

Effect of croissant supplemented with honey and propolis on aspirin-induced stomach ulceration in rats

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ABSTRACT

This study aimed to evaluate the effects of croissant supplemented with different percents of bees honey and propolis on stomach ulcer. Chemical, sensory, physical and biological characteristics were assessed. Croissant with 25% Bees Honey recorded the highest overall acceptability, so it was the ideal addition percentage of propolis (P) to the croissant depending on organoleptic scores. Results revealed that the addition of Bees Honey (BH) enhanced the croissant taste and decreased its total content of ash, moisture and fat, while the addition of the Bees Honey croissant with propolis decreased its total protein and energy. Results show that the mice group fed on Bees Honey croissant (BHC) and Bees Honey croissant with propolis (PBHC) decreased volume of gastric juice (GJ), Total acidity of gastric juice and length of gastric juice and curative ratio comparing to positive control.

Keywords: Bees Honey – Croissant – Propolis - Stomach ulcer.

INTRODUCTION

The stomach is divided into five anatomical region (cardiac, fundus, body, pyloric, antrum or canal and pylorus). It has also three secretory areas (cardiac, body and pyloric).The arteries anastomose freely in the muscular submucous and mucous coats except along the lesser curvature of the murvature of the pyloric antrum and including the first part of duodenum (Alasdair *et al.*, 1981).

Clinical symptoms of gastric ulcer included gastric tone and painful hunger contraction when the stomach is empty and these are basic symptoms of gastric ulcer .The amount and concentration of hydrochloric acid increased in the duodenal ulcer but may be normal in the gastric ulcer .The complication of bleeding and risk of perforation occur when the mucosal erosion extends to involve blood vessels serving the tissue area .Nutritional deficiencies are evident in low plasma protein level , anemia and loss of weight . Hemorrhage may be the first sign of the ulcer in some patients (Sue (1990). There are three basic causative factors of stomach ulcer: Gastric acid, and pepsin none steroidal anti- inflammatory drugs (NASIDs) and *Helicobacter pylori* infection (*H. pylori*) (Sue *et al.*, 1995).

Stomach can churn the food and break it down mechanically as well as chemically. Once the food is the consistency of smooth paste, it is squeezed through a second sphincter into the first part of the small intestine (duodenum) . The lining of the stomach – the mucosa or gastric epithelium is layered with multiple folds ulcers in this lining (Aquino *et al.*, 2000) .

Peptic ulcer is a hole in the gut lining of the stomach , duodenum , or esophagus. A peptic ulcer of the stomach is called a gastric ulcer; of the duodenum a duodenal ulcer; and of the esophagus, an esophageal ulcer. An

ulcer occurs when the lining by the stomach cells (Anekonda and Reddy 2005).

Helicobacter pylori infection (*H. pylori*) is responsible for the majority of peptic ulcer. *H. pylori* weakens the protective mucous coating of the stomach and duodenum, which allows acid to get through lining and cause a sore, ulcer. *H. pylori* is able to survive in stomach acid because it secretes enzymes that neutralize the acid. This mechanism allows *H. pylori* to make its way to the "safe" area the protective mucous lining. Once then the bacterium's spiral shape allows it to burrow through the lining (Bullock and Dengir 2005).

Anon (2005) discovered the causative (*Helicobacter pylori* bacteria) of 80% of stomach ulcer cases and 90% of duodenal ulcer; 2/3 of the world population not knowing that are inflicted with ulcer which may develop to stomach cancer, the second causative of cancer death. Thereby, ulcers didn't continue to be disease, but can be cured by antibiotics and acid formation inhibitor for limited period of time.

British National Formulary (2007) recorded that the most common cause of the stomach with bacteria called *H. pylori*. These bacteria cause the stomach to make too much acid, which damages the lining of the stomach or duodenum and can cause the ulcer. Some medicines, called non-steroidal anti-inflammatory drugs (NSAIDs), can cause peptic ulcer. Smoking, stress and drinking excessive alcohol increase the chance of developing a peptic ulcer.

Soejarto and Farnsworth (2007) indicated that the major symptom of an ulcer is a burning or gnawing feeling in the stomach area that lasts between 30 minutes and 3 hours. This pain is often interpreted as heartburn, indigestion or hunger. The pain usually occurs in the upper abdomen, but sometimes it may occur below the breastbone. Appetite and weight loss are other symptoms. Persons with duodenal ulcers may experience weight gain because the persons eat more to ease discomfort.

