

## ANALGESIC ACTIVITY OF *ADIANTUM FLABELLULATUM*

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*Adiantum flabellulatum* L. (Bengali name - Mayurshikha, English name- Maidenhair fern) is a rhizomatous fern with feathery fronds and naked, polished stipes grows wild in the plains and hill bases of Sylhet district. It belongs to the Adiantaceae family. Plants of this family have been reported to possess antimicrobial<sup>(1)</sup> and antifungal<sup>(2)</sup> activities. The aerial parts of the plant has been used for treating cough, rhizomes are used as anthelmintics<sup>(3)</sup> and in hard swelling and hard tumors of spleen.<sup>(4)</sup> Literature survey revealed that the plant contains triterpene, 3, 4-epoxyflicares, flavonoids, adiantone and other related compounds.<sup>(5)</sup> Literature survey also revealed that 19 compounds were identified in both roots and leaves of *A. flabellulatum*, and this shows that there are some obvious similarities between the essential oil in roots and leaves of *A. flabellulatum*, but they are different from each other fundamentally <sup>(6)</sup>. In this very study we examined the analgesic activity of different extracts of the rhizomes of *A. flabellulatum* and report the result of our preliminary studies.

The rhizomes of *Adiantum flabellulatum* were collected from Sylhet and identified properly by a taxonomist of the National Herbarium, Mirpur, Dhaka. The rhizomes were washed, cut into small pieces, sun dried and pulverized into a coarse powder.

200 g of dried powder of rhizome of the plant was successively percolated at room temperature with hexane, chloroform and methanol (500 ml × 3 in each case) to get hexane, chloroform and methanol extracts, respectively. The extracts were filtered off and evaporated to dryness *in vacuo* at 40°C by using a rotary evaporator to get gummy concentrate of hexane (1.85 g), chloroform (0.95 g) and methanol (0.82 g) extracts, respectively. Finally, the extracts were defatted by refrigeration at 4°C.

The hexane, chloroform and methanol extracts of rhizome of *Adiantum flabellulatum* were evaluated for their analgesic activity on Swiss albino mice according to acetic acid induced writhing method <sup>(7)</sup>. The mice, weighing between 20-25 g, were collected from the Animal Resource Division of ICDDR,B. The mice were randomly divided into different groups depending on the number of samples and doses to be applied and consisted of 5 mice in each group. All the animals were individually weighed and the

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dose of the test samples and control materials adjusted accordingly. The animals were kept in the laboratory atmosphere for at least one week for acclimatization prior to any experiment and given the standard food supplied by ICDDR,B. The test samples were prepared as suspension in saline water with a few drops of 1% Tween-80 as suspending agent. Aminopyrine (50 mg/kg body weight) was used as standard and 1% Tween-80 solution was used as control in this experiment.

Glacial acetic acid was administered intraperitoneally by using special trap to the experimental animals to create pain sensation. As a result, the animals squirm their body at regular intervals out of pain. This squirm or contraction of the body is termed as writhing. Any substance that has got analgesic activity is supposed to reduce the number of writhing of animals within a given time and with respect to the control group. At zero hour, test samples (at a dose of 400 mg/kg body weight), aminopyrine and control were administered orally by means of a long needle with a ball shaped end. After 40 minutes, glacial acetic acid (0.7% at a dose of 0.1 ml/10 g body weight) was administered intraperitoneally to each of the animals of all the groups by using special trap. The forty minutes interval was given to ensure the proper absorption of the administered samples. Five minutes after the administration of acetic acid, the number of writhing were counted for each mouse.

The hexane, chloroform and methanol extracts of rhizome of *A. flabellulatum* were examined for their analgesic activity at an oral dose of 400 mg/kg body weight on *Swiss albino* mice. The chloroform and methanol extracts showed significant analgesic activity with 29.5 and 38.0% inhibition of acetic acid induced writhing in mice (Table 1), whereas the hexane extract did not exhibit any marked activity (12.0% inhibition) in the experiment. The methanol extract showed the maximum analgesic activity and the hexane extract showed the least activity. Aminopyrine at an oral dose of 50 mg/kg body weight exhibited 64.5% inhibition of acetic acid induced writhing in mice in this study.

**Table 1. Analgesic activity of different extracts of rhizomes of *Adiantum flabellulatum*.**

Test sample(s)	Dose (mg/kg) body weight	Average writhing*	% writhing	% inhibition**	SD	SE	T-test
Hexane	400	29.2	88.0	12.0	3.3	1.47	p < 0.05
Chloroform	400	23.4	70.5	29.5	3.84	1.72	P < 0.01
Methanol	400	20.6	62.0	38.0	2.3	1.02	p < 0.001
Aminopyrine	50	11.8	35.5	64.5	1.48	0.66	P < 0.001
Control	Saline	33.2	100.0	-	4.6	2.05	-

\*The average writhing was calculated from three determinations in each group (n = 5) of mice.

\*\* % of inhibition was calculated compared with % of writhing. (% of inhibition <15, 15-30 and >30 was considered as non-significant, moderate and significant, respectively in comparison with the % of inhibition of aminopyrine).

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