EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 11
Issue: 4
288-299
Year: 2024

PHYTOCHEMICAL AND PHARMACOLOGICAL EVALUATION OF ANTI-ULCER ACTIVITY OF TRICHOPUS ZEYLANICUS

***[1]Akash Kumar, [2]Dr. Ravi Prakash, [3]Rahim Khan and [4]Ankit Mehra**

[1]Research Scholar, Malhotra College.
[2]Professor, Malhotra College.
[3,4]Assistant Professor, Malhotra College.

***Corresponding Author: Akash Kumar**
Research Scholar, Malhotra College.

Article Received on 19/02/2024 **Article Revised on 09/03/2024** **Article Accepted on 29/03/2024**

ABSTRACT
The study investigates the potential of the hydroalcoholic extract of Trichopus zeylanicus leaves as a natural remedy for ulcer treatment. Notably, the extract is found to contain substantial amounts of total phenolic and flavonoid compounds, known for their antioxidant properties. Through experimental models, the research demonstrates the extract's ability to effectively inhibit the formation of ulcers induced by ethanol. This protective effect is further validated through histological examination, which reveals a notable reduction in mucosal lesions and sub-mucosal edema. The observed anti-ulcer activity is attributed primarily to the presence of flavonoids within the extract. Flavonoids have been extensively documented for their antioxidant properties and their potential in mitigating ulcer formation. Furthermore, the study highlights the safety profile of the extract, as evidenced by sub-acute toxicological assessments. Even at relatively high doses, there were no signs of toxicity or mortality observed over a 14-day period. Additionally, the study extends its investigation to the stem extract of Trichopus zeylanicus, which exhibits significant anti-ulcer effects comparable to the standard drug, omeprazole. Importantly, this activity is achieved without inducing toxicity, even at elevated concentrations. The findings underscore the therapeutic potential of Trichopus zeylanicus extracts in ulcer management and highlight the need for further research to elucidate the specific bioactive compounds responsible for these beneficial effects.

KEYWORDS: Trichopus zeylanicus, hydroalcoholic extract, anti-ulcer, gastroprotection.

INTRODUCTION
Peptic ulcer disease (PUD) remains a significant gastrointestinal disorder affecting millions of people worldwide, characterized by the erosion of the gastrointestinal mucosa, primarily in the stomach and duodenum.[1] Despite advances in modern medicine, the management of peptic ulcers continues to pose challenges due to factors such as side effects of conventional therapies and the emergence of drug-resistant strains of Helicobacter pylori, the primary causative agent.[2]

In recent years, there has been a growing interest in exploring natural remedies derived from medicinal plants as alternative or adjunctive therapies for the treatment of peptic ulcers.[3] Trichopus zeylanicus, a perennial herb indigenous to certain regions of Asia, has long been recognized in traditional medicine for its purported medicinal properties, including anti-inflammatory and gastroprotective effects.[4] However, despite its historical use, scientific evaluation of its anti-ulcer potential and elucidation of its underlying mechanisms have been limited.

Given the traditional use of Trichopus zeylanicus and the increasing demand for safe and effective alternatives to conventional ulcer therapies, there is a compelling need to conduct comprehensive phytochemical and pharmacological evaluations of this medicinal plant.[5] This study aims to fill this gap by systematically assessing the phytochemical composition of Trichopus zeylanicus extracts and investigating their potential anti-ulcer activity through in vivo and in vitro pharmacological assays.

Through a rigorous evaluation of the anti-ulcer properties of Trichopus zeylanicus, including its phytochemical constituents and pharmacological mechanisms, this research seeks to contribute to the growing body of evidence supporting the therapeutic potential of natural remedies in the management of peptic ulcer disease. Such investigations are crucial for the development of novel and safer treatment options for individuals

suffering from peptic ulcers, ultimately improving clinical outcomes and quality of life.

Peptic ulcer disease (PUD) remains a prevalent gastrointestinal disorder affecting millions of individuals worldwide, with significant implications for public health (Lanas et al., 2017).[6] The management of PUD traditionally involves the use of proton pump inhibitors (PPIs), histamine-2 receptor antagonists (H2RAs), and antibiotics to eradicate Helicobacter pylori infection, the primary etiological factor (Malfertheiner et al., 2009).[7] However, the prolonged use of these medications is associated with adverse effects and the emergence of antibiotic-resistant strains of H. pylori, necessitating the exploration of alternative treatment options (Fallone et al., 2016).[8]

In recent years, there has been growing interest in herbal medicines and natural products for the management of PUD due to their perceived efficacy and relatively fewer adverse effects (Aydin et al., 2019).[9] Trichopus zeylanicus, a plant species native to certain regions of Asia, has attracted attention for its potential therapeutic properties, including anti-ulcer activity (Prakash et al., 2009).[10] Several studies have investigated the pharmacological effects of Trichopus zeylanicus extracts, shedding light on its mechanisms of action and therapeutic potential in the context of PUD.

