Anti-arthritic activity of abrus precatorious in albino rats

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Citation

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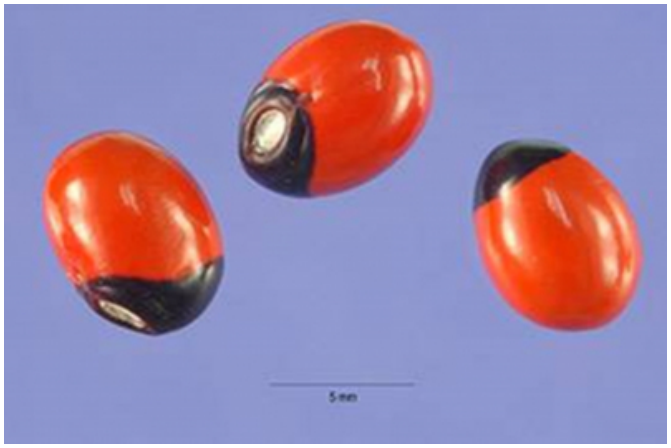
Abstract

The aim of this study was to evaluate the antiarthritic activity of water extract of leaves of Abrus precatorius(AP) on arthritis induced model in rats. Arthritis was induced in male albino Wister rats by injection of croton oil (0.1ml) into the left foot pad of the animals. Treatment with AP at 200 and 400mg/kg and standard Indomethacin (0.3mg/kg) was started on the same day and continued up to day 12. The paw volume was measured on day 1, 5, 12 and 21 for both the paws and antiathritic activity was evaluated. The extract of AP produced reduction in the inflammation of the paw produced due to croton oil. The antiarthritic action started on day 5 and continued till day 12 and the activity was comparable to that of the standard on both days. AP significantly inhibited adjuvant induced arthritis and has significant ant-inflammatory effect (p<.05).

INTRODUCTION

Figure 1



Abrus precatorius . is of the family fabaceae belonging to the plant kingdom plantae. It is a vascular plant of the order fabales Figure above shows picture of the plant. Abrus precatorius (leguminosae) is a perennial plant that grows in tropical and subtropical areas of the world. It has been used for the treatment of various diseases such as colds, cough, convulsion, fever, rheumatism, conjunctivitis and ulcers by traditional healers. Nath and Sethi 1992 (1) reported its arbortificint properties. Rain-tree 2004 (2) reported its use in the treatment of diabetes and chronic nephritis.

Rheumatoid arthritis (RA) is a chronic autoimmune diseases in which there is inflammation of joints, sinovial proliferation and destruction of articular cartilage (3). Although a number of drugs such as steroids (4) and non steroids (5) being used in the treatment of RA have been developed in the past few decades, there is still and urgent need for more effective drugs with lower side effects(6) . This study therefore investigates the antiathritic activity of extract of AP.

MATERIALS AND METHODS

Male albino Wister rats weighing between 150-250g were used for the present study. The animals were maintained under standard environmental conditions and were fed with standard diet of growers mash supplied by Gee Pee Nigeria Ltd. and had access to clean drinking water ad libitum. Croton oil was obtained from Serva Feibiochemica, Heldelberg, Germany. Indomethacin was purchased from Pfizer Nigeria .

PREPARATION OF THE PLANT EXTRACT

The fresh leaves of the plant AP were dried in the open air shade for a period of about four weeks prior to extraction process. The water extract of the plant was obtained by procedure in accordance with the general process, described in the USPXIII to yield an extract of 4.0% w/v, which was used in the experiment. Inflammation was induced using the method of Tonelli etal (1965) (7) with slight modification.

ACUTE TOXICITY STUDIES

Acute toxicity studies were carried out following OECD guidelines (8) and was found to be safe up to 1000mg/kg body weight in albino Wister rats

ANTI-ARTHRITIC ACTIVITY

Antiarthritic activity of AP was studied using croton oil induced arthritis model (Tonelli et al 1965). Thirty rats were randomly divided into five groups of six animals each and treated for 12 days. Group I served as normal control, Group II as arthritic control, Group III as standard which received 10mg/kg Indomethacin (P.O), Group IV and V received 200mg/kg and 400mg/kg of AP respectively orally and served as test groups.

All the animals except normal control group were injected with 0.1ml croton oil in the subplantar region of the left hind paw.

On day 1, paw volume of all the animals were measured. The treatment with standard drug and AP started on the same day and continued till day 12. The paw volume was measured on day 5 and 12. The edema rate (ER) and inhibition rate (IR) of each group was calculated as follows (9)

Figure 2

$$ER\% = \frac{Vt - Vo}{Vo} \times 100$$

Where Vo is the volume before croton oil injection (ml); Vt the volume at day t after croton oil injection (ml)

Figure 3

$$IR\% = \frac{E_c - E_t}{E_c} \times 100$$

Where E_c is the edema rate of control group and E_t is the edema rate of treated group.

Statistical Analysis.

The results are expressed as mean ¬+ SEM the data were analyzed by one way analysis of variance (ANOVA).

RESULTS

On day 5, there was no significant reduction in percentage edema rate compared to arthritic control in all treatment groups. On day 12, there was a significant (P<0.05) reduction in percentage edema rate of both groups of 200 and 400mg/kg AP respectively compared to the arthritic control (Table 1). None of the animals showed signs of development of secondary lessons.

The antiarthritic activity of AP at both doses were comparable to that of the standard (Indomethacin) on day 12. Percentage edema rate in the non injected paw was also reduced in AP 200mg/kg and 400mg/kg treated animals significantly (P<0.05) compared to the arthritic control on day 12. Inhibition rate at both the doses was found to be more than the standard on day 5, whereas on day 12, inhibition rate at both doses were compared to that of the standard.

Figure 4

TABLE 1: ANTIARTHRITIC ACTIVITY OF % EDEMA RATE (ER)

	Left (injected) paw		Right (Non-injected) paw	
Treatment	**Day 5**	**Day 12**	**Day 5**	Day 12
Normal Control	0 ± 0	0 ± 0	0 ± 0	0 ± 0
Arthritic Control	100 ± 0	400 ± 10.00	0 ± 0	150 ± 10.00
Standard Indomethacin (10mg/kg)	116 ± 10.00	100 ± 10.00ª	25 ± 10.00	16.66± 10.00
AP. (200mg/kg)	160 ± 12.00	260 ± 10.00ª	0 ± 0	60.00 ± 8.00
A.P.. (400mg/kg)	160 ± 12.00	80 ± 10.00ª	0 ± 0	16.00 ± 8.00

ª P≤0.05

DISCUSSION

Croton oil induced inflammatory response represents a widely used model in assessing anti inflammatory activity of various substances (9). The method is simple, rapid and repeatable. This model therefore allowed for investigation of the therapeutic efficacy of AP. All the animals tolerated the experimental procedure and no death was recorded till the end of the experiment. The dosage selection was based on acute toxicity studies.

AP significantly (P<0.05) inhibited the development of arthritis induced by croton oil in rats for 12 days. The effect of AP was dose dependent. The reduction in the paw volume of the treatment groups provides an adequate index of the antiarthritic activity of AP. This report therefore clearly showed that AP significantly inhibited adjuvant induced arthritis in rats as it significantly reduced the paw volume on day 12. Further trials clinically, are hereby suggested to corroborate this report.

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