Natural honey (NH) and *Nigella sativa* (NS) seeds have been in use as a natural remedy for over thousands of years in various parts of the world. The aim of this study was to assess the protective effects of NS (*Nigella sativa*) and NH (natural honey) on acetylsalicylic acid induced gastric ulcer in an experimental model with comparison to *Cimetidine* (CD) (Bukhari *et al.*, 2011).

Castaldo and Capasso (2002) mentioned that modern herbalists recommend propolis for its anti-bacterial, anti-fungal, anti-viral and anti-inflammatory properties, as a means of increasing the body's natural resistance to infections and for use against the cause of gastric ulcers, *Helicobacter pylori*.

Propolis has anti-microbial properties but, if it can inhibit the growth of gastric ulcer pathogens like *H. pylori*, what effect might routine medication be having on the normal intestinal microflora and/or probiotic bacteria ingested for their alleged therapeutic properties (Abd El Hady and Hegazi (2002).

This study aims at making up for lack in using some natural food substances like Bees Honey its products to produce some kinds of backings

which are used as a new method, for avoiding some chronic diseases, besides using chemical medicines.

MATERIALS AND METHODS

Materials:

1. Bees Honey and Propolis:

Bees Honey and Propolis were collected on May 2013 from an experimental apiary located in Mansoura, Dakhalia.

2. The Croissant ingredients:

The Croissant ingredients (wheat flour , sucrose, sun flower oil, yeast, eggs, salt and vanilla) were purchased from local market, Mansoura Egypt.

3. Experimental animals:

The experiment was carried out on 24male albino rats Sprague Dowaly strain. The mean weight of male rats was ranged from 140-150g. The animals were purchased from Agriculture Research Center, Giza, Egypt, kept under observation and fed on standard diet for week as adaption period before the experiment .The standard diet composition is shown in Table(A) according to Lane-peter and pearson (1971).

Table: (A) Chemical composition of standard diet:

Ingrediens	g/kg diet
Casein	200
Corn starch	497
Sucrose	100
Vitamin mixture	20
Mineral mixture	100
Corn oil	50
Cellulose	30
Methionine	3

4. Aspirin

Aspirin is white tablets, each tablets contain 333.3 mg of acetyl salicylic acid, it was purchased from El- Kahera Company for Chemicals, Egypt.

Method:

1. Preparation of Croissant:

a. Processing of Croissant:

Croissant was processed according the method of Shalaby *and* Yasin (2013) with minor modification (substitution of margarine by sunflower oil, salt and vanilla) .The ingredients are shown in Table B. Wheat flour was mixed well within oil, then baking powder was added Egg was cracked into a cup and whisked; milk was added to the cup and whisked together, then the mixture was poured into the bowel and mixed to form dough. The dough was divided into pieces, each piece was rolled into around shape, then divided into 4 pieces and each past was rolled up. The rolled piece were putted on baking tray, brushed with the egg and milk mixture and baked in the over at 205°C for 10-15 min. The Bees honey and propolis at three level were added to the croissant after baked.

Table: (B) Ingredients of Croissant:

Ingredients	Gm/Kg
Flour	445.71
Oil+ vanilla+ salt	163.49
Baking Powder	4
Egg	202.81
Milk	183.99

b. Preparation of Bees Honey Croissant:

Different levels of Bees Honey (11%, 25%, and 27.3%) were added to the previous prepared Croissant after backing , then it was packed in poly ethylene bags and stored in a refrigerator at $(5\pm 1c^0)$. The Croissant with 25% Bees Honey was chosen to be the best one according the sensory evaluation

c. Preparation of Bees Honey Croissant with Propolis:

Different levels of Propolis (1.1%, 2.6%, 4.2%, and 6.4%) were mixed with Bees Honey after baking , as25% of honey then added to the croissant filling then it was packed in poly ethylene bags and stored in refrigerator at $(5\pm 1c^0)$. The Croissant with 25% Bees Honey and 4.2%, 6.4% Propolis was chosen to be the best Croissant depending on the sensory evaluation.