Phytochemical analyses have revealed that Trichopus zeylanicus extracts contain various bioactive compounds, including phenolic compounds, flavonoids, alkaloids, and glycosides (Alam et al., 2015).[11] These phytoconstituents possess antioxidant, anti-inflammatory, and cytoprotective properties, which are believed to contribute to the plant's gastroprotective effects.

In vitro studies have demonstrated the ability of Trichopus zeylanicus extracts to inhibit the growth of H. pylori, suggesting a potential role in the management of PUD associated with H. pylori infection (Gupta and Srivastava, 2013).[12] Furthermore, preclinical studies using animal models of PUD have shown that Trichopus zeylanicus extracts exhibit significant anti-ulcer activity, including the inhibition of gastric acid secretion, enhancement of mucosal defense mechanisms, and promotion of ulcer healing.

MATERIAL AND METHODS

Collection and Identification of plant material

The Stem of chosen plant in particular *Trichopus zeylanicus* was gathered from Bhojpur (M.P.) in the month of Jan, 2023. The Stem were additionally distinguished by Dr. Saba Naaz, HOD Department of Botany, Saifia Science College Bhopal, and examples have been submitted and protected in the Department of Botany.

Pharmacognostical studies

Macroscopic Characteristics

The Stem of *Trichopus zeylanicus* were visibly inspected for shape, size, surface qualities, surface, variety, consistency, and scent, taste, etc.

Microscopic Characteristics

Stem of *Trichopus zeylanicus* were taken. Areas were cleared with chloral hydrate and afterward stained with safranin staining arrangement and mounted with glycerine. Same strategy was followed for minuscule qualities of powdered material Muntingia Calabura.

Physiochemical examination

The accompanying physicochemical boundaries were completed in dried powder concentrate of *Trichopus zeylanicus*.[13-14]

Loss on drying

Two grams of powdered medication of (Stem) *Trichopus zeylanicus* was taken in a dissipating dish and afterward dried in a stove at 100ºC till the steady weight was gotten. The load subsequent to drying was noted and misfortune on drying was determined. The rate was determined based on example taken at first.

Total Ash

Two grams of powdered medication of (Stem) *Trichopus zeylanicus* was taken in a silica pot and lighted it by continuously expanding the intensity to 400°C until it was white, demonstrating the shortfall of carbon. Debris was cooled in desiccators and weighed immediately. The level of complete debris was determined based on example taken at first.

Acid insoluble ash

To the pot containing all out debris, 25 ml of hydrochloric corrosive (HCl, ~70g/l) was added; it was covered with a watch-glass and bubbled delicately for 5 minutes. The watch-glass was flushed with 5 ml of high temp water and this fluid was added to the pot. The insoluble matter was gathered on a debris less channel paper and it was washed with high temp water until the filtrate was impartial. The channel paper containing the insoluble matter was moved to the first cauldron; it was dried on a hot plate and lighted to steady weight. The buildup was permitted to cool and afterward weighed immediately. The level of corrosive insoluble debris was determined based on example taken at first.

Water soluble ash

To the cauldron containing the complete debris, 25 ml of water was added and bubbled for 5 minutes. The insoluble matter was gathered on a debris less channel paper. It was washed with high temp water and touched off in a pot for 15 minutes. The buildup was permitted to cool and afterward weighed right away. Weight of insoluble matter was deducted from the heaviness of all out debris. The level of water-dissolvable debris was determined based on example taken at first.

Assurance of oil ether solvent extractive

Five grams of powdered medication of (Stem) Trichopus zeylanicus was taken in 100 ml of oil ether in a tapered jar, stopped with cotton fleece and afterward saved on a rotating shaker at 110 rpm for 24 h. From that point, it was separated and the filtrate was dissipated to dryness at 100°C till consistent weight was gotten. The level of extractable matter was determined concerning the example taken at first.

Assurance of hexane solvent extractive

Five grams of powdered medication of (Stem) Trichopus zeylanicus taken in 100 ml of hexane in a tapered cup, stopped with cotton fleece and afterward saved on a rotating shaker at 110 rpm for 24 h. From there on, it was separated and the filtrate was vanished to dryness at100°C till consistent weight was gotten. The level of extractable matter was determined concerning the example taken at first.

Assurance of ethyl acetic acid derivation solvent extractive

Five grams of powdered medication of (Stem) Trichopus zeylanicus was taken in 100 ml of ethyl acetic acid derivation in a cone shaped flagon, stopped with cotton fleece and afterward saved on a rotating shaker at 120 rpm for 24 h. From that point, it was sifted and the filtrate was vanished to dryness at 100°C till steady weight was acquired. The level of extractable matter was determined regarding the example taken at first.

Assurance of $(CH_3)_2CO$ dissolvable extractive

Five grams of powdered medication of (Stem) Trichopus zeylanicus was taken in 100 ml of CH3)2CO in a conelike carafe, stopped with cotton fleece and afterward saved on a revolving shaker at 110 rpm for 24 h. From that point, it was separated and the filtrate was dissipated to dryness at 100°C till consistent weight was gotten. The level of extractable matter was determined regarding the example taken at first.

