ejpmr, 2020,7(4), 407-413

SJIF Impact Factor 6.222

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

A STUDY ON ANTIULCER ACTIVITY OF *BENINCASA HISPIDA* LEAVES IN ULCER INDUCED RAT

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Article Received on 27/01/2020 **Article Revised on 17/02/2020** **Article Accepted on 07/03/2020**

ABSTRACT

Aim: The main aim of the study was to investigate antiulcer activity of aqueous, ethanol leaf extract of *Benincasa Hispida* by using various ulcer induced agents in rats. **Methods**: The authenticated drug *Benincasa hispida* was dried in shade and powdered coarsely. Extraction was done according to standard procedure using analytical grade solvents. The coarse powder of the *Benincasa hispida* was Sox let extracted with the solvents with increasing order of polarity i.e. Ethanol (64.5-65.5^{oc}), and distilled water. The extracts obtained were concentrated under reduced pressure. Qualitative chemical tests were conducted for ethanol and aqueous extract of *benincasa hispida*. To identify the various phytoconstituents. BH powder extracts or standard drug or control vehicle was administered 30min. prior to pyloric ligation. Mean ulcer score for each animal is expressed as ulcer index. **Results**: Anti ulcer activity of *BH Leaves* was confirmed by using different rat models (pylorous ligation model.) and different doses of aqueous and ethanol extracts i.e. 250 mg/kg and 500 mg/kg of bodyweights. 8 mg/kg body weight of lansoprazole (pylorus ligation model) treated group increased the pH of gastric fluid to slightly neutral and reduced the volume of gastric fluid when compared to controlgroup. aqueous and ethanol extracts treated groups at the dose level of 250 mg/kg and 500mg/kg body weight showed nearly same results of pH as that of control group i.e. acidic. The volume of gastric fluids in aqueous and ethanol extracts treated groups at the dose level of 500mg/kg body weight has decreasedsignificantly. Among all the treated groups, aqueous and ethanol extracts of *BH Leaves* at the dose level 500 mg/kg body weight offered greater percentage protection by reducing ulcer index in (pylorus ligation model) studied when compared with standards. Lansoprozole (pylorus ligation model) respective standardused. **Conclusion:** Flavonoid is an anti-oxidant and its mucosal barrier protecting capacity may be responsible for the anti ulcer activity of *BHLeaves*.

KEYWORDS: Anti-oxidant, Anti-ulcer activity, *Benincasa hispida,* Flavanoid, Pylorus ligation model.

INTRODUCTION

For more than a century, peptic ulcer disease has been a major cause of morbidity and mortality. Although hospital admissions for uncomplicated peptic ulcers in developed countries had begun decrease, there was a striking rise in admissions for ulcer hemorrhage and perforation among elderly people. This increase has been attributed to the increased use of non-steroidal anti-inflammatory drugs (NSAIDs), alcoholic beverages, cigarettes and Helicobacter pylori infections. Although hospital admissions for uncomplicated peptic ulcers in developed countries had begun decrease, there was a striking rise in admissions for ulcer hemorrhage and perforation among elderly people. This increase has been attributed to the increased use of non-steroidal anti-inflammatory drugs (NSAIDs), alcoholic beverages, cigarettes and Helicobacter pylori infections.[1]

Approximately 500,000 new cases are reported each year. Ulcer disease has become a disease predominantly affecting the older population, with the peak incidence occurring between 55 and 65 years of age. In men, duodenal ulcers were more common than gastric ulcers; in women, the converse was found to be true. Thirty-five percent of patients diagnosed with gastric ulcers will suffer serious complications. Although mortality rates from peptic ulcer disease are low, the high prevalence and the resulting pain, suffering, and expense are verycostly.[2] India is a varietals emporium of medicinal plants. It is one of the richest countries in the world as regards genetic resources of medicinal plants. Plants and other natural substances have been used as the rich source of medicine.

