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Research Article

**UNVEILING THE EFFECT OF A STEM BARK EXTRACT ON
CARDIOVASCULAR SYSTEM**U. S. Jijith^{1,2,*}, C. R. Sudhakaran Nair¹, K. Pramod^{1,2}¹ College of Pharmaceutical Sciences, Govt. Medical College, Thiruvananthapuram – 695011, Kerala, India.² College of Pharmaceutical Sciences, Govt. Medical College, Kozhikode – 673008, Kerala, India.**Abstract:**

The plant *Anamirta cocculus* Wild is used in traditional and folk medicine for various diseases. Thus the study was aimed to carry out preliminary pharmacological screening for its cardiovascular effects. The effect of the extract on perfused blood vessels of frog and perfused frog heart was studied. The extract produced vasodilator effect and decrease cardiac output in perfused blood vessels of frog. The extract showed a depressant effect on perfused frog heart. The action was not blocked by atropine. It also blocked the action of adrenaline on heart. The results of the study indicated that the extract might have antiarrhythmic activity.

Keywords: *Anamirta cocculus*, cardiovascular effect, pharmacological screening.**Corresponding author:****U. S. Jijith**

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INTRODUCTION:

Drugs acting on blood vessels may increase the lumen of blood vessels or may decrease the lumen of blood vessels by relaxing or contracting the vascular muscles. Those agents which increase the lumen are known as vasodilators while those which decrease the lumen of blood vessels are known as vasoconstrictors. The blood vessels have been shown to contain muscarinic, alpha and beta adrenergic, and H₁ and H₂ histaminergic receptors. Alpha receptors are excitatory while others are generally inhibitory. Sympathomimetic agents produce positive inotropic and positive chronotropic effect. Parasympathomimetics such as acetylcholine produce negative inotropic and negative chronotropic response. The plant *Anamirta cocculus* Willd is used in traditional and folk medicine for various diseases [1]. But there were limited scientific reports available to back up its pharmacological efficacy. Thus the study was aimed to carry out preliminary pharmacological screening for its cardiovascular effects.

MATERIALS AND METHODS:

Materials

Extract employed for the study

An alcoholic extract prepared from the stem bark of *Anamirta cocculus* prepared as reported previously was used [2].

Ethical Clearance

Experiments on animals were carried out after getting approval from Institutional Animal Ethics Committee, Govt. Medical College, Thiruvananthapuram (No. 39/IAEC/MCT/06; dated 19.09.2006).

Effect on Perfused Blood Vessels Of Frog

The frog was pithed and heart exposed. The pericardium over the heart was removed. Aorta and the inferior vena cava were freed from connective tissue so that these structures were clear. A thread was passed under the aorta and a 'V' shaped cut was made on it. The venous cannula was inserted. The venous cannula was then tied and connected to the reservoir. A thread was also passed under the inferior vena cava and a 'V' shaped cut was given to it near to the heart. It was then cannulated. The other aorta was tied. The flow from the reservoir was adjusted to get a constant flow rate around 40 drops per minute. When the fluid coming out from inferior vena cava became clear, the volume of fluid collected in 30 seconds was noted for 6 times. After drugs were administered through the aorta, the volume of fluid coming out from vena cava in

30 seconds was measured for six times (Each drug was administered only after the fluid flow rate became normal) [3].

Effect on Perfused Frog Heart

Student's physiograph was used for the study. A frog weighing about 20 g was pithed and pinned on a frog board. A median incision was made through the skin over the sternum of pithed frog. Abdomen was opened and heart exposed by removing the pericardium and given a few drops of frog ringer solution over the heart. Traced the inferior vena cava and a fine cotton thread was passed around it. A small 'V' shaped cut was made on inferior vena cava and venous cannula introduced to it and tied securely, which in turn connected to a perfusion bottle containing frog ringer. A small cut made on the aorta allowing the perfusate to come out. Then adjusted to venous pressure of 2-4 cm by altering the height of perfusion bottle. The flow of the solution was adjusted and controlled by the screw clamp. The apex of the heart was attached by hook to the force transducer, which was connected to student physiograph and adjusted the chart papers in proper position. Ink was filled in the inkwell and 0.25 mm/sec was selected as the chart speed. The strain gage coupler was used for this preparation and sensitivity was adjusted to 50 mcV [4, 5].

