

Full Length Research Paper

## Antiulcerogenic effect of extracts of *Momordica Balsamina* Linn against experimentally induced gastric ulceration in rats

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Various doses of extracts of *Momordica Balsamina* was administered to wistar rats to test for antiulcerogenic activity in ulcer induced gastric ulceration. The various doses of extracts administered were 100mg/kg, 200mg/kg, 400mg/kg and 800mg/kg. These doses displayed ulcer inhibition rates ranging from 34.40% - 70.70% as compared to that of ranitidine which showed an ulcer inhibition rate of 72.66 %. This result therefore shows that *Momordica Balsamina* has potential to serve as an antiulcerogenic agent therefore offering another ethnobotanical use for this all-important medicinal plant.

**Keywords:** Ethnobotanical, ulcer, ethanol, antiulcerogenic, wistar rats.

### INTRODUCTION

In the world over, researchers governments and other organizations are working hard to meet an unmet need in the management of ulcer disease especially peptic ulcer disease. Ulcers are created when stomach secretions erode stomach lining or when there is a disruption of the gastric mucosal lining. There is therefore a need to develop an alternative safe, efficacious and affordable compliment (which could be either in the form of drug, food or nutritional supplements) in the management of ulcer. *Momordica Balsamina* Linn is an important medicinal plant that has been identified to have great potentials as a well-known anti-inflammatory and wound healing agent (Sharma 2009; Ganesan, 2008). The need to provide an efficient, efficacious, cost- effective and accessible alternative to the management of ulcer disease would be further enhanced through this study by exposing the anti-ulcer potential of this plant. Therefore because of the above mentioned reasons, the effects of *Momordica balsamina* linn leaves on ulceration was

decided to be assayed. *Momordica balsamina* linn is a tropical old world vine with red or orange warty fruit. *Momordica balsamina* linn is a perennial herb with soft stem and tendrils that climbs up shrubs boundary fields and fences. The green leaves are deeply palmately 5-7 lobed about 12 cm long, margin toothed, stalked. The plant produces spindle shaped Fruits. *Momordica balsamina* linn is fairly common and widespread in tropical Africa and Asia, Arabia, India and Australia. *Momordica balsamina* linn grows in white, yellow, red and grey sandy soil, also loam, clay, alluvial, gravelly and calcereous soil. *Momordica balsamina* linn thrive in full sun and semi- shade in grassland, savanna, woodland, forest margins and in river banks vegetation as well as disturbed areas. *Momordica balsamina* linn which is native to tropical Africa has since invaded Asia, Australia and Central America (Grubben et al, 2004).

*Momordica balsamina* linn is an economically important medicinal plant belonging to the family cucurbitaceae (chakravarty, 1990). The immature fruits are eaten as vegetables and are a rich source of vitamin C, Vitamin A, Phosphorus and Iron (Sultana et al., 2003; Paul et al.,

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2009). In northern Nigeria, *Momordica balsamina* leaves are prepared as vegetable soup for lactating mothers. This is believed to regenerate and replenish lost blood during labour and also helps to purify her breast milk (Roodt, 1998). *Momordica balsamina* was introduced into Europe in 1568 and was medicinally used to treat wounds (Roodt, 1998).

According to Watt and Breyer-Brandwijk (1962), they reported that a liniment made by infusing the fruit in olive or almond oil is used by individuals with chapped hands, burns and haemorrhoids. The Zulu tribe of South Africa also use *Momordica balsamina* plant for stomach and intestinal complaints (Hutchings et al., 1996). Also, the seed oil of *M. balsamina* has been shown to have effects on fertilization (Lotti et al., 1978). Ganesan et al. (2008) reported further that the anti-inflammatory activity was studied by Carrageenin-induced edema in rats and 60% oedema inhibitions was observed with 300 mg/kg methanol extract of these dried leaves which was nearly equivalent to that of 10 mg/kg of indomethacin. The anti-inflammatory effect was significant ( $p < 0.001$ ) in the dose of 100, 200 and 300 mg kg<sup>-1</sup> of methanol extract when compared to the control Group. Also, Umukoro and Ashorobi (2006) reported that the leaf extract possesses anti-inflammatory property, as it significantly inhibits edema induced by carrageen in and formaldehyde in rats. However, the extract did not show membrane stabilizing effect, as it failed to offer significant protection of the erythrocyte against lysis induced by hypotonic solution.

Sharma et al. (2009) reported that the fruit powder, in the form of an ointment (10% w/w dried powder in simple ointment base) showed a statically significant response ( $P < 0.01$ ) in terms of wound contracting ability, wound closure time, period of epithelisation, tensile strength of the wound and regeneration of tissues at wound site when compared with the control group, and these results were comparable to those of reference drug povidone iodine ointment in an excision, incision and dead space wound model in rats.

Balsam apple possess medicinal properties such as anti-HIV, anti-inflammatory, anti-Leukemic, anti-microbial, anti-tumor and also anti-diabetic properties (Taylor, 2002; Karumi et al., 2003). The leaves, fruits, seeds, and bark of the plant contains resins, alkaloids, flavonoids, glycosides, steroids, terpenes, cardiac glycoside, saponins and any other medicinal importance viz. anti-HIV, anti-plasmodial, shigelloidal, anti-diarrheal, anti-septic, anti-bacterial, anti-viral, anti-inflammatory, anti-microbial, hypoglycemic, antioxidant, analgesic and hepatoprotective properties (Thakur et. al,2009).

