

LANTANA CAMARA: A POTENT INFLUENTIAL FACTOR IN IMPROVING THE GASTRIC MUCOSA OF WISTAR RATS RAVAGED BY ULCER

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Abstract: Over the years, traditional medicine has been used to treat various degrees and forms of ailment with significant positive therapeutic outcome. We designed this research to ascertain the use of *Lantana camara* as a potent factor in improving gastric ulcer caused by the administration of aspirin in Wistar rats. 250mg/kg of the extract was used to evaluate the anti-ulcer capacity of the plant extract. The omeprazole was used as a standard drug (20mg/kg). It was found that the Gastric mucosa was significantly improved after the administration of 250mg/kg of the extract after aspirin-induced ulcer. The present study justifies the traditional usage of this plant to treat the gastric ulcer.

Keywords: Gastric mucosa, *Lantana camara*, aspirin, omeprazole, ulcer

Introduction

Lantana camara is an important medicinal plant. The plant has been documented to possess anti-inflammatory effect, anti-hyperglycemic tendency, anti-motility property and anti-fungal ability (Sanjeeb *et al.*, 2012). Since the synthetic drugs used in the treatment and prevention of ulcer have a number of pitfalls such as gynecomastia and hyperplasia. Medicinal plants are effective in the treatment of human diseases, *Lantana camara* is one of such plants which have been used to cure human diseases (Atawodi, 2005). Gastric Ulcer is the disruption of the mucosal cytoarchitecture of the stomach particularly the epithelium, which may result in a perforation due to active inflammation. Symptoms of Gastric Ulcer include the following; upper abdominal pain that may improve with eating. Other symptoms includes belching, vomiting, weight loss and poor appetite (Snowden, 2008). Gastric ulcers are present in about 4% of the population (Snowden, 2008). About 10% of people developed gastric ulcer at some point in their life (Najm, 2011). Excessive gastric acid secretion is a factor in the pathogenesis of gastric ulcer disease (Adesanya *et al.*, 2002). *H. pylori* is the etiologic factor in most patients with gastric ulcer disease and may predispose individuals to the development of gastric carcinoma. *Helicobacter pylorus* is a S-shaped gram negative bacterium which measures about 0.5 to 3µm in size. *H. pylori* colonizes in the human stomach. The method of *H. pylori* transmission is unclear, but

seems to be person-to-person spread via a fecal-oral route (Ugochukwu *et al.*, 2013). The use of non-steroidal anti-inflammatory drugs has been linked with the development of gastric ulcers and complications such as gastrointestinal bleeding and perforation which are side effects can lead to death. NSAIDs initiate mucosal injury topically due to their acidic properties. This is done by diminishing the hydrophobicity of gastric mucus, endogenous gastric acid and pepsin thus injuring surface epithelium (Awofisayo *et al.*, 2008). Systemic effects of NSAIDs appear to play a role through the reduced synthesis of mucosal prostaglandins (Akpotuzor *et al.*, 2013).

Materials and methods

Handling of experimental animals

16 male Albino Wistar rats weighing between 170-200 g were obtained from the animal House of College of Health Sciences, University of Uyo, Nigeria. The animals were examined and weighed before the commencement of this experiment. They were kept in clean cages and given clean tap water *ad libitum*.

Preparation of drugs

Aspirin (acetylsalicylic acid) was prepared by dissolving 300mg in 10 ml of distilled water. Omeprazole was prepared by dissolving a single tablet (20mg) in 10ml of distilled water.

Collection of plant and identification

Lantana camara was obtained from Ekom Iman along Etinan-Uyo highway, Akwa Ibom State. The plant was identified at the Department of Botany and

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Ecological studies, University Of Uyo with the Herbarium number: UUH 4023(Etinan).

Plant extraction

Extraction of the leaves of *Lantana camara* was done in the Department of Biochemistry, College of Health Sciences, University of Uyo.

Experimental Protocol

The animals were divided into 4 groups with 4 animals each.

Group 1 was given distilled water orally for 14 days

Group 2 was given 300mg/kg of aspirin dissolved in water and given intra-peritoneally as a single dose.

Group 3 was given 300mg/kg of aspirin dissolved in water and given intra-peritoneally plus 250mg/kg of ethanolic extract of *Lantana camara* administered orally, 6 hours after ulcer induction for a period of 14 days.

Group 4 was given 300mg/kg of aspirin dissolved in water and given intra-peritoneally plus

20mg/kg of omeprazole administered orally, 6 hours after ulcer induction for a period of 14 days.

Ulcer Induction

300mg/kg of Aspirin was injected intraperitoneally and the animals were deprived from both food and water for 6 hours.

Animal sacrifice

After the last dose schedule, the animals were sacrificed after anesthesia with chloroform, the stomach was excised and dissected to ascertain ulcerations. The stomach was processed histologically, stained with H& E reagents and viewed under a microscope.

