned was prcpared freshly (in distilled water) and 0.1,0.2,0.4 and 0.8 ml of this solution suspensions were added to the bath for recording their effects. Final concentrations in the bath were, therefore, 100, 200, 400 and 800 ug/mI. The tissue was

washed several times and tested with acetyicholine for 45 seconds to 1 minute, after the addition of a particular dose of the extract. Those extracts which did not produce spasmogenic effèct of their own, were tested for antispasmogenic effect against acetvlcholinc induced contractions.
Tyrode solution on containing the following constituents (in G/L of distilled water) was used:- NaCl, 8.0; KCI, 0.2; $CaCl_2$; 0.2; $MgCl_2$
0.1; NaH_2PO_4, 0.05; $NaHCO_3$, 1.0 and
Glucose, 1 .0.

(ii) Blood glucose determination:

Experiments were performed on albino rats (Sprague Dawley strain) of either sex weighing 190-200 gram and kept fasted (water given ad libitum) for a period of 24 hours. On the day of experiment, 0. 1 ml of blood was collected in a 1 ml syring from a cut made at the tail of the concerned rat with the help of a sharp blade just before and $2^1/_2$ 3 hours after the administration of the concerned extract. The extract was administered orally via a polythenc tube in the form of a suspension in normal saline in a 500 mg/kg body weight dose. The blood was deproteinized and the determination of the blood glucose level was made by NelsonSomogyi method (1952).

(iii) Induction of Inflammation:

Experiments were performed on male albino rats of Sprague Dawley strain, weighing 100-120 grams. A suspenskn of 0.6 mg powder of dead Mycobacterium Kansasi in I ml of liquid paraffin was injected into the right foot pad of the rat. The extracts (in the form of suspension in normal saline) were administered orally through a polythene tube in 500 mg/kg bcdy weight doses just before the injection of the adjuveut (0 day) and on the 1st and 2nd day after the injection. The animals in tile control group received equivalent amounts of normal saline. The circumference of the injected pad was measured with the help of a thread on the zero and 3rd day of the injection. The percentage increase in the girths of the inflammed paws were calculated in the control and test groups for the purpose of comparison (New bould, 1963; Khanum and Qayum, 1969).

Results

Eleven extracts produced spasmogenic effect on the isolated guinea-pig ileum preparation, whereas, four extracts which did not produce any effect of their own antagonized the spasmogenic effect of acetyicholine on this preparation (Table II). None of these extracts could produce a significant hypoglycaemic or anti inflarn matory effect (Tables II, III).

Table II

Effect on Blood Sugar and Isolated Guinea-pig Ileum.

Plant	*BLOOD SUGAR*				*Ileum Ileum*
	Control	*Test*	*P*		
1.	85.8 ± 5.8 (3)	93.1 ± 2.2 (3)	> 0.1		S
2.	84.0 ± 1.5 (3)	85.3 ± 4.4 (3)	> 0.5		S
3.	85.0 ± 3.8 (3)	93.0 ± 3.8 (3)	> 0.1		AS
4.	78.1 ± 2.2 (3)	82.3 ± 3.9 (3)	> 0.1		S
5.	97.1 ± 2.7 (4)	95.2 ± 4.5 (4)	> 0.5		AS
6.	98.0 ± 2.0 (3)	96.3 ± 4.3 (3)	> 0.5		S
7.	91.6 ± 4.9 (6)	84.5 ± 4.7 (6)	> 0.1		S
8.	80.6 ± 1.8 (3)	81.5 ± 2.3 (3)	> 0.5		S
9.	71.7 ± 5.5 (3)	73.3 ± 6.0 (3)	> 0.5		AS
10.	71.8 ± 2.8 (4)	67.5 ± 4.2 (4)	> 0.5		S
11.	81.5 ± 2.3 (3)	80.6 ± 1.8 (3)	> 0.5		S
12.	76.6 ± 2.3 (3)	67.5 ± 2.5 (3)	> 0.5		S
13.	70.8 ± 5.8 (3)	86.6 ± 5.4 (3)	> 0.1		S
14.	77.4 ± 3.8 (6)	73.2 ± 2.3 (6)	> 0.1		S
15.	80.0 ± 10.1 (3)	78.3 ± 11.1 (3)	> 0.5		AS

Table III

Effect on Acute Inflammation.

No.	*Percent Increase in girth (mm)*		*P*
	Control	*Test*	
1.	80.9 ±7.0	66.5± 7.0	> 0.1
2.	80.9 ±7.0	75.2±10.2	> 0.1
3.	80.9 ±7.0	71.4± 3.4	> 0.1
4.	50.6 ±4.9	53.3± 7.0	> 0.1
5.	54.3 ±4.2	57.5± 4.3	> 0.5
6.	50.6 ±4.9	56.3± 8.7	> 0.5
7.	61.6 ±5.7	69.6± 3.6	> 0.1
8.	61.6 ±5.7	57.4± 5.0	> 0.5
9.	54.3 ±4.2	55.3± 6.4	> 0.5
10.	61.65±5.7	71.9± 6.0	> 0.1
11.	54.3 ±4.2	43.2± 9.8	> 0.1
12.	50.6 ±4.9	68.6± 8.1	> 0.1
13.	61.6 ±5.7	69.7± 9.8	> 0.5
14.	80.9 ±7.0	79.0± 8.4	> 0.5
15.	54.3 ±4.2	67.4±12.0	> 0.1

Each value represents the means ±standard error. Figures in parentheses indicate the number of animals used.

S:-Spasmodic action. AS:-Antispasmodic action.

Each value represents the mean±standard error. Four animals were used in each group.

Discussion

The results indicate that the medicinal plants reported in this paper produced useful pharmacological actions on the isolated intestinal pieces of the guinea-pig. Detailed investigations to determine the mechanism of these spasmogenic and antispasmogenic effects may lead to the development of agents possessing useful therapeutic effects.
These extracts did not produce any significant effect on the blood glucose level of rats, and inflammatory reaction induced in the hind paws of these animals. Further investigations on alloxan induced diabetes and inflammatory reactions produced by orhcr procedures, may lead to definite conclusions regarding their hypoglycaemic and antidiabetic effects.

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