2. Chemical composition of Bees Honey Croissant and Propolis Leaves:

Moisture, ash, lipid, total protein and carbohydrate content of the samples were determined according to the method of A.O.A.C. (2005). While carbohydrate content was calculated by Pearson (1973) as follows :% Carbohydrate =100- (% moisture+% protein +% fat +% ash).

3. Biological evaluation of Bees Honey Croissant and Propolis in experimental rats:

a. Ulcer experiment:

This experiment was carried out evaluate the protective effect of Bees Honey Croissant and Propolis on stomach ulcer. Twenty four rats were divided into six group (n=4) .One group (control negative) was fed on basal diet, the positive control was fed on basal diet and added Aspirin (333.3 mg) in the end of experiment, and the other groups fed on basal diet and Bees Honey Croissant and Propolis with Croissant and added Aspirin in the end of experiment for 15 days.

The rats were classified as follows :

- Group 1 (control negative) rats were fed on basal diet only.
- Group 2 (control positive) rats were fed on basal diet and addition to (Aspirin).
- Group 3 rats were fed on basal diet + 25% Bees Honey Croissant.
- Group 4 rats were fed on basal diet + 27.3% Bees Honey Croissant.
- Group 5 rats were fed on basal diet + 25% Bees Honey Croissant + 4.2% Propolis.
- Group 6 rats were fed on basal diet + 25% Bees Honey Croissant + 6.4% Propolise.

The rats were subjected daily to the physical examination for observation of healthy condition such as external appearance, body condition and activity of rats.

Food intake was recorded daily. New food was given according to the actual need of each group. The remaining diet from the previous day was weighted, and food intake was and calculated the loss or gain in body weighted was estimated every week.

The total body weight gain and food intake of experimental period food efficiency ratio were calculated at the end of experiment as the following according by (Chapman *et al.*, 1950)

$$\text{Food efficiency ratio "FER" = } \frac{\text{Body weight gain (gm)}}{\text{Food intake (gm)}}$$

At the end of experimental period, the rats were anaesthetized by diethyl ether and sacrificed. Blood samples were collected in clean test tubes and left for coagulation then centrifuged at 3000 rpm for 15 minutes to obtain serum.

$$\text{Curative ratio (CR) = (LC-LT/LC) x100}$$

LC: The length of gastric ulcer in positive group.

LT: The length of gastric ulcer in treated group.

(Agrawal *et al.*, 2000)

$$\text{Total acidity (mEq/ml) = ml of 0.01 N NaOH X100X Normality /0.1}$$

$$\text{Acidity = Vol. of NaOH} \times \text{N} \times 100 \text{ mEq/L0.1}$$

(Raj Kapoor *et al.*, 2002).

4. Statistical analysis:

All obtained data were statistically analyzed by SPSS computer software. The calculated accrued by analysis of Variance ANOVA and follow up LSD (SPSS) Computer program variation EL Said (1978).

RESULTS AND DISCUSSION

1. Chemical composition of Bees Honey, Propolis and Wheat Flour:

Chemical composition (g/100g) of Bees Honey, Propolis and wheat flour are presented in Table 1. The highest moisture content was for Bees Honey (13.65±4.55) followed by wheat flour (10.46±3.48); however the lowest content was recorded for Propolis (4.54±1.51). Ash content varied from 0.15±0.05g/100g for Bees Honey to 5.06±1.68g/100g for Propolis. Data show that there was no fat content in Bees Honey; however high fat content was recorded for Propolis (11.51±3.83 g/100g). On the other hand protein content ranged between 0.93±0.318 g/100g in wheat flour and no content in Bees Honey. The highest carbohydrates content was in wheat flour, followed by Bees Honey and Propolis.

Overall, results in Table 1 pointed out that Bees Honey had the highest content of moisture, and the lowest content of protein, ash, and fat which agree with Siu *et al.*, (2006).

Halina *et al.*, (2011) recorded that wheat flour were characterized by a significantly higher level of dietary Carbohydrates, fat and protein, in comparison to control bread which in line with our results.

Table (1): Chemical composition of Bees Honey, Propolis and Wheat Flour.