Results

Several histopathological observations were evident in the results shown below. The control group showed normal cytoarchitecture of the gastric mucosa with a well defined epithelial lining. The ulcer group (Group 2) showed severe mucosal perforations, epithelial lining erosion and gastric cell metaplasia. Similarly, the treatment groups (group 3 and 4) showed an improvement in the already eroded epithelial lining of the mucosa, improved gastric metaplastic cells and showed reduced infiltration of leucocytes.

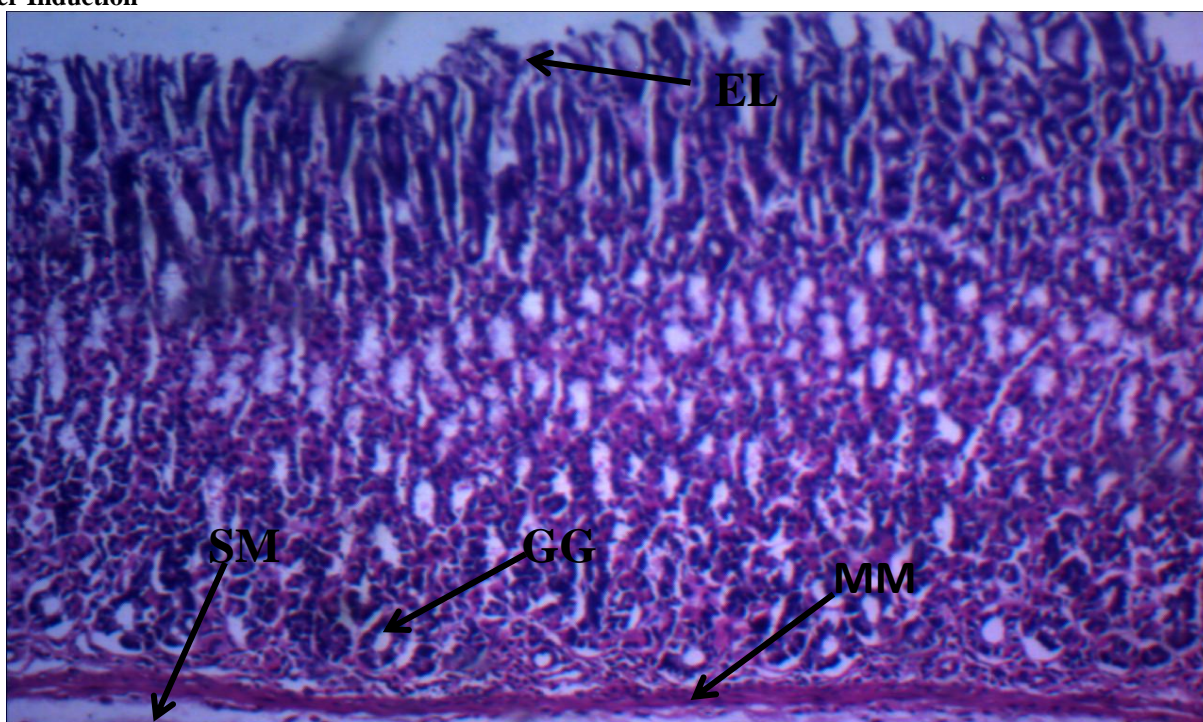


Figure 1: Photomicrograph of control group showing accurate epithelial lining(EL), muscularis mucosa (MM), submucosa (SM) and Gastric glands(GG) : X10 magnification



Figure II: Photomicrograph of group 2 administered with 300mg/kg of aspirin showing mucosal perforations (MP), gastric cell metaplasia (GCM) and epithelial lining erosion (ELE) : X10 magnification.

