

**ANTINOCICEPTIVE ACTIVITY EVALUATION OF *MOMORDICA CHARANTIA* L. FRUIT METHANOLIC EXTRACT**

**Md. Mahbubur Rahman¹, Sadia Israt Khanom², Sujon Chandra Sarkar² and
Mohammed Rahmatullah^{1*}**

¹Department of Pharmacy, University of Development Alternative, Lalmatia, Dhaka-1207,
Bangladesh.

²Department of Biotechnology & Genetic Engineering, University of Development
Alternative, Lalmatia, Dhaka-1207, Bangladesh.

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***Corresponding Author**

**Dr. Mohammed
Rahmatullah**

Department of Pharmacy,
University of Development
Alternative, Lalmatia,
Dhaka-1207, Bangladesh.

ABSTRACT

Background. *Momordica charantia* is a Cucurbitaceae family plant whose fruits are considered to have medicinal values and also consumed as a vegetable. It was of interest to evaluate the antinociceptive activity of methanol extract of fruits of the plant (MEMC). **Methods.** Antinociceptive activity was determined through reductions in number of writhings caused by intraperitoneally injected acetic acid-induced abdominal pain in mice. **Results.** At MEMC doses of 100, 200 and 400 mg per kg body weight, the extract dose-dependently reduced the number of abdominal constrictions induced by intraperitoneal administration of acetic acid in mice by 21.4, 39.3, and 46.4%, respectively. By comparison, a standard antinociceptive

drug, aspirin, when administered to mice at doses of 200 and 400 mg per kg body weight, reduced the number of abdominal constrictions by 42.9 and 53.6%, respectively, demonstrating that the extract antinociceptive activity at the highest dose was potent than aspirin at a dose of 200 mg per kg. **Conclusion.** The results suggest that fruits of the plant possess phytochemical constituent(s) with antinociceptive activities, and which can be of use in relieving pain.

KEYWORDS: Antinociceptive, *Momordica charantia*, Cucurbitaceae, writhing.

BACKGROUND

Momordica charantia L. (Cucurbitaceae family) is known in English as 'bitter gourd' (because of the bitter taste of its fruits) and in Bengali as 'korolla'. The plant and particularly the leaves and fruits are considered to have medicinal importance by traditional medicinal practitioners. In Togo, the plant has been reported to be used for treatment of gastrointestinal problems in adults, and measles and chicken pox in children.^[1] In various Asian traditional medicines, the plant or plant part is used to treat a variety of diseases including cholera, diarrhea, dysentery, gout, rheumatism, cancer, and diabetes.^[2] In Bangladesh, fruits are mainly used to treat diabetes.^[3-5]

The antinociceptive action of *Momordica charantia* in tibial and sural nerve transaction-induced neuropathic pain in rat has been reported.^[6] Ethanolic extract of fruit has also been reported for analgesic and anti-inflammatory activities.^[7] Rural people in Bangladesh suffer enormously from pain because of agricultural work; at the same time, they are unaware of the adverse side-effects that may result from chronic use or over-dosage of over-the-counter painkillers. As such, we had been screening various floral species of Bangladesh to find out if these species can contribute to pain relief, for then the plants can be used by themselves as effective pain-killers.^[8-17] The objective of the present study was to evaluate antinociceptive activity of methanolic extract of *Momordica charantia* fruits (small variety) against acetic acid-induced abdominal pain in mice.

METHODS

Plant material collection and extraction

Fruits of *Momordica charantia* were collected from Keraniganj in Dhaka city, Bangladesh during December, 2016. Plant specimen was taxonomically identified at the University of Development Alternative by a trained botanist. The sliced air-dried fruit pieces of *Momordica charantia* were grounded into a fine powder and 100g of the powder was extracted with methanol (1:5, w/v) for 48 hours. The extract (MEMC) was evaporated to dryness. The final weight of the extract (MEMC) was 8.308g.

Chemicals

Glacial acetic acid was obtained from Sigma Chemicals, USA; aspirin was obtained from Square Pharmaceuticals Ltd., Bangladesh.