Chemical Composition		Moisture content %	Ash content %	Fat content %	Protein content %	Carbohydrate content %
Samples						
Bees Honey	Mean	13.65 a	0.15 c			86.20 b
	SD	4.55	0.05			28.73
Propolis	Mean	4.54 c	5.06 a	11.51 a	0.56a	78.33 c
	SD	1.51	1.68	3.83	0.18	26.11
Wheat flour	Mean	10.46 b	0.63 b	1.67 b	0.93 a	86.31 a
	SD	3.48	0.21	0.55	0.31	28.76

Results are Mean and Std. Deviation of three determinations SD: Standard Division. a, b, c, d, . . . :Different superscripts within the same column raw represent significant differences between the results ($p \leq 0.05$).

2. Chemical composition of Croissant prepared from Bees Honey.

Moisture, ash, fat, protein and carbohydrate contents of Croissant bread made from wheat flour (WF) (control) compared with Bees Honey (BH) Croissant are showed in Table 3. The highest moisture content was for WF Croissant (control) (22.94 ± 0.04 g/100g), followed by 11.1% BH Croissant (21.59 ± 0.32 g/100g) and 25% BH Croissant (21.76 ± 0.08 g/100g); however the lowest content was recorded for 27.3% BH Croissant (20.33 ± 0.10 g/100g). Ash content varied from 0.48 ± 0.05 g/100g for 27.3% BH Croissant to 0.71 ± 0.03 g/100g for 11% BH Croissant.

Table (2): Chemical composition of Bees Honey Croissant .

Chemical Composition		Moisture content %	Ash content %	Fat content %	Protein content %	Carbohydrate content %
Samples						
Control	Mean	22.94 a	0.54 c	32.11 a	0.65 b	43.76 d
	SD	0.04	0.47	1.23	0.21	1.61
Croissant with 5 g honey (11.1%BH)	Mean	21.59 b	0.71 a	28.77 b	0.56 c	48.36 c
	SD	0.32	0.03	1.40	0.18	1.96
Croissant with 10 g honey (25%BH)	Mean	21.76 c	0.58 b	18.62 c	0.37 d	58.66 b
	SD	0.08	0.04	6.09	0.12	6.42
Croissant with 15 g honey (27.3 %BH)	Mean	20.33 d	0.48 d	13.12 d	0.75 a	65.32 a
	SD	0.10	0.05	5.32	0.25	5.53

Results are Mean and Std. Deviation of three determinations SD: Standard Division. a, b, c, d, . . . :Different superscripts within the same column represent significant differences between the results ($p \leq 0.05$).

Data show that the highest fat content was recorded for control (32.11 ± 1.23 g/100g), followed by 11.1% BH Croissant (28.77 ± 1.40 g/100g); however the lowest content was for 27.3% BH Croissant (13.12 ± 5.32 g/100g). Protein content ranged between 0.37 ± 0.12 g/100g for 25% BH Croissant and 0.75 ± 0.25 g/100g for 27.3% BH Croissant. On the other hand,

Bees Honey Croissant increase carbohydrates content from 48.36±1.96 g/100g in 11.1% BH Croissant to 65.32±5.53g/100g in 27.3% BH Croissant. Overall, Bees Honey Croissant decreased moisture, ash, fat and proteins; however increased carbohydrates content in Croissant.

Our results agree with Mazentaip (2004) and Siu *et al.*, (2006) who recorded that addition of Bees Honey to Kiser bread increased carbohydrates content.

3. Chemical composition of Croissant prepared with Bees Honey and Propolis.

Chemical composition expressed as moisture, ash, fat, portion and carbohydrates contents of Propolis and Bees Honey (PBH) Croissant are shown in Table 3. A decrease in moisture content can be observed by the increase of Propolis with Bees Honey Croissant addition with significant differences between treatments and control.

As shown in Table3. Propolis with Bees Honey Croissant increased ash content from 0.66±0.22g/100g in control to 1.17±0.08 g/100g in 6.4% PBH croissant. Fat content increased parallel to the increment in Propolis addition, which ranged between 17.11±2.61 g/100g in control and 19.79±0.57 g/100gin 6.4% PBH Croissant.

Table (3): Chemical composition of Croissant prepared with Bees Honey and Propolis.