Normal contraction was recorded before administration of the drugs. Standard drug like acetylcholine, adrenaline, atropine and calcium chloride were given in doses 10 µg, 10µg, 100 µg and 1000 µg respectively. The extract was given in a dose of 100 mg, 50 mg and 25 mg. The response of the extract in the presence of atropine was noted. The effect of adrenaline in the presence of extract was also recorded.

RESULTS AND DISCUSSION:

Effect on Perfused Blood Vessels of Frog

The extract showed a dose related fall in rate of cardiac output. It may be due to vasoconstriction of blood vessels or decreased heart rate. The rate of cardiac output of adrenaline was reduced by extract at a concentration of 20 mg/ml. The rate of reduction of cardiac output of acetylcholine was almost similar to the effect produced by the extract. The results were statistically significant (p<0.05) and are shown in Fig 1. The study result implied that the extract might have anti-arrhythmic like properties.

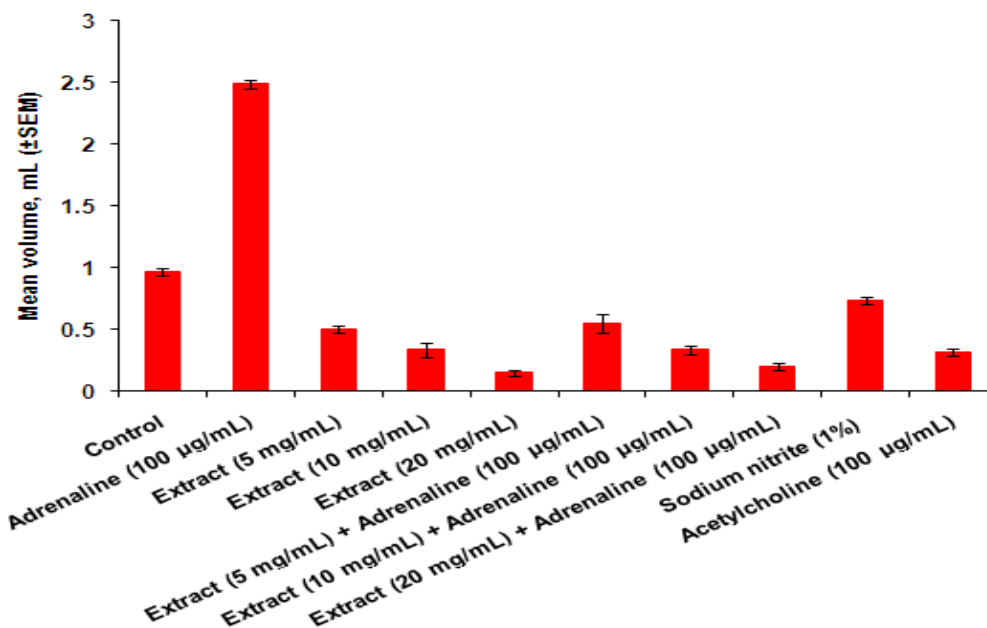


Fig. 1: Effect of *Anamirta cocculus* extract on perfused blood vessels of frog

Effect on Perfused Frog Heart

Alcoholic extract of *Anamirta cocculus* reduced the force of contraction (negative inotropic action) of perfused frog heart preparation. In high concentrations (75 and 100 mg/mL), the extract stops the heart and gives straight line on lower boarder (i.e. in the diastolic condition). The extract

at a concentration of 75 mg/mL blocked the action of adrenaline (0.05 µg/mL), which may be due to the blocking of adrenergic receptors of the heart. Atropine did not block the depressant action of the extract at a concentration of 75 mg. The study results are shown in Fig 2. These effects of the extract may be useful in cardiac arrhythmias.