Animals

In the present study, Swiss albino mice, which weighed between 14-16 g were used. The animals were obtained from International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B). All animals were kept under ambient temperature with 12h light followed by a 12h dark cycle. The animals were acclimatized for three days prior to actual experiments. The study was conducted following approval by the Institutional Animal Ethical Committee of University of Development Alternative, Dhaka, Bangladesh.

Antinociceptive activity

Antinociceptive activity of MEMC was examined using previously described procedures.^[18] Briefly, mice were divided into six groups of five mice each. Group 1 served as control and was administered vehicle only. Groups 2 and 3 were orally administered the standard antinociceptive drug aspirin at doses of 200 and 400 mg per kg body weight, respectively. Groups 4-6 were administered MEMC at doses of 100, 200 and 400 mg per kg body weight, respectively. Following a period of 60 minutes after oral administration of standard drug or extract, all mice were intraperitoneally injected with 1% acetic acid at a dose of 10 ml per kg body weight. Intraperitoneal administration of acetic acid to a mouse results in pain, which is manifested by the number of abdominal constrictions of the mouse. A period of 5 minutes was given to each animal to ensure bio-availability of acetic acid, following which period the number of abdominal constrictions (writhings) was counted for 10 min. The following formula was used for calculation of percent inhibition of the number of writhings in aspirin and MEMC administered animals compared to control mice,

$$\text{Percent inhibition} = (1 - W_e/W_c) \times 100$$

where W_e and W_c represents the number of writhings in aspirin or MEMC administered mice (Groups 2-6), and control mice (Group 1), respectively.

Statistical analysis

Experimental values are expressed as mean \pm SEM. Independent Sample t-test was carried out for statistical comparison. Statistical significance was considered to be indicated by a p value < 0.05 in all cases.^[17]

RESULTS

At MEMC doses of 100, 200 and 400 mg per kg body weight, the extract reduced the number of abdominal constrictions induced by intraperitoneal administration of acetic acid in mice by 21.4, 39.3, and 46.4%, respectively. The results were not significant at the lowest dose tested;

however, the higher doses of 200 and 400 mg per kg gave significant antinociceptive results, as manifested in the reductions in the number of writhings. By comparison, a standard antinociceptive drug, aspirin, when administered to mice at doses of 200 and 400 mg per kg body weight, reduced the number of abdominal constrictions by 42.9 and 53.6%, respectively, demonstrating that the extract antinociceptive activity at the highest dose was potent than aspirin at the lowest dose. The results are shown in Table 1. Overall, the results demonstrate that pain-relieving phytochemical component(s) are present in the fruits.

Table 1: Antinociceptive effect of crude methanol extract of *Momordica charantia* fruit (MEMC) in the acetic acid-induced pain model in mice.

Treatment	Dose (mg/kg body weight)	Mean number of writhings	% inhibition
Control (Group 1)	10 ml	5.6 ± 0.51	-
Aspirin (Group 2)	200 mg	3.2 ± 0.58	42.9*
Aspirin (Group 3)	400 mg	2.6 ± 0.40	53.6*
MEMC (Group 4)	100 mg	4.4 ± 0.60	21.4
MEMC (Group 5)	200 mg	3.4 ± 0.68	39.3*
MEMC (Group 6)	400 mg	3.0 ± 0.32	46.4*

All administrations (aspirin and extract) were made orally. Values represented as mean ± SEM, (n=5); * $P < 0.05$; significant compared to control.

DISCUSSION

Diosgenin is present in fruits of *Momordica charantia*.^[19] The compound has been reported to possess analgesic and anti-inflammatory properties,^[20] and thus can be the responsible phytochemical for the observed antinociceptive effects. However, further investigations are necessary to come to a definite conclusion.

CONCLUSION

The results suggest that methanolic extract of fruits of *Momordica charantia* can be used for alleviating pain.

Conflicts of interest

The author(s) declare that they have no competing interests.

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