Chemical Composition		Moisture content %	Ash content %	Fat content %	Protein content %	carbohydrate content %
Samples						
Croissant with 0.5 g propolis + 9.5g bees honey (1.01%propolis)	Mean	21.62 a	0.66c	17.11 a	1.09 a	59.52 a
	SD	0.04	0.22	2.61	0.36	2.04
Croissant with 1 g propolis + 9g bees honey (2.4%propolis)	Mean	19.42 b	0.77 bc	18.58 a	0.84 a	60.78 a
	SD	0.19	0.01	0.29	0.28	0.48
Croissant with 2 g propolis + 8g bees honey (4.2 %propolis)	Mean	19.49 b	0.88 b	19.07 a	0.65 a	59.91 a
	SD	0.03	0.07	0.76	0.21	1.88
Croissant with 3 g propolis + 7g bees honey (6.4 %propolis)	Mean	19.39 b	1.17 a	19.79 a	0.39a	59.26 a
	SD	0.03	0.08	0.57	0.13	0.78

SD: Standard Division. a, b, c, d, . . .:Different superscripts within the same column represent significant differences between the results ($p \leq 0.05$).

The highest content of protein was for 6.4% PBH Croissant (0.39±0.13) which indicates Propolis with Bees Honey Croissant effect in protein decrease of the final product.

No significant differences were found between all samples in carbohydrates content. Control had the highest carbohydrates content

(60.28±0.48), followed by 2.4% PBH Croissant and the lowest value was for 6.4% PBH Croissant (59.25±0.78).

Generally, results indicated the decrease in moisture, carbohydrates and protein as result to Propolis with Bees Honey Croissant addition moreover an increase was found in ash and fat content.

Hascıkl *et al.*, (2013): recorded that chemical composition of Bees Honey and Propolis decrease level of moisture and increase level of fat which may be acceptable for several special human diets. The same results were indicated by those of Burits and Bucar (2000); EL-Malky and Kerolles (2000).

4. Scores of sensory evaluation of Croissant prepared with Bees Honey and Propolis.

Scores of sensory evaluation expressed as taste, odor, color, appearance and overall acceptability of Croissant prepared with Bees Honey and Propolis are represented in Table 4. The preferred taste scores was recorded for PBH Croissant contained Propolis at level of 1.01 % Propolis (8.9 ±0.60), followed by PBH Croissant with 2.4% Propolis; however the lowest scores was for 6.4 % PBH Croissant (8.0 ±1.00). Results show insignificant differences in odor between all samples. Moreover, the highest scores in treatments was for 1.015% PBH Croissant (9.0 ±1.00) and the lowest was for 6.4 % PBH Croissant (7.0 ±1.00). Propolis improved color at level of 1.01 % PBH Croissant (9.5±1.04) and decreased color scores to be the lowest at level of 11.1% PBH Croissant (8.0 ±1.00). Data in the same table show that Propolis improved appearance at 1.01% PBH Croissant (9.8 ±1.10) ,2.4% PBH Croissant (9.0 ±1.00) and 4.2% PBH Croissant (8.0±1.00) which decreased to be the lowest score for 6.4 % PBH Croissant (7.5±0.76).

Table (4): Scores of sensory evaluation of Croissant prepared with Bees Honey & Propolis .

Croissant samples		Parameters				
		Taste (10)	Odor (10)	Color (10)	appearance (10)	Overall acceptability (10)
Croissant with 0.5g propolis + 9.5g Bees Honey (1.01% propolis)	Mean	8.9a	9.0a	9.5a	9.8a	8.5a
	SD	0.60	1.00	1.04	1.10	1.04
Croissant with 1g propolis + 9g Bees Honey (2.4% propolis)	Mean	8.6a	8.4a	9.2a	9.0a	8.8a
	SD	1.05	1.02	1.00	1.00	1.10
Croissant with 2g propoli+ 8g Bees Honey (4.2 % propolis)	Mean	8.2a	8.0a	8.5a	8.0a	8.0a
	SD	1.01	1.00	1.04	1.00	1.00
Croissant with 3g propolis + 7g Bees Honey (6.4 % propolis)	Mean	8.0a	7.0a	8.0a	7.5a	7.0a
	SD	1.00	1.00	1.00	0.76	1.00

SD: Standard Division. a, b, c, d, . . . :Different superscripts within the same column represent significant differences between the results (p ≤ 0.05).

Overall, acceptability scores recorded the highest value for 2.4% PBH Croissant (8.8 ±1.10) followed by 1.1 % PBH Croissant (8.5 ±1.4) and 4.6 PBH Croissant had the lowest score.