The winter melon, also called ash gourd,[3] white gourd, winter gourd, tallow gourd,[4] and Chinese preserving

melon[5] is a vine grown for its very large fruit, eaten as a vegetable when mature. It is the only member of the genus *Benincasa*. The fruit is fuzzy when young. The immature melon has thick white flesh that is sweet when eaten. By maturity, the fruit loses its hairs and develops a waxy coating, giving rise to the name wax gourd, and providing a long shelf life. The melon may grow as large as 80 cm in length. Although the fruit is referred to as a "melon," the fully grown crop is not sweet. It has yellow flowers and broad leaves.[6] It is native to South Asia and Southeast Asia. The winter melon is widely grown throughout Asia,[7] including Japan[8] where it is thought to have originated from.[9] The pharmacological studies revealed that the plant exerted many pharmacological activities including central nervous effects (anxiolytic, muscle relaxant, antidepressant, in the treatment of Alzheimer's disease and to minimize opiates withdrawal signs), antioxidant, anti inflammatory, analgesic, antiasthmatic, diuretic, nephroprotective, antidiabetic, hypolipidemic and antimicrobial effects. Borrelli and Izzo reveal the extensive variety of chemical compounds isolated from medicinal plants with antiulcer activity. This is an important reason to investigate antiulcer effects in medicinal plants with traditional use in gastric diseases. The present review aimed to highlight the chemical constituents and pharmacological effects of Benincasa hispida. The major constituents of Benincasa hispida fruits were volatile oils, flavonoids, glycosides, sacchrides, proteins, carotenes, vitamins, minerals, ß-sitosterin and uronic acid.[10-12] Chemical analysis showed that the main sugars in the Benincasa hispida peels were galactose, glucose, xylose and sorbose. All the above data acquired by extensive literature survey and folk medicine practice inspired to go for the possible anti-ulcer activity of *Benincasa hispida* leaves. In view of this, the present study is taken up to investigate the possible anti-ulcer role of *Benincasa hispida* leaves.

MATERIAL AND METHODS

Materials

Drugs

- Lansoprazole

Plant

The whole plant mixture of *Benincasa hispida* used for the investigation was collected from Guntur. The plant herbarium specimen was identified and authenticated by plant taxonamist.

Reagents

- Benedict'sreagent.
- Barfoed'sreagent.
- Million'sreagent.
- Dragendroff'sreagent.
- Hager’sreagent.
- Mayer'sreagent.
- Wagner'sreagent.

Chemicals

All chemicals used were of analytical grade

1. Formalin (Merck specialities pvt. limited).
2. Gum acacia (Merck specialities pvt. limited).
3. Chloroform (Merck specialities pvt. limited)
4. Anaesthetic ether (Merck specialities pvt. limited)
5. Ethanol (Merck specialities pvt. limited)
6. Petroleum ether(Merck specialities pvt. limited)

Instruments

1. Electronic weighing balance (cyber labs)
2. Centrifuge (“Microfuge” M/S Remi instruments Pvt. Ltd., Maharashtra, India.)
3. Soxhlet’s extraction apparatus.
4. PH Meter (Dalta instruments, Hyderabad).
5. Micropipette (Recorders and Medicare Systems Pvt. Ltd. Chandigarh. India.)
6. Microscope
7. Oral feeding needle (space lab, Nasik).

Animals

Albino wistar rats of either sex weighing between 150 to 200 gm were procured form registered breeders the animals were housed under standard conditions of temperature (25 □2^{0}C) and relative humidity (30-70%) with a 12:12 light-dark cycle. The animals were fed with standard pellet diet.

METHODOLOGY

Extraction

The authenticated drug *Benincasa hispida* was dried in shade and powdered coarsely. Extraction was done according to standard procedure using analytical grade solvents. The coarse powder of the *Benincasa hispida* was Sox let extracted with the solvents with increasing order of polarity i.e. Ethanol (64.5-65.5^{oc}), and distilled water. The extracts obtained were concentrated under reduced pressure.