Assurance of ethanol dissolvable extractive

Five grams of powdered medication of (Stem) *Trichopus zeylanicus* was taken in 100 ml of ethanol in a cone shaped carafe, stopped with cotton fleece and afterward saved on a turning shaker at 110 rpm for 24 h. From there on, it was sifted and the filtrate was vanished to dryness at 100°C till steady weight was gotten. The level of extractable matter was determined concerning the example taken at first.

Assurance of water-solvent extractive

Five grams of powdered medication of (Stem) Trichopus zeylanicus was taken in 100 ml of water in a cone shaped flagon, stopped with cotton fleece and afterward saved on a rotating shaker at 110 rpm for 24 h. From there on, it was sifted and the filtrate was dissipated to dryness at 100°C till consistent weight was acquired. The level of extractable matter was determined concerning the example taken at first.

Assurance of pH

The concentrate of (Stem) Trichopus zeylanicus was broken down in refined water and was kept in a water shower for 20 min. It was then separated and the pH of the filtrate was noted with the assistance of pH meter.

Assurance of liquefying point

The liquefying point of concentrates of (Stem) Trichopus zeylanicus was finished by open slim technique.

Preparation of unrefined concentrates

Powdered material of (Stem) Trichopus zeylanicus was exposed to dissolvable extraction utilizing suitable techniques.

Extraction by Soxhlation Method

100 grams of powdered stems of *Trichopus zeylanicus* was comprehensively separated with various dissolvable oil ether and Hydro alcohol (Ethanol: water;70:30) by Soxhlation strategy. The concentrate was vanished over their edges of boiling over. At long last, the rate yields were determined of the dried concentrates.

Phytochemical analysis

Qualitative photochemical analysis

Photochemical assessments were completed concentrates according to the accompanying standard techniques.[15]

1. Detection of alkaloids: Extracts disintegrated separately in weaken Hydrochloric corrosive and sifted.

a) Hager's Test: Filtrates were treated with Hager's reagent (immersed picric corrosive arrangement). Alkaloids affirmed by the arrangement of yellow hued encourage.

2. Detection of sugars: Extracts were broken up separately in 5 ml refined water and sifted. The filtrates were utilized to test for the presence of carbs.

a) Fehling's Test: Filtrates were hydrolysed with dil. HCl, killed with salt and warmed with Fehling's An and B arrangements. Arrangement of red encourage shows the presence of diminishing sugars.

3. Discovery of glycosides: Extracts were hydrolysed with dil. HCl, and afterward exposed to test for glycosides.

a) Legal's Test: Extracts were treated with sodium nitropruside in pyridine and sodium hydroxide. Finding of pink to dark red tone demonstrates the presence of cardiovascular glycosides.

4. Detection of saponins

a) Froth Test: Extracts were weakened with refined water to 20ml and this was shaken in a graduated chamber for 15 minutes. Development of 1 cm layer of froth demonstrates the occurrence of saponins.

5. Detection of phenols

a) Ferric Chloride Test: Extracts were treated with 3-4 drops of ferric chloride arrangement. Development of somewhat blue dark tone shows the presence of phenols.

6. Detection of flavonoids

a) Lead acetic acid derivation Test: Extracts were treated with not many drops of lead acetic acid derivation arrangement. Development of yellow variety encourage demonstrates the event of flavonoids.

7. Detection of proteins

a) Xanthoproteic Test: The concentrates were treated with not many drops of conc. Nitric corrosive. Development of yellow tone shows the presence of proteins.

8. Detection of diterpenes

a) Copper acetic acid derivation Test: Extracts were broken up in water and treated with 3-4 drops of copper acetic acid derivation arrangement. Arrangement of emerald green tone demonstrates the presence of diterpenes.

Quantitative investigations of phytoconstituents

Total phenol content assessment

Principle: The absolute phenol content of the not entirely set in stone by the changed folin-ciocalteu technique.

Arrangement of Standard: 10 mg Gallic corrosive was broken down in 10 ml methanol, different aliquots of 10-50µg/ml was ready in methanol.

Planning of Extract: 10 mg of dried remove was broken down in 10 ml methanol and channel. Two ml (1mg/ml) of this concentrate was for the assessment of phenol.

Technique: 2 ml of concentrate and every standard was blended in with 1 ml of Folin-Ciocalteu reagent (recently weakened with refined water 1:10 v/v) and 1 ml (7.5g/l) of sodium carbonate. The combination was vortexes for 15s and permitted to represent 10min for variety improvement. The absorbance was estimated at 765 nm utilizing a spectrophotometer.

Total flavonoids content assessment

Principle: Determination of complete flavonoids content depended on aluminium chloride technique.

Planning of standard: 10 mg quercetin was broken down in 10 ml methanol, and different aliquots of 5-25µg/ml were ready in methanol.

Preparation of concentrate: 10 mg of dried extricate was disintegrated in 10 ml methanol and channel. Three ml (1mg/ml) of this concentrate was for the assessment of flavonoids.

