



## HISTOLOGICAL EVALUATION OF THE COMBINE EXTRACT OF AQUEOUS ZINGIBER OFFICINALE (GINGER) ROOT AND HONEY ON THE STOMACH OF ADULT WISTAR RATS

Eru, M. Eru, Kebe, E. Obeten, Kelechi C. Uruakpa, & Mesembe O Edet  
Dept of Anatomy, University of Calabar-Nigeria.

### Abstract

*Zingiber officinale* (ginger). Ginger has been used for the purpose of the treatment of many diseases such as arthritis, painful menstrual periods, nausea etc. Honey is used mainly for cooking, baking; as spread on bread and as an additives to various beverages such as tea and as sweetener in some commercial beverages. The aim of this work is to assess the effects of ginger mixed with honey on the histology of the stomach of adult Wistar rats. Thirty adult Wistar rats weighing 190-200g were divided into control group A and two experimental groups B and C each consisting of ten rats. The animals in control group A received water only while the animals in the experimental group B and C received 9mg/kg and 228mg/kg of ginger and honey for 14 and 28 days respectively. At the end of experimentation, results showed no significant changes compared to the control group.

**Keywords:** Ginger, Honey, Stomach, Wistar rats.

### Introduction

Ginger is a rhizome of the monocotyledonous perennial plant though it is widely referred to as a root. Ginger has been used for the purpose of the treatment of many diseases such as arthritis, colic, diarrhea, heat condition, common cold, flu-like symptoms, headache and painful menstrual periods. Ginger contains essential chemicals which include sesquiterpenoids with (-) zingiberene as the main components, but lesser amounts of other sesquiterpenoids are  $\beta$ -phellandrene, cineol and citral. These active ingredients in different ways produce varying pharmacological effect under varying condition.

Honey is a sweet food, made by bees using nectar from flowers. Honey bees form nectar into honey by process of regurgitation, and store it as a primary food source in wax honey-combs inside the beehive. Honey contains a wide variety of vitamins, minerals, amino acids and antioxidants. The vitamins include: niacin, riboflavin and pantothenic acid; minerals present include calcium, copper, iron, manganese, magnesium, phosphorus, potassium and zinc. Honey also contains a variety of flavonoids and phenolic acids which acts as antioxidant, scavenging and eliminating free radicals. Honey is a mixture of sugars and other compounds; with respect to carbohydrate, honey is mainly fructose (about 38.5%), and glucose (about 31.0%), making it similar to the synthetically produced inverted sugar syrup which is approximately 48% fructose, 47% glucose and 5% sucrose. With all nutritive sweetness, honey is mostly sugars and contains only trace amount of several compounds thought to function as antioxidant including chrysin, pinobanksin, vitamin C and pinocembrin<sup>5</sup>.

The stomach is the most distensible part of the gastro intestinal tract located in the upper left abdominal quadrant. It is the site where food materials are being stored, digested and also absorbed, Moore (1999). It has four parts, these include:

- The cardia:** This is the part surrounding the cardiac orifice
- The fundus:** This is the small dilated part that is related to the left dome of the diaphragm and is limited inferiorly by the horizontal plane of the cardiac orifice. The superior part of the fundus usually reaches the level of the left 5<sup>th</sup> intercostals space. The cardiac notch is between the oesophagus and fundus. The fundus may be dilated by gas, fluid, food or any combination of these (Chaurasia 2004).
- The body:** This lies between the fundus and the pyloric antrum.
- The pyloric part:** This is the funnel shaped region of the stomach. The pyloric antrum leads into the pyloric canal. The pylorus is thickened to form the pyloric sphincter, which control the discharge of the stomach content through the pyloric orifice into the duodenum (Moore, 2006).