Qualitative chemical test

Preliminary phytochemical investigation of extract

Qualitative chemical tests were conducted for ethanol and aqueous extract of *benincasa hispida*. To identify the various phyto-constituents. The various tests and reagents used are given below and observations are recorded and tabulated.

Tests for Carbohydrates

Molisch's test (General test)

To 2-3 ml aqueous extract, few drops of □-naphthol solution in alcohol was added, shaken and concentrated H_2SO_4 was added from the sides of the test tube. It was observed for violet ring at the junction of two liquids.

For Reducing Sugars

A. **Fehling's test:** 1 ml Fehling's A and 1ml Fehling's B solutions was mixed and boiled for one min. Equal volume of test solution was added. Heated in boiling water bath for 5-10 min and observed for a yellow, then brick red precipitate.
B. **Benedict's test:** Equal volume of Benedict's reagent and test solution (T.S.) in test tube were mixed.

Heated in boiling water bath for 5 min. Solution may appear green, yellow or red depending on amount of reducing sugar present in test solution.

Test for Monosaccharides

Barfoed's test

Equal volumes of Barfoed's reagent and test solution were added. Heated for 1-2 min, in boiling water bath and cooled. Observed for red precipitate.

Test for Hexose Sugars

Cobalt-chloride test: 3 ml of test solution was mixed with 2ml cobalt chloride, boiled and cooled. Added few drops of $FeCl_3$ and NaOH solution. Solution was observed for greenish blue (glucose), purplish (Fructose) or upper layer greenish blue and lower layer purplish (Mixture of glucose and fructose).

Tests for Non-Reducing Sugars

a) Test solution does not give response to Fehling's and Benedict's test.
b) Tannic acid test for starch: With 20% tannic acid, test solution was observed for precipitate.

Tests for Proteins

a. Biuret test (General test): To 3 ml T.S. added 4% NaOH and few drops of 1% $CUSO_4$ solution and observed for violet or pink colour.
b. Millon's test (for proteins): Mixed 3 ml T.S. with 5 ml Million's reagent, white precipitate obtained. Precipitate warmed turns brick red or precipitate dissolves giving redcolour.
c. Xanthoprotein test (For protein containing tyrosine or tryptophan): Mixed 3ml T.S. with 1 ml concentrated H_2SO_4, observed for white precipitate.
d. Test for protein containing sulphur: Mixed 5 ml T.S. with 2 ml 40% NaOH and 2 drops 10% lead acetate solution. Solution was boiled, turns black or brownish due to PbS formation.
e. Precipitation test: The test solution was observed for white colloidal precipitate with following reagents:

i. Absolute alcohol
ii. 5% mercuric chloride solution
iii. 5% cupric sulphate solution
iv. 5% lead acetate
v. 5% ammonium sulphate

Tests for Steroids: Salkowski Reaction: To 2 ml of extract, 2 ml chloroform and 2 ml concentrated H_2SO_4 was added. Shook well, whether chloroform layer appeared red and acid layer showed greenish yellow fluorescence was observed.

a) Liebermann-Burchard Reaction: Mixed 2ml extract with chloroform. Added 1-2 ml acetic anhydride and 2 drops concentrated H_2SO_4 from the side of test tube, observed for first red, then blue and finally green colour.
b) Libermann's reaction: Mixed 3 ml extract with 3 ml acetic anhydride. Heated and cooled. Added few drops concentrated H_2SO_4, observed for blue colour.

Tests for Amino Acids

a) Ninhydrin test (General test): 3 ml T.S. and 3 drops 5% Ninhydrin solution were heated in boiling water bath for 10 min and observed for purple or bluish colour.
b) Test for Tyrosine: Heated 3 ml T.S. and 3 drops Million's reagent. Solution was observed for dark red colour.
c) Test for tryptophan: To 3 ml T.S. added few drops glycoxalic acid and concentrated H_2SO_4 observed for reddish violet ring at junction of the two layers.

