



Short Communication

Analgesic activity of the ethanolic extract of *Aphanamixis polystachya* bark

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SUMMARY

Ethanolic extract of *Aphanamixis polystachya* bark was used to investigate its analgesic activity by acetic acid induced writhing in mice. The bark extract exhibited statistically significant and dose dependent analgesic activity in mice. The bark extract at the doses of 250 and 500 mg/kg body weight showed 40.69% and 62.07% writhing inhibition respectively in mice whereas diclofenac-Na produced 75.17% writhing inhibition as a positive control.

Key words: *Aphanamixis polystachya*; Acetic acid induced writhing

INTRODUCTION

Aphanamixis polystachya (Meliaceae), commonly known as 'Roina', is a large timber tree with bunches of rounded locular fruits and glossy deep brown seeds and widely distributed in India, China and Bangladesh (Ghani, 2003). Ethanolic extract of the stem possesses anti-cancer properties and that bark is an effective immunosuppressive, showed anti-tumours and abdominal complaints. Seed extract possesses antibacterial and antifungal properties and also used as a liniment of rheumatism (Ghaini, 2003; Rabi and Gupta, 1995). A number of chemical constituents have been reported in this plant such as rohitukin, limonoids, amooranin, tetranotriterpene and aphanamixinin (Chatterjee *et al.*, 1970; Mulholand and Naidoo, 1999; Ghani,

2003; Rabi *et al.*, 2003).

As part of our on-going pharmacological screening of randomly selected Bangladeshi medicinal plants (Uddin *et al.*, 2004, 2005; Shilpi *et al.*, 2005; Rouf *et al.*, 2006, 2007), we now report on the investigation of analgesic activity of *Aphanamixis polystachya* bark extract.

MATERIALS AND METHODS

Plant material

Bark of *A. polystachya* were collected from the Dumuria, Khulna, Bangladesh at the March 2005 and identified by experts of the Bangladesh National Herbarium, Dhaka, Bangladesh.

Extraction

Shade-dried and ground bark (200 g) was extracted by maceration over 24 - 72 h using 90% ethanol (EtOH) at room temperature. The extract was filtered and dried using a rotary evaporator at a temperature not exceeding 55°C and the yield was approximately 3.5% w/w on dry weight basis.

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Animals

Swiss albino mice of either sex (20 - 25 g) were obtained from the Animal house, Pharmacy Discipline, Khulna University, Khulna. The animals were housed under standard laboratory conditions (relative humidity 55 - 65%, room temperature $23.0 \pm 2.0^\circ\text{C}$ and 12 h light-dark cycle). The animals were fed with standard diet and water *ad libitum*.

Analgesic activity study using acetic acid induced writhing assay

The method of Uddin *et al.* (2005) was adopted with slight modification. The animals were orally fed with the extracts, vehicles (for control groups) at the specified doses (250 & 500 mg/kg body weight). Fourty five minutes after administration of the extract and the vehicle, each animal was given 0.7% (v/v) solution of acetic acid (0.1 ml/10 g body weight) interperitoneally (i.p.) to induce abdominal contractions or writhing. Five minutes after the administration of acetic acid, the number of writhing for each animal was counted for 15 min. The number of writhings in the control was taken as 100% and percent inhibition was calculated as follows:

$$\% \text{ Inhibition of writhing} = 100 - (\text{treated mean} / \text{control mean}) \times 100$$

For comparison, the same experiment was carried out with a positive control group treated orally with Diclofenac-Na (Square Pharmaceuticals Ltd., Bangladesh) at the dose of 25 mg/kg body weights.

Statistical analysis

All data were expressed as mean \pm S.E.M. The Student's *t*-test was used to analyze data obtained from *in vivo* experiments.

RESULTS AND DISCUSSION

The *A. polystachya* bark extract significantly and dose dependently suppressed the frequency of acetic acid induced writhing in mice. At the dose 250 mg/ kg body weight the extract showed 40.69% writhing inhibition ($P < 0.001$) where as at 500 mg/ kg body weight produced 62.07% writhing inhibition ($P < 0.001$), where the standard drug diclofenac-Na showed 75.17% writhing inhibition and all the results are statistically significant (Table 1).

Analgesic activity of the bark of *A. polystachya* was assessed by acetic acid induced writhing method in mice. Acetic acid is a pain stimulus and causes localized pain as writhing after interparitonal administration in mice. Acetic acid stimulates the release of free arachidonic acid from tissue phospholipids by the action of phospholipase A_2 . Synthesis of prostaglandins from arachidonic acid via the cyclooxygenase pathway is one of the major causes of pain sensation (Uddin *et al.*, 2006). The agent that reduced the number of writhing will demonstrate analgesia by inhibition of prostaglandin synthesis which is a peripheral mechanism of pain inhibition.

The extract of *A. polystachya* bark reduced the number of writhing with a dose dependent manner. So it can be assumed that the extract reduced the production of free arachidonic acid or inhibit the

Table 1. Effect of the ethanolic extract of *A. polystachya* bark on acetic acid induced writhing in mice

Treatment	Dose ^a (mg/kg, p.o.)	Writhings ^b	Inhibition (%)
Control (1% Tween 80, 10 ml/kg, p.o.)	-	29.0 \pm 1.66	-
Diclofenac- Na	25	7.2 \pm 0.65*	75.17
<i>A. polystachya</i> bark extract	250	17.2 \pm 0.82*	40.69
	500	11.0 \pm 0.79*	62.07

^aAdministered 45 min before 0.7% acetic acid administration (ml/kg, i.p.), ^bCounted for 15 min, starting 5 min after acetic acid administration; Values are mean \pm S.E. * $P < 0.001$ vs. control, Student's *t*-test; n = 5.

enzyme responsible for the synthesis of prostaglandins and ultimately relieve pain-sensation.

The above investigation was revealed that the ethanolic extract of *A. polystachya* bark possesses analgesic activity with a dose dependant manner. Further study should require finding out the actual mechanism of analgesic action of the extract.

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