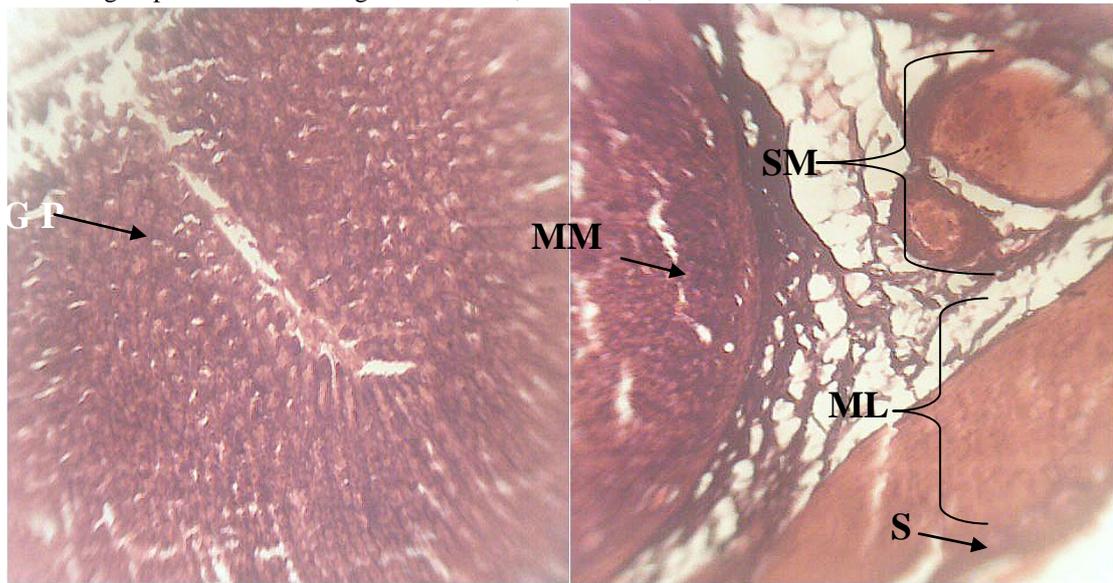
### Experimental Protocol

Thirty adult Wistar rats weighing 190-200g were divided into three groups; A, B and C of ten rats each. Group A served as the control and was fed with animal chow and water. Group B and C were administered 9mg/kg of ginger and 228mg/kg of honey for two and four weeks respectively. All animals were sacrificed 24 hours after the last administration, the stomach excised and fixed in Bouin's fluid. Following complete fixation of the stomach, routine histological processing was carried out. The stomach sections were stained with haematoxyline and eosin stains.

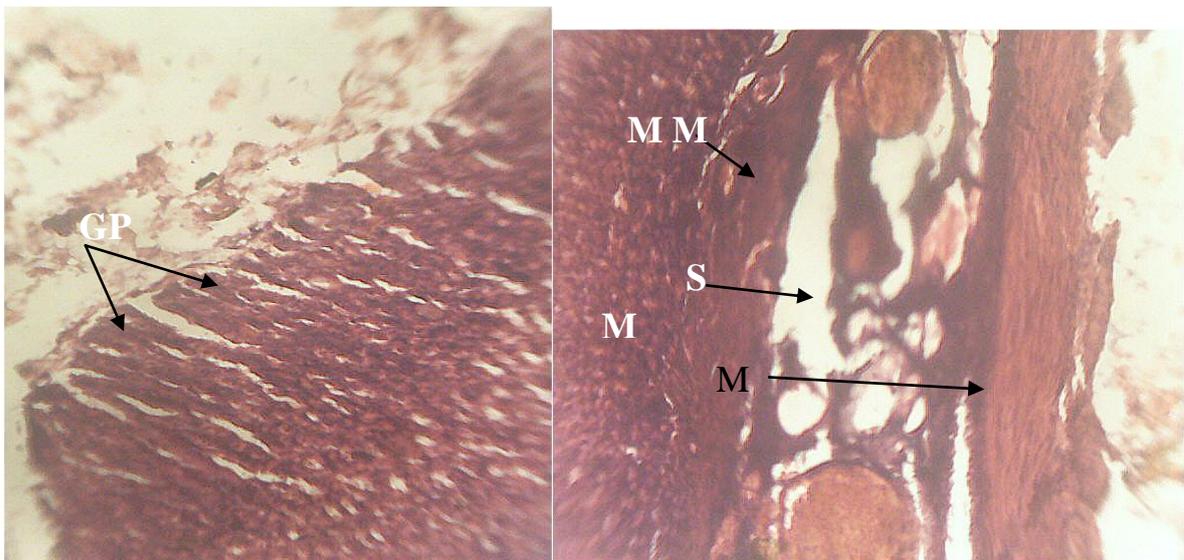
### Results

The photomicrograph of the control group showed normal mucosa, submucosa, muscularis, externa and serosa.

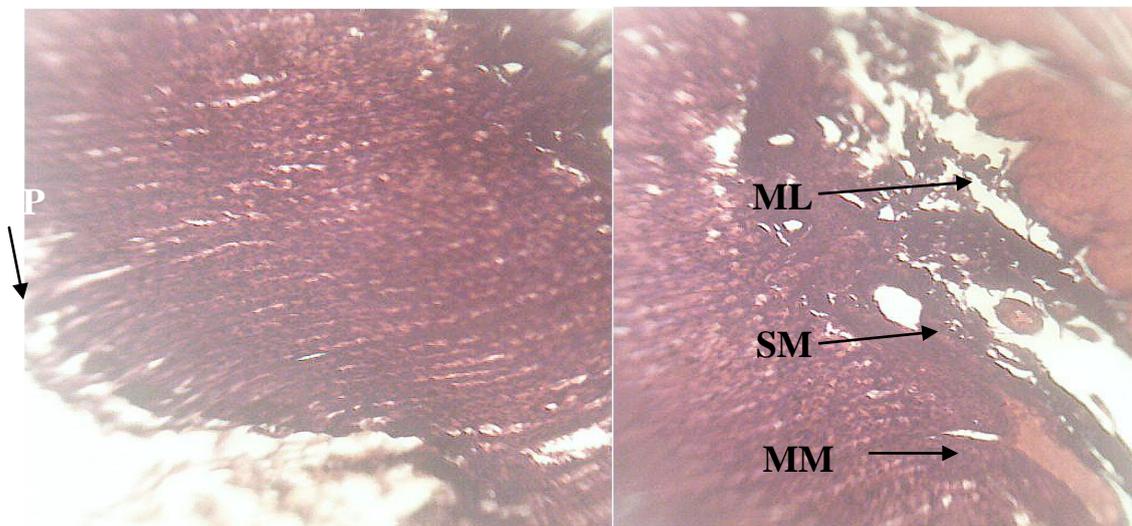
In the experimental groups treated with 9mg/kg of ginger and 228mg/kg of honey showed no significant changes. The experimental groups showed normal gastric mucosa, submucosa, muscularis externa and serosa.