Tests for Flavonoids

a) **Shinoda test:** To dried powder or extract, added 5 ml 95% ethanol, few drops concentrated HCl and 0.5 g magnesium turnings. Pink colour was observed.
b) To small quantity of residue, added lead acetate solution observed for Yellow colored precipitate.
c) Addition of increasing amount of sodium hydroxide to the residue was observed asto whether it showed yellow colouration, which was decolourised after addition of acid.
d) **Ferric chloride test:** To test solution, added few drops of ferric chloride solution observed for intense green colour.

Tests for Alkaloids

a) Dragendroff's test: To 2-3 ml filtrate added few drops Dragendroff's reagent and was observed for orange brown precipitate.
b) Mayer's test: 2-3 ml filtrate with few drops Mayer's reagent was observed for precipitate.
c) Hager's test: 2-3 ml filtrate with Hagers reagent was observed for yellow precipitate.
d) Wagner's test: 2-3 ml filtrate with few drops of Wagner's reagent was observed for reddish brown precipitate.

Tests for Tannins and Phenolic Compounds:- To 2-3 ml test solution, added few drops of following solutions and was looked for respective coloration or precipitate:

a) 5% Ferric chloride solution:- Deep blue-black colored.
b) Lead acetate solution: - White precipitate.
c) Gelatin solution: - White precipitate.
d) Bromine water: - Decoloration of bromine water.
e) Acetic acid solution:- Red colour solution.
f) Potassium dichromate:- Red precipitate.
g) Dilute iodine solution: - Transient red colour.
h) Dilute Nitric acid: - Reddish to yellow colour.

Tests for Vitamins

a. Test for Vitamin A:- Dissolve a quantity equivalent to 10-15 units in 1ml chloroform and add 5ml of antimony trichloride solution, a transient blue colour is produced immediately.
b. Test for vitamin C (Ascorbic acid):- Dilute 1 ml of

2% w/v solution with 5 ml of water and added 1 drop of freshly prepared 5% w/v solution of sodium nitroprusside and 2 ml dilute NaOH solution. Added 0.6 ml of hydrochloric acid drop wise and stir, the yellow color turns blue.

c. Test for Vitamin D:- Dissolved a quantity equivalent to about 100 units of Vitamin D, activating in chloroform and added 10 ml of antimony tricohloride solution, a pinkish-red color appeared at once.

Tests for Glycosides

General test for Glycosides

Part A

To 2-3 ml of extract dil. H_2SO_4 was added and heated on a water bath for 1-2 mins. Neutralize with 10% NaOH, check with litmus paper and to resulting solution add Fehling's A & B. Increased red precipitate in this case shows glycosides are present.

Part B

To 2-3 ml of extract, water was added and heated. According to need, NaOH was added for neutralization and also added equal quantity of water. To the resulting solution added Fehling's A & B. Increased red precipitate in this case showed glycosides are absent. Compare Part A and B.

Tests for Cardiac Glycosides

a. Baljet's test: The test solution was observed for yellow to orange colour with sodiumpicrate.
b. Legal's test (For cardenoloids): To aqueous or alcoholic test solution, added 1 ml pyridine and 1 ml sodium nitroprusside, observed for pink to red colour.
c. Test for deoxysugars (Kellar Killani test): To 2 ml extract added glacial acetic acid, one drop of 5% $FeCl_3$ and concentrated H_2SO_4, observed for reddish brown colour at junction of the two liquid and upper layers bluish green.
d. Libermann's test (For bufadenolids): Mixed 3 ml extract with 3 ml acetic anhydride. Heated and cooled. Added few drops concentrated H_2SO_4 observed for blue colour.

Tests for Saponin Glycosides

a. Foam test: The drug extract or dry powder was shaken vigorously with water. Persistent foam was observed.
b. Hemolytic test: Added test solution to one drop of blood placed on glass slide. Hemolytic zone whether appeared was observed.
c. Tests for Coumarin Glycosides: Test solution when made alkaline, observed for blue or green fluorescence.

Anti ulcer activity

Pilorus ligation method

Albino wistar rats of either sex weighing between (150-200gms) were divided into six groups of six animals in group.

