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Pharmacological screening of the essential oil of pavonia odorata willd.

Seema Nakhare*, S.C GARG* and A.W. Bhagwat**
*Department of chemistry, Dr. Hari Sigh Gour Vishwavidyalaya, Sagar-470 003.
Department of Pharmacology, Mahatma Gandhi Medical college, Indore (M.P)

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ABSTRACT: *Essential oil obtained from the rhizomes of pavonia odorata willd has been found to posses a number of interesting pharmacological actions on various parameters. The essential oil produced fall in blood pressure of anaesthethized dog and caused cardiac inhibition in frog's isolated heart. The essential oil caused relaxation of the rabbit's intestine and had no effect on rectus abdominus muscle of frog, but reduced the spasmogenic effect of acetylcholine and potassium.*

INTRODUCTION

Pavonia odorata willd belongs to the family Malvaceae. It is commonly known as sugandhbala. It id an erect, annual herb distributed in the warmer parts of the world, chiefly in America, parts of Nepal , bihar, orissa and Uttar pradesh[1]. The fragrant roots are reported to posses refrigerant, antipyretic, stomachic and astringent properties. The fragrant roots are reported to be used in dysentery infloammation and haemorrhage of intestine[2]. The essential oil from the rhizomes has strong anthelmintic activity against tapeworms and round worms[3], and good antimicrobial activity against *Staphylococcus aureus, Diplococcus pneumoniae, trichophyton mentagro phytes, chrysosporium indicum* and *botrydiplodia* sp.etc.[4]

The present communication reports the preliminary results of pharmacological activities of the essential oil obtained from the rhizomes of *Pavonia odorata*.

*Address for correspondence

MATERIAL AND METHODS

1. Extraction of essential oil:

The rhizomes of *Pavonia odorata* were procured form the local market of sagar and subjected to steam distillation in a clavenger's apparatus. It had an yield of0.2% (w/w).

2. preparation of emulsion:

The essential oil was employed in the form of an emulsion, prepared with 3% aqueous solution of polysorbate-80 using a hand homogenizer the emulsion of the oil used for dog's experiment was prepared in gum acacia5 instead of ploysorbate-80. Solution of the standare drugs were prepared in distilled water.

3. Experimental:

Effect of the essential oil was studied on following parameters and its interaction with various antagonists using conventional procedures.

1. Carotid blood pressure of anaesthethized dog[6]

2. Isolated heart of Frog[7]
3. Isolated ileum of Rabbit.[8]
4. Isolated rectus muscle of Frog.[9]

All the experiments were performed at the room temperature of 30oC. Appropriate control experiments were performed simultaneously by giving injections of equivalent doses of the solvent alone.

Results

1. **Carotid blood pressure of anaesthetized Dog**: The essential oil of *P odorata* administered in a dose of 60mg/kg, body weight intravenously, produced significant fall of blood pressure in anaesthetized dog, which per sisted for about 3 minutes. However at a dose level of 120 mg/kg, a considerable fall in the blood pressure was observed, the administration of atropine sulfate (1mg/kg) and pheniramine maleate (1mg/kg) respectively, failed to block hypotensive effect of the essential oil (Fig 1).

2. **Isolated heart of Frog:** Essential oil in a dose of 40µg caused cardiac depression. The amplitude and rate of contraction was decreased. The recovery was observed after 2 to 3 minutes. Higher dose of 80 µg produced complete cardiac inhibition, and diastolic arrest was iv-served. There was complete recovery after 30 to 40 minutes. Essential oil. In-duced cardiac inhibition was not blocked by atropine (1.0µg/ml) (Fig.2)

3. **Isolated ileum of Rabbit :** The essential oil of *P. odorata* caused relaxation in rabbit's isolated intestine in a dose of 0.05ml/ml. The recovery from this effect of the essential oil was markedly delayed (Fig 3).

4. **Isolated rectus muscle of frog**: The essential oil of *P. odorata* per se., when given in a dose of 0.01 ml/ml did not cause self contractile response, however they reduced the contractions induced by acetylcholine (0.1 µg/ml) and potassium (1.0 mg/ml) F.g.4).

Discussion

As had been shown in figures 1,2,3 and 4, it appears that the essential oil from *P.odorata* acts as a general depressant. It acts as an inhibiting agent on various parameters.

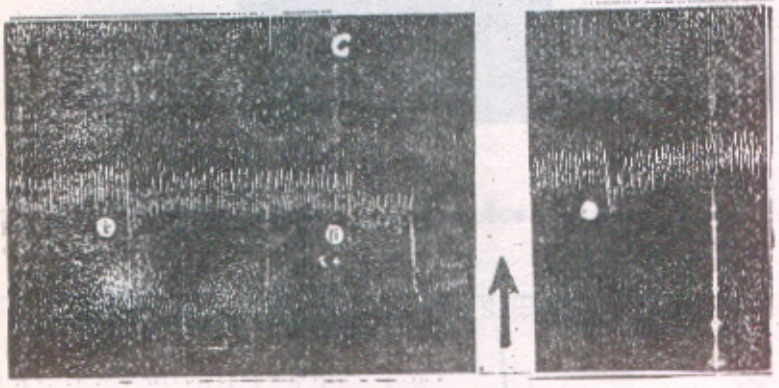
The hypotension produced in anaesthetized dog by the essential oil was not blacked by atropine and pheniramine maleate, hence it was clear that the hypotensive effect of the essential oil was not mediated through cholinergic or histaminergic receptors. It may by due to direct non-specific vasodilation.
The essential oil also caused complete cardiac inhibition in frog's heart and it was not blocked by atropine. The possible mechanism of action does not involve muscarinic receptor, because antimuscarinic drug like atropine could not block the cardiac inhibition, so produced, it may be a direct depressant effect similar to the of potassium ion