Method: 1 ml of 2% AlCl3 arrangement was added to 3 ml of concentrate or every norm and permitted to represent 15min at room temperature; absorbance was estimated at 420 nm.

Pharmacological movement

Animals

Wistar rodents (180-200 g) and Swiss pale skinned person mice (guys; 20-25 g) were utilized in the current review. The creatures were secured from College of Veterinary Science and Animal Husbandry Mhow, Indore (M.P), India. They were given typical eating regimen and faucet water promotion labium and were presented to 12-h light and 12-h dim cycle. The creatures were adjusted to the lab conditions before tests. Exploratory convention was supported by Institutional Animal Ethics Committee. Care of the creatures was taken according to rules of the Committee with the end goal of Control and Supervision of Experiments on Animals (CPCSEA), Ministry of Environment and Forests, Government of India. Test convention was supported by Institutional Animal Ethics Committee.

Acute toxicity study

Five gatherings (n = 6) of male pale skinned person mice were utilized in the intense poisonousness investigation of *Trichopus zeylanicus* Hydroalcoholic remove. Creatures from all gatherings were abstained for the time being and regulated (p.o) with single portion (250, 500, and 3000 mg/kg) of the concentrate. A gathering of creatures which got equivalent volume of PBS filled in as control. Changes in the way of behaving of creatures were noticed for 24 h after extricate organization. For any indications of harmfulness and mortality, creatures were noticed for 14 days.

Against ulcer (ulcer-preventive) action study

Five gatherings (n = 6) of Wistar rodents were utilized to concentrate on the counter ulcer action of *Trichopus zeylanicus* Hydroalcoholic remove. PBS, Hydroalcoholic concentrate, omeprazole and ethanol were managed to the creatures per orally (p.o). Bunch 1 got PBS (10 mL/kg) all around the trial period (11 days) and filled in as control. Bunch 2 got PBS (10 mL/kg) for 10 days and on the eleventh day got outright ethanol (5 mL/kg) and filled in as ulcer control. Bunch 3 and 4 were individually controlled with 300 and 400 mg/kg Trichopus zeylanicus Hydroalcoholic extricate, bunch 5 with omeprazole (8 mg/kg) for 10 days. Every one of the gatherings were abstained for 24 h and again directed with the concentrate or medication at particular portion. After 30 min of this treatment, creatures of gatherings 2-5 were managed with 5 mL/kg ethanol to actuate ulcer. After 15 min of ethanol organization, every one of the creatures were forfeited utilizing sedative ether. Gastric volume was estimated by pylorus ligation technique. Each stomach was opened along the more prominent bend and inspected visibly for gastric disintegrations under an analyzing magnifying instrument (20 X). The length and width (mm) of ulcer on the gastric mucosa were estimated via plane glass square (10×10 mm). The Ulcer Area (UA) was determined. The % of security (P %) benefited to the creatures through different medicines were determined utilizing the recipe: recipe:

$$P\% = \frac{\text{UA ulcer control} - \text{UA treatment}}{\text{UA ulcer control}} \times 100$$

Grouping of animals

Group I Control Received PBS 10 ml/kg, p.o
Group II Ulcer Control Received PBS 10 ml/kg, p.o as long as 10 days and on eleventh day gets outright liquor 5 ml/kg, p.o
Group III Received HATZ 300 mg/kg, p.o
Group IV Received HATZ 400 mg/kg, p.o
Group V Received Omeprazole 8 mg/kg, p.o

Bio-Chemical assessment

Assessments in Gastric Juice

The different biochemical boundaries like sugar content viz. fucose, hexosamine, all out hexoses, and sialic corrosive and absolute starches were assessed. Gastric volume, pH, free and add up to sharpness and all out proteins were likewise assessed.

Gastric volume

The gastric juice was centrifuged, permitted to empty, and taken into a glass needle of graduation 0.01 ml. The volume of gastric juice was estimated.

Assurance of pH

Utilizing the pH meter, the pH of the gastric juice was estimated.

RESULTS AND DISCUSSION

Preliminary phytochemical investigations

Macroscopic Characters *Trichopus zeylanicus* Stem

- Height : 1-3 meter
- Colour : Dusty brown
- Texture : Glabrous
- Fracture : Wood

Physicochemical analysis

Proximate parameters analysis

The consequence of general examination of rough powder of *Trichopus zeylanicus* (Stem) is normal qualities are communicated level of air-dried material.

Table: Proximate parameters of crude powder of *Trichopus zeylanicus* (Stem).