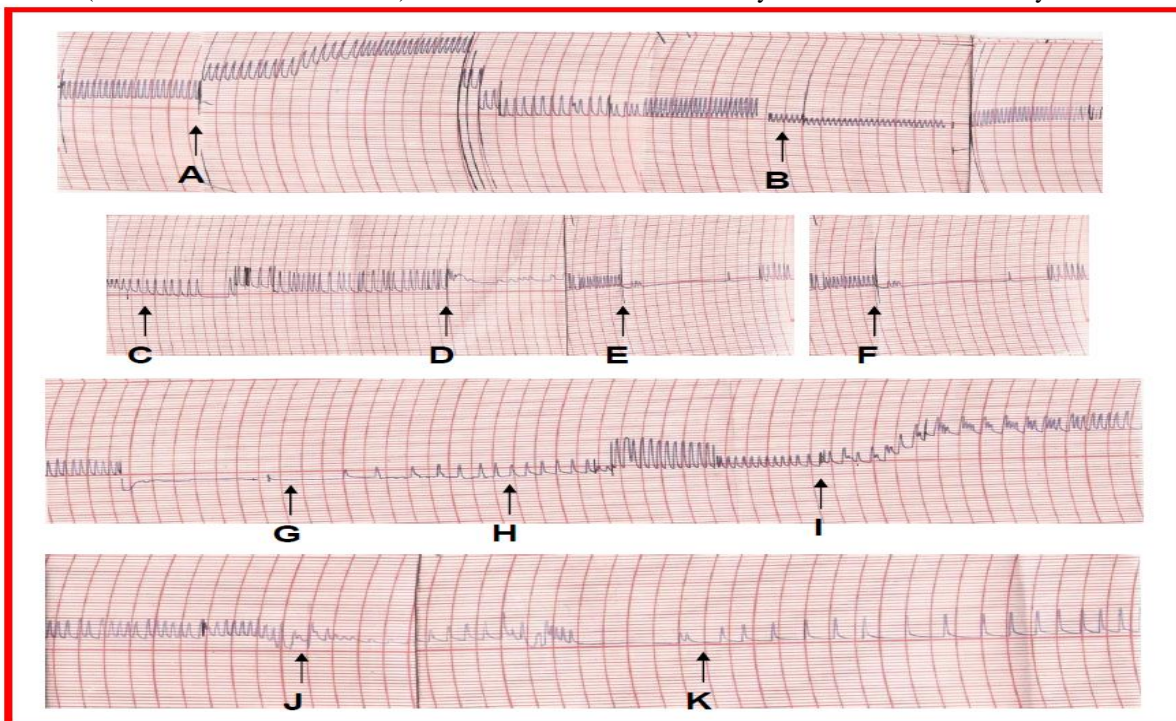


Fig. 2: Effect of extract on perfused blood vessels of frog (A) Adrenaline – 0.5 µg/mL (B) Acetylcholine – 0.5 µg/mL (C) Extract – 25 mg/mL (D) Extract – 50 mg/mL (E) Extract – 75 mg/mL (F) Extract – 100 mg/mL (G) Extract – 75 mg/mL (H) Extract – 75 mg/mL + Adrenaline – 0.5 µg/mL (I) Calcium chloride – 1% w/v (J) Atropine sulphate – 100 µg/mL (K) Extract – 75 mg/mL + Atropine sulphate – 100 µg/mL

CONCLUSION:

Pharmacological screening was carried out on alcoholic extract of stem bark of *Anamirta cocculus*. The extract produced vasodilator effect and decrease cardiac output in perfused blood vessels of frog. The extract showed a depressant effect on perfused frog heart. The action was not blocked by atropine. It also blocked the action of adrenaline on heart. The results of the study indicated that the extract might have antiarrhythmic activity.

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