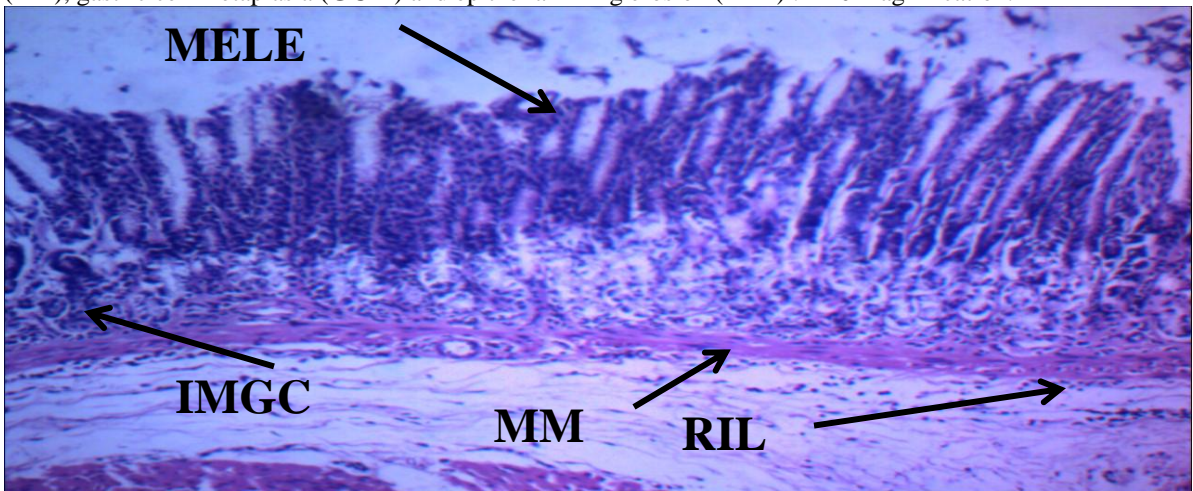
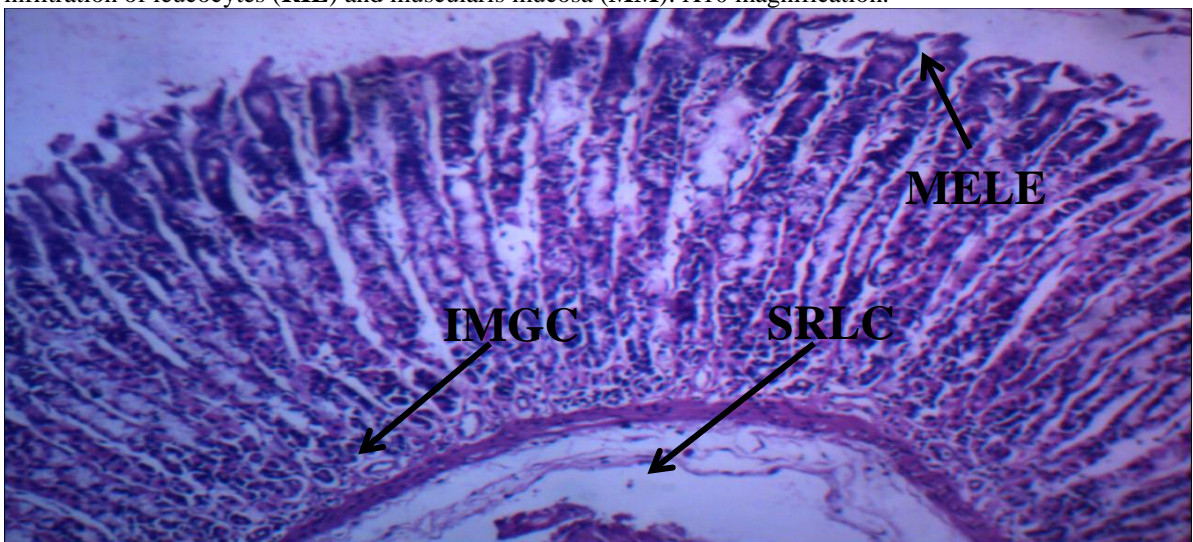


Figure III: Photomicrograph of group 3 administered with 300mg/kg of aspirin and 250mg/kg of *Lantana camara* showing mild epithelial lining erosion (MELE), improved metaplastic gastric cell (IMGC), reduced infiltration of leucocytes (RIL) and muscularis mucosa (MM): X10 magnification.



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Figure IV: Photomicrograph of group 4 administered with 300mg/kg of aspirin and 200mg/kg of omeprazole showing mild epithelial lining erosion (**MELE**), improved metaplastic gastric cell (**IMGC**) and significant reduction infiltration of leucocytic cell (**SRLC**): X10 magnification.

Discussion

The gastric mucosa consists of a surface epithelium that invaginates to various extents into the lamina propria forming gastric pits (Liuz and Jose, 2005). Viewing the epithelial surface of the stomach under the microscope showed numerous small irregular invaginations of the epithelial lining. An ulcer is a disruption of the mucosal integrity that leads to an excavation due to active inflammation. This corroborated the report from this research in the group administered with 300mg/kg of aspirin which indicated severe mucosal perforation, epithelial lining and gastric cell metaplasia. The ulceration caused by any aggressive agent may be exacerbated by aggressive agents which may further result in additional gastric and duodenal ulcers (Liuz and Jose, 2005). Administration of *Lantana* extract indicated mild epithelial lining erosion and improved metaplastic gastric cell, this implies that certain processes that repair superficial damage of the gastric mucosa may be caused by several factors which play a very important role in the defense mechanism as well as adequate blood flow that promotes gastric physiological action (Liuz and Jose, 2005). This is also supported by the findings of Gabriel Edem *et al.*, 2020 who noted that *Lantana camara* significantly ameliorates ulcer in male wistar rats by reducing gastric acidity, hydrogen ion concentration (pH) and ulcer score.

Ethical approval

Ethical clearance to undertake this research was given by the ethical committee of the institution

Conflict of interests

Authors have declared that no competing interests exist.

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