S.No.	Parameters	Value (W/W)
1.	Loss on Drying	88.6 %
2.	Total Ash	11.45%
3.	Acid insoluble ash	0.66 %
4.	Water soluble ash	3.3 %
5.	Petroleum Ether Soluble extractive	0.55%
6.	Hexane soluble extractive	0.55 %
7.	Ethyl Acetate soluble extractive	2.11 %
8.	Acetone Soluble extractive	10.5 %
9.	Methanol soluble extractive	34.5 %
10.	Water soluble extractive	45.2 %
11.	pH of Methanol extract	3.9
12.	Melting point of Methanol extract	115°C

Phytochemical analysis

The plant material was extracted by continuous hot percolation using Soxhlet apparatus and the results of percentage yield of *Trichopus zeylanicus* (Stem) calculated by the following formula was found to be**.**

Table: % Yield (W/W) of *Trichopus zeylanicus* (Stem)

S. No.	Extract	% Yield
1.	Pet. Ether	7.36 %
2.	Hydro alcohol	11.59 %

Qualitative photochemical analysis

The results of qualitative photochemical analysis of the Hydroalcoholic extract of *Trichopus zeylanicus* (Stem).

Table: Result of photochemical screening of *Trichopus zeylanicus* (Stem).

S. No.	Constituents	Hydro alcohol extract
1.	**Alkaloids** Hager's Test:	+ve
2.	**Glycosides** Legal's Test:	-ve
3.	**Flavonoids** Lead acetate Test:	+ve
4.	**Diterpenes** Copper acetate Test:	-ve
5.	**Phenol** Ferric Chloride Test:	+ve
6.	**Proteins** Xanthoproteic Test:	+ve
7.	**Carbohydrate** Fehling's Test:	+ve
8.	**Saponins** Froth Test:	+ve

Results of Estimation of total phenolic and flavonoids content

Total Phenolic content estimation (TPC)

Total phenolic compounds (TPC) was expressed as mg/100mg of gallic acid equivalent of dry extract sample using the equation obtained from the calibration curve: Y = 0.011X+0.011, R2= 0.998, where X is the gallic acid equivalent (GAE) and Y is the absorbance.

Calibration Curve of Gallic acid

Table: Preparation of Calibration curve of Gallic acid.

S. No.	Concentration (µg/ml)	Absorbance
1.	10	0.135
2.	20	0.247
3.	30	0.364
4.	40	0.474
5.	50	0.581
Hydroalcoholic Extract of *Trichopus zeylanicus*	10	0.219

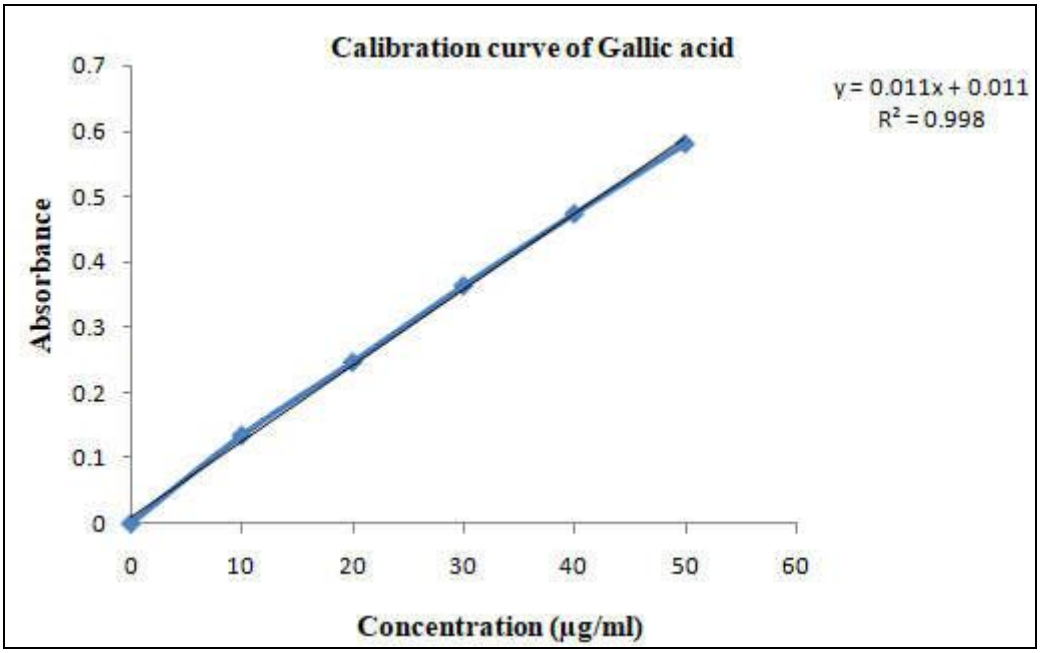

Figure: Graph of Calibration curve of Gallic acid.

Total flavonoids content estimation (TFC)

Total flavonoids content was calculated as quercetin equivalent (mg/100mg) using the equation based on the calibration curve: **Y=0.032X + 0.018, R2=0.998**, where X is the quercetin equivalent (QE) and Y is the absorbance.

Calibration Curve of Gallic acid

Table: Preparation of Calibration curve of Quercetin.