1. Group-I – Control (2% gumacacia)
2. Group-II – Standard (Lansoprazole 8mg/kg in 2% gumacacia).
3. Group-III – Aqueous extract of *BH* leaves (250mg/kgp.o.).
4. Group-IV – Aqueous extract *BH* leaves (500mg/kgp.o.).
5. Group-V – Ethanolic extract *BH* leaves (250mg/kgp.o.).
6. Group-VI – Ethanolic extract *BH* leaves (500mg/kgp.o.).

In this method albino rats were fasted in individual cages for 24 hr. care was taken to avoid coprophagy. BH powder extracts or standard drug or control vehicle was administered 30min. prior to pyloric ligation. Under light ether anesthesia, give an incision of 1cm long in the abdomen just below the sternum. Expose the stomach pass a thread around the pyloric sphincter and apply a tight knot. While putting the knot care was taken so that no blood vessels are tied along the knot. The abdomen was sutured clean the skin from any blood spots and bleeding. Apply collodion over the wound. At the end of 4 hr. after ligation the animals were sacrificed with excess of anesthetic ether. Open the abdomen and tie the oesophageal end (cardiac end) of the stomach. Cut and removed the entire stomach from the body of the animal. Gastric juice was collected into graduated centrifugation tube and was centrifuged at 1000 rpm for 10 min. and gastric volume was noted. The p^H of the gastric juice was recorded by P^H meter. Open the stomach along the greater curvature and washed with running water to see for ulcers in glandular portion of the stomach. The number of ulcers per stomach was noted and severity of the ulcers of the ulcers scored microscopically with the help of hand lens (10X) and scoring was done as following.

0 = normal stomach.
0.5 = red coloration.
1.0 = spot ulcers.
1.5 = hemorrhagic streaks.
2.0 = ulcer > 3 but < 5.
3.0 = ulcer > 5

Mean ulcer score for each animal is expressed as ulcer index. The percentage protection was calculated using the formula,

Percentage protection = $100 - U_t/U_c \times 100$ Where, U_t = ulcer index of treated group. U_c = ulcer index of control group.

Statistical analysis was performed by simple graph.

RESULTS

Table 1: Preliminary phytochemical screening.

s.no	Type of phyto chemical Constituents	Petroleum ether extract	Chloroform Extract	Ethanolic Extract	Aqueous Extract
1	Carbohydrates	_	+	+	+
2	Proteins	_	_	+	+
3	Flavonoids	_	-	+	+
4	Steroids	+	+	+	_
5	Tannins	_	_	+	+
6	Saponin Glycosides	_	_	+	+
7	Glycosides	_	+	+	+
8	Alkaloids	_	_	+	_

Note: - Absent, + Indicates presence.

Acute toxicity (LD50) studies[13]

Acute toxicity studies for aqueous and ethanolic extracts of *Benincasa hispida* were conducted as per OECD guidelines 420 using albino swiss mice. Each animal was administered chloroform extracts by oral route. The animals were observed for any changes continuously for the first 2 hrs and up to 24 hrs for mortality. There were no mortality and noticeable behavioral changes in all the groups tested. The extracts were found to be safe up to 2000 mg/kg body weight.

An attempt was made to identify LD_{50} of aqueous, ethanolic, *Benincasa hispida* leaves. Since no mortality was observed at 2000 mg/kg. It was thought that 2000 mg/kg was the cut off dose. Therefore, 1/8 and 1/4 dose i.e. 250 mg/kg. and 500 mg/kg. Were selected for all further in vivo studies.

Pylorus ligation ulcer Model

Effect of aqueous, ethanolic, *Benincasa hispida* leaves on pH of gastric secretion following pylorus ligation in rats:

At 250 mg/kg & 500mg/kg the pH was remained unchanged when compared with control. The influence on the pH in pylorus ligation of Lansoprazole (8mg/kg); aqueous, ethanolic, *Benincasa hispida* leaves (250, 500mg/kg) is mentioned in the following table.