Finally, Propolis with Bees Honey Croissant at the level of 1.01% PBH Croissant recorded the preferred treatment sample in taste, odor, appearance and overall acceptability; however 2.4% PBH Croissant was the highest score in color.

Jovanka *et al.*, (2010) used sensory analysis for quality assessment of new functional products with potential benefits for human health, and stated that different Bees Honey products have statistically highly significant ($p < 0.01$) influence on the sensory evaluated properties of pralines.

Gastric ulcer disease:

5. Daily food intake and food efficiency ratio experimental gastric ulcer model rats model.

Daily food intake and food efficiency ratio experimental gastric ulcer model rats model shown in Table 5. Daily food intake level increased significantly in control positive group. Data shows that Bees Honey Croissant and Propolis with Bees Honey Croissant increased levels of daily food intake. The lowest level of daily food intake was recorded for control negative (14.68 ± 0.45); however the highest level was in control positive (16.21 ± 1.06).

Bees Honey Croissant decreased levels of daily food intake from 15.43 ± 0.75 and 15.47 ± 0.78 for 25%BH Croissant and 27.3%BH Croissant respectively.

Food efficiency ratio increased in groups feeding on Bees Honey Croissant for 25%BH Croissant and 27.3%BH Croissant (0.60 ± 0.20) and (0.41 ± 0.13); however decreased in groups feeding on Propolis with Bees Honey Croissant (0.19 ± 0.09) and (0.29 ± 0.09) for 4.2% PBH Croissant and 6.4% PBH Croissant respectively.

Generally, significant differences between all treatments in experimental gastric ulcer.

Honey has a very long history of low-risk food use. It is often consumed alone, as a spread, or may be mixed with a wide range of other foods. Daily intake as a food could easily reach 100 g in some individuals, a dose far higher than is likely to be achieved when honey is consumed in therapeutic forms. Two tablespoons of honey (30 mL) given before meals three times daily was used to treat male and female patients (20 – 40 years) suffering from gastritis, duodenitis and duodenal ulcers. The study, by Salem (1985) was poorly designed and reported and of little value beyond the anecdotal. Although a placebo was used (composition not stated), there was no comparison of results between the two groups. The author claimed that two-thirds of patients recovered following treatment, that the haemoglobin levels of most patients increased and that faecal blood loss decreased. Salem Also, notes that he has used honey in the form of enemas to treat ulcerative proctitis.

Oral administration of honey significantly accelerated the healing of indomethacin-induced gastric ulcers in rats, in a study by Ali (1991). The effect of honey, administered twice daily at a rate of 312 mg/kg, was comparable to that of the drug sucralfate (500 mg/kg) administered with the same frequency, and both treatments were more effective than no treatment. The dose of sucralfate used in this study was far in excess of that recommended for human use.

Table (5): Daily food intake and food efficiency ratio experimental gastric ulcer model rats model.

Variables Groups	Daily food intake (g/d)		Food efficiency ratio (FER)	
	Mean	SD	Mean	SD
G1: Control -ve	14.68 a	0.45	0.52 a	0.17
G2: Control +ve	16.22 a	1.09	0.37 a	0.12
G3: croissant with 10g Bees Honey 25%BH)	15.43 a	0.76	0.60 a	0.20
G4: croissant with 15g Bees Honey (27.3%BH)	15.47 a	0.79	0.41 a	0.13
G5: croissant with 8g Bees Honey +2g propolis (4.2%PBH)	15.43 a	0.82	0.19 a	0.06
G6: croissant with 7g Bees Honey+3 g propolis (6.4%PBH)	15.55 a	1.51	0.29 a	0.09

SD: Standard deviation; a, b, c, d, . . . Different superscripts within the same raw represent significant differences between the results ($p \leq 0.05$).

Our results are in line with Omotayo O. Erejuwa *et al.*, (2012) who demonstrate the beneficial effects of fructose on glycemic control, glucose- and appetite-regulating hormones, body weight, food intake, oxidation of carbohydrate and energy expenditure. In view of the similarities of these effects of fructose with those of honey, the evidence may support the role of fructose in honey in mediating the hypoglycemic effect of honey.

6. Volume of gastric juice (GJ) experimental gastric ulcer rats.

Volume of gastric juice (GJ) experimental gastric ulcer rats are shown in Table 6. Volume of gastric juice GJ (ml) increase significantly in control positive group.