Smooth muscle relaxation of the ileum indicates and direct antispasmodic action. The site of action appears to be directly on the wall of smooth muscle.

On isolated rectus muscle of frogs the essential oil did not cause self contraction but reduced the contractions induced by acetyl choline and potassium. Acetyl choline elicits contractions by activating cholinergic receptor while potassium doses so by causing depolarization of the muscle

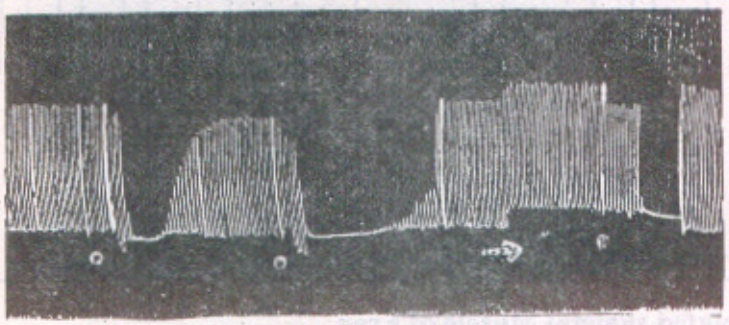
membrane, the ability of the oil to reduce the contractions of acetyl choline and potassium suggests that their action is nonspecific, and it is probably exerted on the muscle membrane.

The results of present investigation suggest some interesting pharmacological effects which need to be further elaborated, preferably using fractionated components of the essential oil.



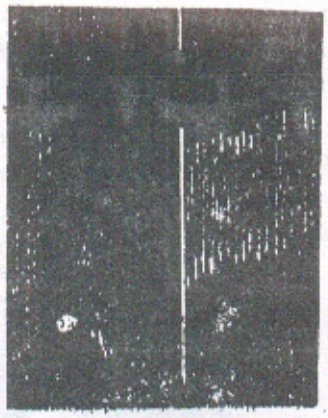
(i) 60 mg / kg and (ii) 120 mg / kg

Fig.1. Effect of the essential oil(o) on dog's carotid blood pressure before and after atropinization (↑ 1.0 mg/kg)



(i) 40 µg / ml and (ii) 80 µg / ml

Fig.2. Effect of the essential oil(o) on frog's isolated heart before and after atropinization (→ 1.0 µg/kg)



0.05ml/ml

Fig.3. Effect of the essential (o)oil on isolated ileum of rabbit

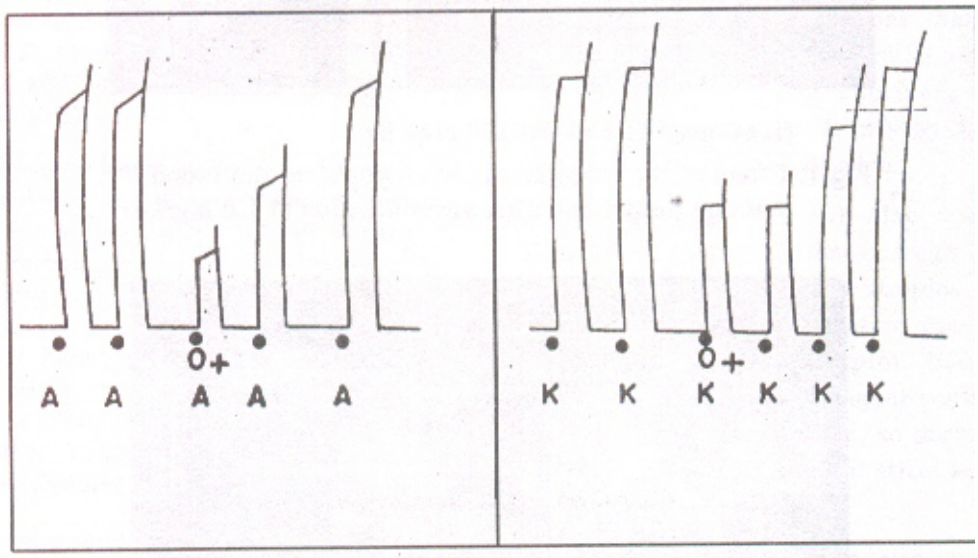


Fig.4. **Isolated skeletal Muscle of Frog**

Effect of the essential oil of *Pavenia odorata* (0 - 0.01 ml /ml)

a = On acetyl choline (A - 0.1 µg / ml) induced contraction

b = On potassium (K - 1.0 mg / ml) induced contraction.

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