Table 2: pH of gastric secretion.

Group no	Treatment	Dose	Ph
1	Control	-	1.3
2	Lansoprazole	8mg/kg	5.717
3	Aq.Extract 250mg	250mg/kg	1.56
4	Aq.Extract 500mg	500mg/kg	2.10
5	Ethnolic Extract 250mg	250mg/kg	1.26
6	Ethonolic extract 500mg	500mg/kg	1.90

Effect of aqueous, ethanolic, benincasa hispida leaves on volume of gastric secretion following pylorus ligation in rats

At 500mg/kg the volume of gastric juice secretion was significantly reduced by chloroform extract of BH leaves in dose dependant manner when compared with control. The influence on the volume of gastric juice secretion in pylorus ligation of Lansoprazole (8mg/kg); chloroform extract of BH (250, 500mg/kg).

Table 3: Gastric volume table.

Group no	Treatment	Dose	Volume of gastric Juice
1	Control	-	6.35
2	Lansoprazole	8mg/kg	1.03
3	Aq.Extract 250mg	250mg/kg	6.51
4	Aq.Extract 500mg	500mg/kg	4.91
5	Ethanolic Extract 250mg	250mg/kg	5.51
6	Ethanolic Extract 500mg	500mg/kg	4.71

Effect of aqueous, ethanolic, *Benincasa hispida* leaves on ulcer index and their % protection in pylorus ligation induced ulceration in rats

At 250 & 500mg/kg the ulcer index had significantly reduced by **aqueous, ethanolic, *Benincasa hispida* leaves** in dose dependant manner when compared with control and percentage protection is comparable tolansoprazole.

The influence on the ulcer index in pylorus ligation of

Lansoprazole (8mg/kg); **aqueous, ethanolic, benincasa hispida leaves** 250,500mg/kg. Along with the percentage protection that had significant changes are summarized in Table.

Table 4: Ulcer index.

Group no	Treatment	Dose	Ulcer index	% protection
1	Control	-	7.33	0%
2	Lansoprazole	8mg/kg	1	86.35%
3	aqueous Extract 250mg	250mg/kg	2.31	68.48%
4	aqueous Extract 500mg	500mg/kg	1.81	75.30%
5	ethanolic Extract 250mg	250mg/kg	2.31	68.48%
6	ethanolic Extract 500mg	500mg/kg	1.81	75.30%

DISCUSSION

Peptic ulcer is a chronic and dominant among the world's diseases. Gastric ulcers are results because of an imbalance between aggressive factors i.e. acid, pepsin and mucosal defence mechanism.[14] Ulcers may be due to 2 main reasons i.e.

- Free radicals generated during stress full situations over chronicperiod.
- Decreased prostaglandin synthesis which offers protection throughincreasing the mucosal resistance and decreasing aggressivefactors.[15]

Pylorus ligation model

Ulcers found in pylorus ligation method are due to imbalance between aggressive factors, defensive mechanism and an increase in acid pepsin secretion as the animals are fasted and localization of that acid secretion by ligation of pylorus part of the stomach. The pylorus ligation increases lipid peroxidation and free radical generation due to reduced GSH levels of gastric mucosa. All these factors contribute to digestion of the gastric mucosa and causes ulcer.

Different parameters studied were

P^H & Volume: From the table and fig. P^H of both aqueous and ethanol extracts when compared to control remain unchanged and in the acidic range when compared with lansoprazole.

From the table and fig For aqueous and ethanol extracts 500 mg/kg the volume of gastric contents were raised significantly when compared to lansoprazole. This indicates that lansoprazole has antisecretory activity, inhibits acid secretion by inhibiting the proton pump and pH was changed to slightly neutral when compared with control group. The drug may not have a significant antisecretory activity but there may be increase in the volume of gastric contents when compared with lansoprazole due to increased prostaglandin synthesis therefore increases mucus production which provided a protective effect by lining the stomach. This may be attributed to the presence of flavonoids, whose gastro protective action involves endogenous PAF, increasing themucus.