## MATERIALS AND METHODS

### Plant Material

The leaves of *Momordica balsamina* linn was collected by the river bank near Lake Alau Dam and was then

transported in a cellophane bag. The plant was identified by a botanist from the botanical unit of the University of Maiduguri. *Momordica balsamina* leaves was gently rinsed in distilled water, sorted, air-dried at room temperature ( $28 \pm 2^\circ\text{C}$ ) and protected from direct contact with sunlight. Once dried, the leaves were then pulverized to fine powder using mortar and stored in air-tight container at room temperature for subsequent use.

### Ethical Statement

All experimental procedures were carried out in compliance with International Guiding Principles for Biomedical Research involving Animals (CIOMS,1985).

### Animal Experimentation

Thirty (30) albino rats of the wistar strain weighing between 180-200g were randomly separated into six groups of five rats each. The animals were given growers mash and water *ad libitum* for 28 days so as to acclimatize to laboratory conditions and habitat. Food was withdrawn twenty four (24) hours prior to experimentation. During this period animals were kept in elevated cages so as to prevent ceprophagy while being sustained on 8% sucrose only so as to prevent dehydration (Alphin and Ward, 1967). Group 1 was treated with normal saline only. Groups 2-5 were pretreated with 100-800 mg/kg of the extract while group 6 will be pretreated with 100mg/kg of ranitidine 1 hour prior to administration of 1ml of 80% ethanol. The drugs were administered intragastrically with the aid of an orogastric cannula. After an hour, the animals were sacrificed by cervical dislocation after ether anesthesia. The stomachs were removed and opened along the great curvature. The stomachs were then examined under a dissecting microscope with square-grid eyepiece to assess the formation of ulcers. For each stomach, ulcerated and total areas were measured as mm<sup>2</sup>.

The Ulcer Indexes (UI) for each stomach was calculated using the following formula:

$$UI = \frac{\text{Ulcerated area} \times 100}{\text{Total stomach area}}$$

The Ulcer Inhibition Rates (UIR) for each group was calculated as:

$$UIR (\%) = \frac{UI (\text{control} - \text{pretreated}) \times 100}{UI (\text{control})}$$

(Main,1975.Günnur, 2005. Alam,2009 and Nwafor and Hajja Gana,2007).

## RESULT AND DISSCUSSION

From table 2 above, it can be seen that the extract of momordica balsamina has significantly elicited antiulcerogenic effect when compared with the control group. 100mg/kg of the extract had inhibited ulceration

**Table 1.** Ethnobotanical uses of Balsam Apple.

S/NO.	PLANT PART	ETHNOBOTANICAL USES	SOURCE (REFERENCE)
1	Leaf	Purgative in children	Reddy et al (1989)
2	Leaf	Anti- helmintic	Sharma et al (1971)
3	Leaf	Treatment of leprosy, pile, and jaundice	Kedar and charabarti (1982)
4	Root	Used for abortions of up to five months pregnancy	Oommacchan and khan (1981)
5	Root	Used as an abortifacient	Jamwal and Anand (1962)
6	Fruit	Manage diabetes	Khan and Singh (1996)
7	Fruit	Anti- helmintic	Ayensu (1978)
8	Fruit juice	Treatment of malaria fever	Reddy et al (1989)
9	Shoots	Treatment of pneumonia and Leucorrhagia	Reddy et al (1989)
10	Leaves	Treatment of typhoid fever	Reddy et al (1989)

**Table 2.** Effect of Extracts of *Momordica balsamina linn* on Mean Ulcer Score, Ulcer Index and Ulcer Inhibition Rate in the Stomach of Experimental Rats.

Groups	Mean Ulcer Score	Ulcer Index	Ulcer Inhibition Rate %
<b>CONTROL</b>	35.13 ± 2.56	2.56	-
<b>MBE 100mg/kg</b>	23.00 ± 2.65	1.68	34.40
<b>MBE 200mg/kg</b>	15.50 ± 5.61	1.13	55.90
<b>MBE 400mg/kg</b>	15.10 ± 2.15	1.10	57.03
<b>MBE 800mg/kg</b>	10.30 ± 2.10	0.75	70.70
<b>RANITIDINE 100mg/kg</b>	9.63 ± 1.85	0.70	72.66

MBE= *Momordica balsamina* Extract, Mean ± SD.

rate by 34.4%, 200mg/kg had cytoprotective effect against ulceration by 55.90, 400mg/kg had 57.03 while 800mg/kg had 70.70%. A comparison between the control group 1 and highest dose group of the extract (MBE 800mg/kg) shows that there is a 70.70% inhibition of gastric ulceration in the pretreated group. This goes to proof that *Momordica balsamina* has potentials as an antiulcerogenic agent.

Gastric mucosal damage induced by ethanol may be due to mucosal leukotriene release which causes constriction (Oates, 1988) and eventual injury. Earlier research by Johji and his colleagues (1988) showed that drugs which have an effect on ethanol induced gastric lesions possess gastric mucosal membrane protective action. Therefore, since ulceration of experimental animals was induced by 80% ethanol and effects against ulceration was significantly observed, it can therefore be conclusively reported that based on the experimental studies carried out, another ethnobotanical use for *Momordica balsamina* has been explored. However,

further studies on this potential anti-ulcer agent needs to be done so as to ascertain which component is eliciting activity against ulceration and how it does that.

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