S. No.	Concentration (µg/ml)	Absorbance
1.	5	0.191
2.	10	0.348
3.	15	0.514
4.	20	0.652
5.	25	0.812
Hydroalcoholic Extract of *Trichopus zeylanicus*	10	0.215

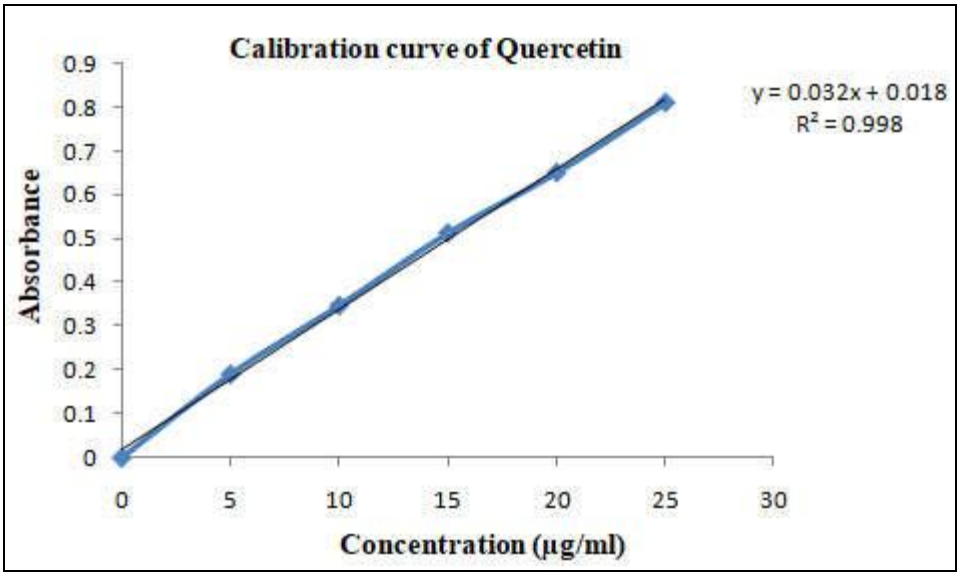

Figure: Graph of calibration curve of Quercetin.

Table: Estimation of total phenolic and flavonoids content of *Trichopus zeylanicus* (Stem).

S. No.	Extract	Total phenolic content (mg/100mg of dried extract)	Total flavonoids content (mg/ 100 mg of dried extract)
1.	Hydro alcohol extract	3.45	8.44

Acute toxicity study

Organization of the different extractives of Hydroalcoholic concentrate of Trichopus zeylanicus in mice at dosages of 250, 500 mg/kg and 3000 mg/kg by oral gavages uncovered no unfavourable impacts or indications of poisonousness. Perceptions two times every day for fourteen days likewise uncovered no medication related detectable changes or mortality. In like manner, the intense oral LD50 of the extractives was finished up to surpass 3000 mg/kg body weight, the most elevated portion tried in the review. No mortality was found and every one of the social boundaries were typical during the review.

Evaluation of against ulcer movement hydroalcoholic concentrate of *Trichopus zeylanicus*

Impact of the Hydroalcoholic concentrate of *Trichopus zeylanicus* on Ethanol Induced Gastric Ulcers in Rats. Ethanol organization in rodents (1 ml/200g b.w.) prompted ulceration of the gastric mucosa of the benchmark group, portrayed by haemorrhagic gastric sores. The Hydroalcoholic concentrate of Trichopus zeylanicus caused a decrease in the seriousness of these sores prompted by ethanol which was clear by a huge ($p<0.01$) decrease in the ulcer list and an expansion in the rate security of ulcers when contrasted and the benchmark group. At 300 mg/kg b.w. the Ethanolic leaves concentrate of Trichopus zeylanicus showed a security record of 28.25% and at 400 mg/kg b.w. the extractives showed insurance record of 54.44%.The outcomes were equivalent to Omeprazole (8 mg/kg) which decreased the ulcer list 69.23% fundamentally.

Table: Effect of the Ethanolic leaves extract of *Trichopus zeylanicus* on Ethanol Induced Gastric Ulcers in Rats.

Treatment	Dose (mg/kg b.w)	Gastric Volume (ml)	Ulcer area (mm2)	Protection (%)
Control	PBS 10 ml/kg	1.54±0.08	0.00±0.00	NA
HATZ	300 mg/kg	3.47±0.29	485.36±6.00	28.25%
HATZ	400 mg/kg	2.10±0.29	297.42±0.27	54.44%
Omeprazole	8 mg/kg	2.45±0.31	154.87±4.65	69.23%

Data are expressed as mean SEM., n=6 in each group. *p<0.05, **p<0.01 – One way ANOVA followed by Dunnett's test