From the table and fig when compared with control group the lansoprazole, aqueous and ethanol extracts 250mg/kg, 500mg/kg group showed significant difference in ulcer index. When compared with lansoprazole. Aqueous and ethanol extracts 500 mg/kg offered maximum protection when compared with standard lansoprazole. This may be attributed to the formation of mucosal layer as a protective barrier even though the pH of the gastric remained acidic. The inhibition of lipid peroxidation and protective effect of BH was may be due to the antioxidant activity of flavonoids against the damaging free radicals produced during pylorousligation.

CONCLUSION

Anti ulcer activity of *BH Leaves* was confirmed by using different rat models (pylorous ligation model.) and different doses of aqueous and ethanol extracts i.e. 250 mg/kg and 500 mg/kg of bodyweights. 8 mg/kg body weight of lansoprazole (pylorus ligation model) treated group increased the pH of gastric fluid to slightly neutral and reduced the volume of gastric fluid when compared to controlgroup. aqueous and ethanol extracts treated groups at the dose level of 250 mg/kg and 500mg/kg body weight showed nearly same results of pH as that of control group i.e. acidic. The volume of gastric fluids in aqueous and ethanol extracts treated groups at the dose level of 500mg/kg body weight has decreasedsignificantly. Among all the treated groups, aqueous and ethanol extracts of *BH Leaves* at the dose level 500 mg/kg body weight offered greater percentage protection by reducing ulcer index in (pylorus ligation model) studied when compared with standards. Lansoprozole (pylorus ligation model) respective standardused. Flavonoid is an anti-oxidant and its mucosal barrier protecting capacity may be responsible for the anti ulcer activity of *BHLeaves*.

REFERENCES

1. Davidase, G. 1994. Flora mesoamericana. (F Mesoamer) FNA Editorial Committee. 1993-. Flora of North AMERICA. (FNAmer).
2. K. R. Markham(1982) Techniques of flavonoid identification The Wealth of India, A Dictionary of Indian Raw Materials and Industrial3. products, Volume – V, New Delhi: CSIR, 1956.
3. "The Plant List: A Working List of All Plant Species". Retrieved April 10, 2014.
4. "Multilingual Multiscript Plant Name Database". Retrieved 10 April 2014.
5. K. Salunkhe and S. S. Kadam (Editors) Handbook of

Vegetable Science and Technology: Production, Composition, Storage and Processing, p. 290, at Google Books.
6. "Benincasa hispida - Plant Finder".www.missouribotanicalgarden.org.
7. T. R. Gopalakrishnan Vegetable Crops, p. 138, at Google Books.
8. "Winter Melon Soup - Canh Bí Đao". youtube.com. 30 August 2014. Retrieved 1 June 2017.
9. "Howtomake Candied Winter Melonaka Tung Kua". 2009. Retrieved 18 December 2011.
10. Winter Squash Leaves in Salted Coconut Milk". praneesthaikitchen.com. 9 August 2011. Retrieved 2 June 2017.
11. Sew CC, Zaini NAM, Anwar F, Hamid AA and Saari N. Nutritional. composition and oil fatty acids of Kundur [Benincasa hispida (Thunb) Cogn]. Pak J Bot., 2010; 42(5): 3247- 3255.
12. Zaini NAM, Anwar F, Abdul Hamid A and Saari N. Kundur [Benincasa hispida (Thunb.) Cogn.]: A potential source for valuable nutrients and functional foods. Food Res Int., 2011; 44: 2368-2376. (Thunb) Cogn. fruit extracts. International Journal of Pharmacy and Pharmaceutical Science Research, 2011; 1(3): 93-97.
13. Available from URL: http://en.wikipedia.org/wiki/Hawaiian_baby_woodrose.
14. Available from URL: http://plants.usda.gov, accessed on2.11.09.
15. Nandkarni KM (1995). Indian Materia Medica, Popular Prakashan Pvt Ltd, Bombay, I: 182.