Group A (control)



Group B



Group C

Keys: GP: gastric pit, ML: muscle layer, MM: muscularis mucosa, SM: submucosa, S: serosa

## Discussion

Ginger is a rhizome of monocotyledonous perennial plant though it is referred to as a root. Ginger is used for the purpose of the treatment of many diseases such as diarrhea, heat condition, common cold, arthritis, headache and painful menstrual periods<sup>1</sup>. Some active components of ginger are reported to stimulate digestion, absorption, relieve constipation and flatulence by increasing muscular activity in digestive tract<sup>9</sup>; and also reduce vomiting and nausea significantly<sup>10</sup>.

On the other hand, honey aggravate air/moving forces, scrapes mucus/holding forces and normalises catabolic fire and blood. Honey promotes the healing process<sup>11</sup>. According to Aiyah, orally administered honey showed no significant differences for weight, length and width of the testis<sup>12</sup>. Honey possibly acts as physiologic modulators of spermatogenic cells proliferations which influences the spermatogenic cycle, thus increasing the sperm production. A possible mechanism would be an interaction with follicle stimulating hormone (FSH) and luteinizing hormone (LH), hormones which were shown to restore spermatogenesis of hyposectionized rat<sup>13</sup>. In this study, the effects of ginger and honey was investigated in adult Wistar rats. After tissue processing, the experimental groups that took 9mg/kg of ginger and 228mg/kg of honey showed no significant histological changes. There is no significant alteration to the epithelial lining, gastric pit, lamina propria, muscularis mucosa, submucosa, muscularis externa and the serosa.

In the light of the above report, it can be concluded that extract of ginger roots and honey has no noticeable effect on the integrity of the stomach histology and rather may be protective. Further research should be carried out using electron microscope on the cells of the stomach.

## References

- Abdullah *et al*, (2010). Ginger Extract (*Zingiber officinale*) triggers apoptosis and G0/G1 cells arrest in HCT 116 and HT 29 colon cancer cell lines. *African Journal of Biochemistry Research* 4(4): 134-142.
- Altman, R. D and Marcussen, K. C. (2001). Effects of Ginger Extract on Knee pain in Patients with Osteoarthritis. *Arthritis Rheum* 44 (11): 2531-2538.
- Asiyah, H. A., Syazana, N. S., Hashida, N. H., Durriyyah Sharifah, H. A & Kamarruddin, M. Y. (2011). Effect of nicotine and gelam honey on testis parameters and sperm qualities of juvenile rats scientific research as essays vol. 6 (26): 5471-5474.
- Calvert, I (2005). Ginger: an essential oil for shortening labour? *Pract. Midwife* 8(1): 30-34.
- Ficker C, Smith ML, Akpagana K, Gbeassor M, Zhang J., Durst, T., Assabgui R. & Arnason JT (2003). Bioassay-guided isolation and identification of antigungal compounds from ginger. *Phytother Res*, 17:897-902.
- Garner DL, Hafez ESE (2000). Spermatozoa and seminal plasma. In Hefez, B. & Hafez E.S.E (ed) *Reproduction in Farm Animal*. 7<sup>th</sup> Edition. Lippincott Williams and Wilkins, New York, pp. 365-375.
- Lansing Prescott, John P. Harley & Donald A. Klein, (1999). *Microbiology*. Boston: WCB/McGraw-Hill.
- Molan, Peter C. (1992). Honey for the treatment of infection. *The New Zealand Beekeeper* (Waikato Honey Research Unit) 216-19-20.
- Mowrey DB & Clayson DE, (1982). Motion sickness, ginger and psychophysics. *Lancet* i, 6557.
- Piotr Tomasik, (2004). *Chemical and functional properties of food saccharides*, CRC Press P. 74.
- Val Whitmyre, (2007). *The plight of the honeybees*. University of California.