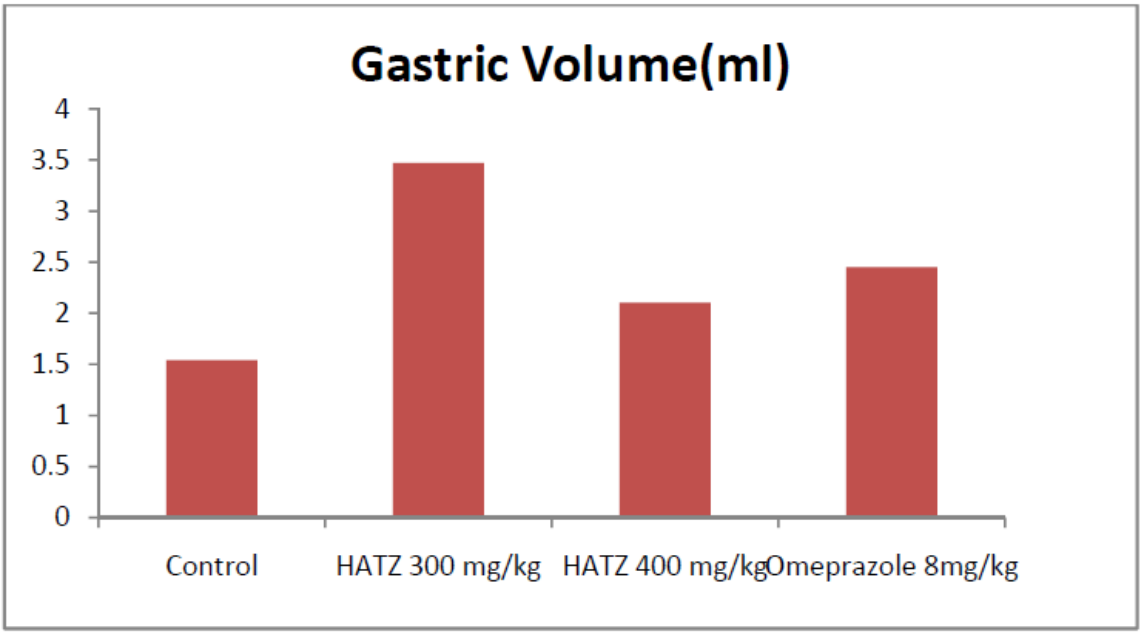

Figure: Effect of Hydroalcoholic extract of *Trichopus zeylanicus* on gastric volume.

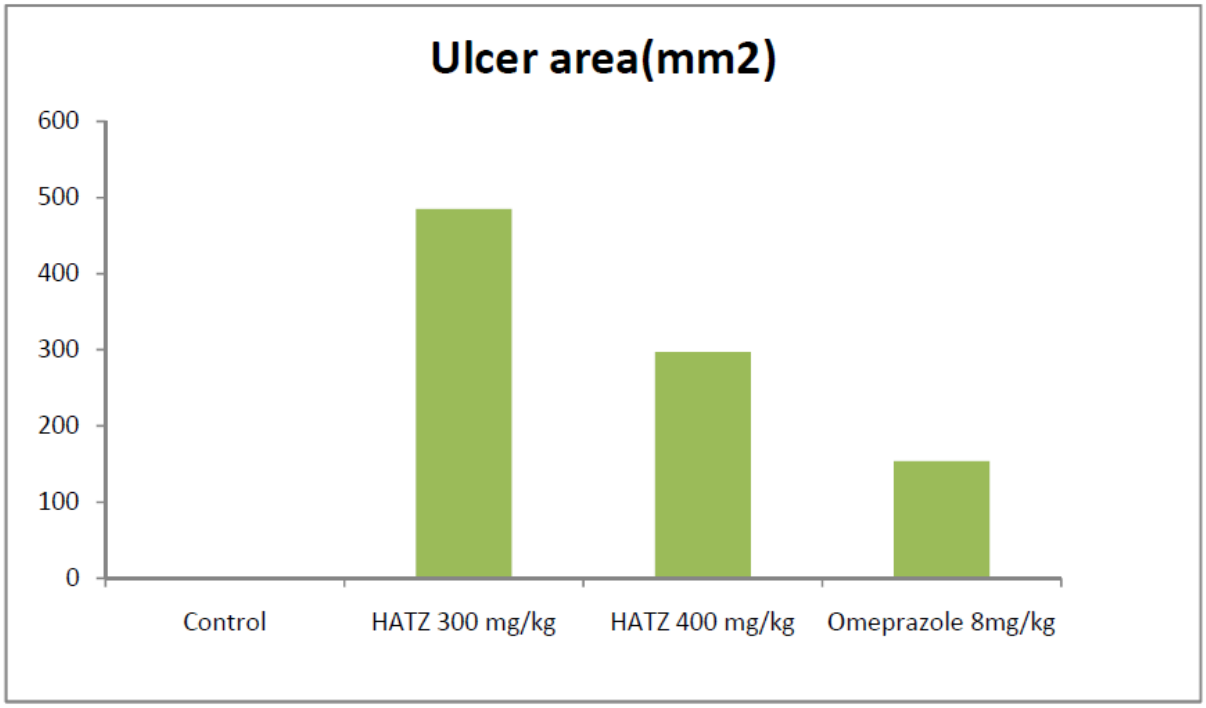

Figure: Effect of Hydroalcoholic extract of *Trichopus zeylanicus* on Ulcer area.