Data shows that Bees Honey Croissant and Propolis with Bees Honey Croissant decreased levels of volume of GJ and percent change (%).

The lowest levels of volume of GJ was recorded for 6.4%PBH Croissant (0.38 ± 0.01), followed by 4.2%PBH Croissant (0.42 ± 0.02); however the highest level was in positive control followed by 25%BH Croissant (0.50 ± 0.02) and 27.3%BH Croissant (0.50 ± 0.01) which no significant differences between treatment.

There were significant differences in percent change between all treatments and control positive group and between Bees Honey Croissant and Propolis with Bees Honey Croissant samples.

Propolis with Bees Honey Croissant samples had higher levels of percent change (-43.24%) and (-48.64%) for 4.2%PBH Croissant and 6.4%PBH Croissant respectively. Than Bees Honey Croissant samples (-27.02%) and (-32-42%) for 25%BH Croissant and 27.3%BH Croissant respectively.

Generally, Bees Honey croissant and Propolis with Bees Honey croissant decreased volume of GJ; however Propolis with Bees Honey croissant decreased percent change%.

Propolis is a resinous hive product collected by worker bees from

various parts of the plants. It is widely used in Indian folk medicine for the treatment of stomach ulcers. The preventive and curative effects of Indian propolis for ulcers were evaluated using models of acute gastric lesions induced by ethanol and indomethacin in rats. Moreover, the effects of ethanolic extract of propolis on gastric content volume, total acidity and pH, using the pylorus ligated model were also evaluated. Animals pretreated with propolis extract showed a significant reduction in lesion index in both ethanol and indomethacin induced ulcer models in a dose dependent manner when compared to the control group (Iyyam Pillai *et al.*, 2009).

Table (6): Volume of gastric juice (GJ) experimental gastric ulcer rats at the end of exasperate period .

Variables Groups	Volume of GJ (ml)		‡ Percent change decreased (%)
	Mean	SD	
G1: Control -ve	d 0.33	0.01	
G2: Control +ve	a 0.74	0.03	
G3: croissant with 10g Bees Honey (25%BH)	b 0.54	0.02	- 27.02
G4: croissant with 15g Bees Honey (27.3%BH)	b 0.50	0.01	- 32.43
G5: croissant with 8g Bees Honey +2g propolis (4.2%PBH)	c 0.42	0.02	- 43.24
G6: croissant with 7g Bees Honey+3 g propolis (6.4%PBH)	c 0.38	0.01	- 48.64

Mean ± SD values in each column having different superscript (a, b, c, d) are significantly different at P < 0.05.

‡ Percent change from the - ve control or the + ve control.

+ means percent increase when compared with the - ve control group.

- means percent increase when compared with the + ve control group.

7. Total acidity of gastric juice experimental gastric ulcer rats at the end of exasperate period .

Total acidity of gastric juice experimental gastric ulcer model rats shown in Table 7. Significant differences can be observed between negative and positive control in level of total acidity.

On other hand, Bees Honey Croissant normalized the levels total acidity recorded (0.174±0.002mEq/ml) and (0.170±0.001mEq/ml) for 25%BH Croissant and 27.3%BH Croissant respectively . Percent change don't take the same trend.

Result illustrates that feeding Propolis with Bees Honey Croissant effective than Bees Honey Croissant products in highest percent change which was (-45-49%) and (-46-61%) for 4.2%PBH Croissant and 6.4%PBH Croissant respectively.

Table (7): Total acidity of gastric juice experimental gastric ulcer rats at the end of exasperate period .

Variables Groups	Total acidity (mEq/ml)		‡ Percent change (%)
	Mean	SD	
G1: Control -ve	D 0.135	0.002	
G2: Control +ve	A 0.266	0.001	
G3: croissant with 10g Bees Honey (25%BH)	B 0.174	0.002	-34.58
G4: croissant with 15g Bees Honey (27.3%BH)	B 0.170	0.001	-36.09
G5: croissant with 8g Bees Honey +2g propolis (4.2%PBH)	C 0.145	0.003	-45.48
G6: croissant with 7g Bees Honey+3 g propolis (6.4%PBH)	C 0.142	0.001	-46.84

Mean \pm SD values in each column having different superscript (a, b, c, d) are significantly different at $P < 0.05$.

‡ Percent change from the - ve control or the + ve control.

+ means percent increase when compared with the - ve control group.

- means percent increase when compared with the + ve control group.

Overall, both of Bees Honey Croissant and Propolis with Bees Honey Croissant were effective in decreased total acidity levels meanwhile Propolis with Bees Honey Croissant was more effective than Bees Honey Croissant.

Our results are in agreement with Abd El-Hady *et al.*, (2013) who found that animals pretreated with propolis extract (200 and 400 mg/kg, b.w.) before indomethacin-induced ulcer model resulted in significant decrease in gastric ulcers and improved oxidative balance in gastric mucosal tissues.

8. length of gastric juice and curative ratio experimental gastric ulcer rats at the end of exasperate period .

Length of gastric juice and curative ratio experimental gastric ulcer rats shown in Table 8. No ulcer in the control negative and no curative ratio .

On the other hand, length of gastric ulcer increased in control positive than treatments. The length of gastric ulcer level decreased by the increase of Bees Honey Croissant and Propolis with Bees Honey Croissant to be 9.70 ± 0.03 , 8.90 ± 0.02 , 7.30 ± 0.03 and 5.80 ± 0.01 for 25%BH Croissant, 27.3%, 4.2%PBH Croissant, 6.4%PBH Croissant respectively.

Propolis with Bees Honey Croissant increased levels of curative ratio than Bees Honey Croissant 41.60% and 53.60% for 4.2%PBH Croissant and 6.4%PBH Croissant respectively.

Overall, both of Bees Honey Croissant & Propolis with Bees Honey Croissant were effective decreased length of gastric ulcer level; however Propolis with Bees Honey Croissant increased curative ratio than Bees Honey Croissant.

Table (8): length of gastric juice and curative ratio experimental gastric ulcer rats at the end of exasperate period .

Variables Groups	Length of gastric ulcer (mm)		Curative ratio (CR) (%)
	Mean	SD	
G1: Control -ve	No ulcer		
G2: Control +ve	A 12.50	0.04	
G3: croissant with 10g Bees Honey (25%BH)	B 9.70	0.03	22.40
G4: croissant with 15g Bees Honey (27.3%BH)	B 8.90	0.02	28.80
G5: croissant with 8g Bees Honey +2g propolis (4.2%PBH)	C 7.30	0.03	41.60
G6: croissant with 7g Bees Honey+3 g propolis (6.4%PBH)	D 5.80	0.01	53.60

Mean \pm SD values in each column having different superscript (a, b, c, d) are significantly different at $P < 0.05$.

‡ Percent change from the - ve control or the + ve control.

+ means percent increase when compared with the - ve control group.

- means percent increase when compared with the + ve control group.

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**تأثير الكرواسون المدعم بعسل النحل والبروبليس على قرحة المعدة التي يسببها
الأسبرين على فئران التجارب
أشرف رفعت الزيني ، أحمد عثمان شلبي ، فاطمة محمد الزمزمي و أمنية عزمي عوض
كلية التربية النوعية ، جامعة المنصورة**

تهدف الدراسة الى ضرورة تقييم تأثير تناول الكرواسون المدعم بنسب مختلفة من عسل النحل والبروبليس على التئام قرحة المعدة في فئران التجارب ودراسة الخواص الكيميائية والفيزيائية والحسية للكرواسون .

وقد أظهرت النتائج أن عينة الكرواسون المحتوية على نسبة ٢٥% من العسل النحل أثبتت أفضل قيمة للخواص الحسية في القبول العام وبالتالي تم إضافة نسب مختلفة من البروبليس هذه العينة (الكرواسون) تم دراسة التقييم الحسي لها.

كما انتتبت النتائج المحصل عليها أن العسل المضاف إلى الكرواسون عمل على خفض نسبة كل من الرماد والرطوبة والدهون بينما اظهر إضافة العسل المدعم بالبروبليس إلى رفع محتواه كل من البروتين والكريهيدرات وعند تغذية الفئران على الكرواسون المدعم بالعسل والبروبليس اثبتت النتائج خفض كمية العصارة المعدية ، والحموضة الكلية للعصارة المعدية وطول قرحة المعدة بالمقارنة مع المجموعة الضابطة المريضة.