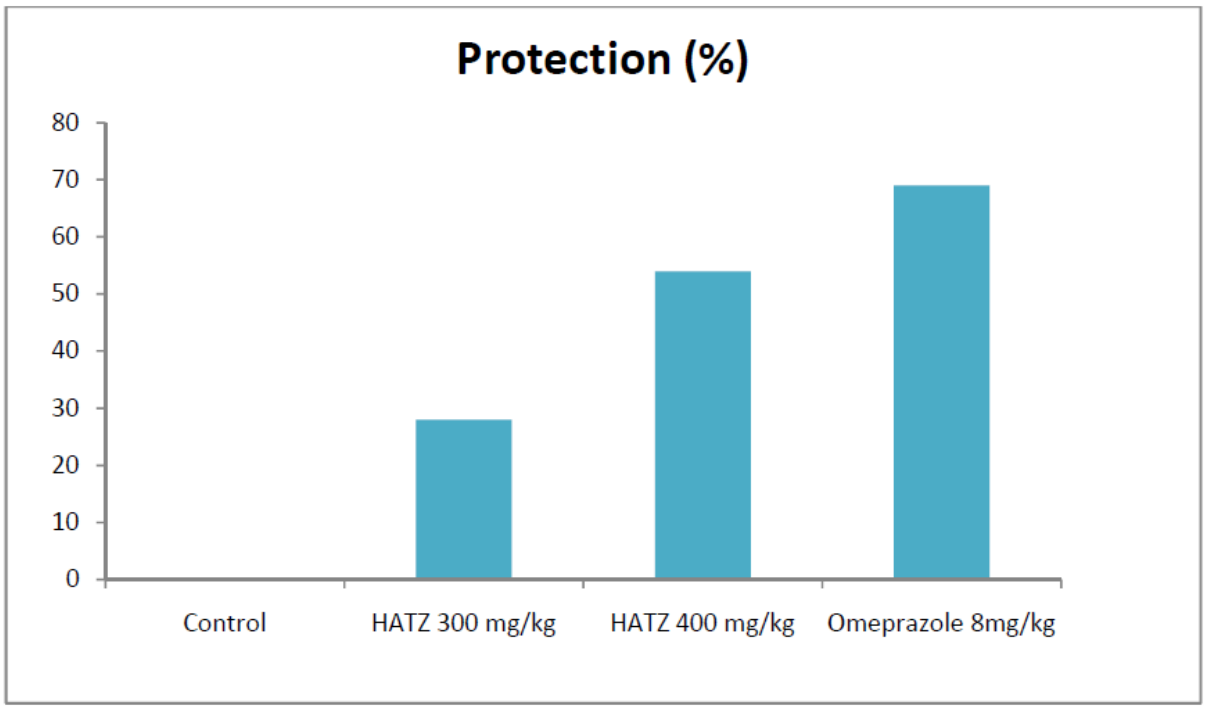

Figure: Effect of Hydroalcoholic extract of *Trichopus zeylanicus* on Protection(%).

Effect on Gastric Volume

Gastric volume in the Hydroalcoholic concentrate of *Trichopus zeylanicus* treated bunches demonstrated that there was no huge diminishing in the volume of the gastric juice at 300 mg/kg (3.47), however at 400 mg/kg (2.10) there was a critical decline in contrast with the benchmark group ($p<0.05$). Omeprazole at 8 mg/kg (2.45) caused a huge reduction in gastric volume.

Impact on pH of Gastric Juice

The Hydroalcoholic concentrate of *Trichopus zeylanicus* at 300 mg/kg and 400mg/kg fundamentally expanded the pH 3.05 and 3.87 individually of gastric juice ($p<0.01$) and was equivalent to the standard medication Omeprazole at 8 mg/kg was 6.32.

Impact on Free Acidity and Total Acidity

Assessment of gastric juice of Hydroalcoholic concentrate of *Trichopus zeylanicus* treated bunches showed that there was a critical lessening in the free causticity and all out sharpness of the gastric juice. Rodents treated with 300 mg/kg and 400 mg/kg of Hydroalcoholic concentrate of *Trichopus zeylanicus* showed a critical lessening in free corrosiveness and complete sharpness ($p<0.01$) was (37.32 and 33.32) and (37.22 & 33.55) was equivalent to that of the Omeprazole at 8 mg/kg treated bunch ($p<0.01$) of rodents was 19.13 and 27.25 respectively.

Table: Effect of Hydroalcoholic extract of *Trichopus zeylanicus* on Antisecretory Parameters.

Treatment	Dose (mg/kg b.w)	pH	Free Acidity (mEq/l/ 100g)	Total Acidity (mEq/l/ 100g)
Control	PBS 10 ml/kg	1.58±0.45	59.01±4.6	78.32±2.5
HATZ	300 mg/kg	3.05±0.35	37.32±0.47	37.22±2.61
HATZ	400 mg/kg	3.87±0.61	33.32±2.65	33.55±2.55
Omeprazole	8 mg/kg	6.32±1.21	19.13±5.2	27.25±2.58

Values are mean ± S.E.M, n=6, NS-not significant, *p < 0.05 and **p < 0.01 Vs control, One way ANOVA followed by Dunnett's test

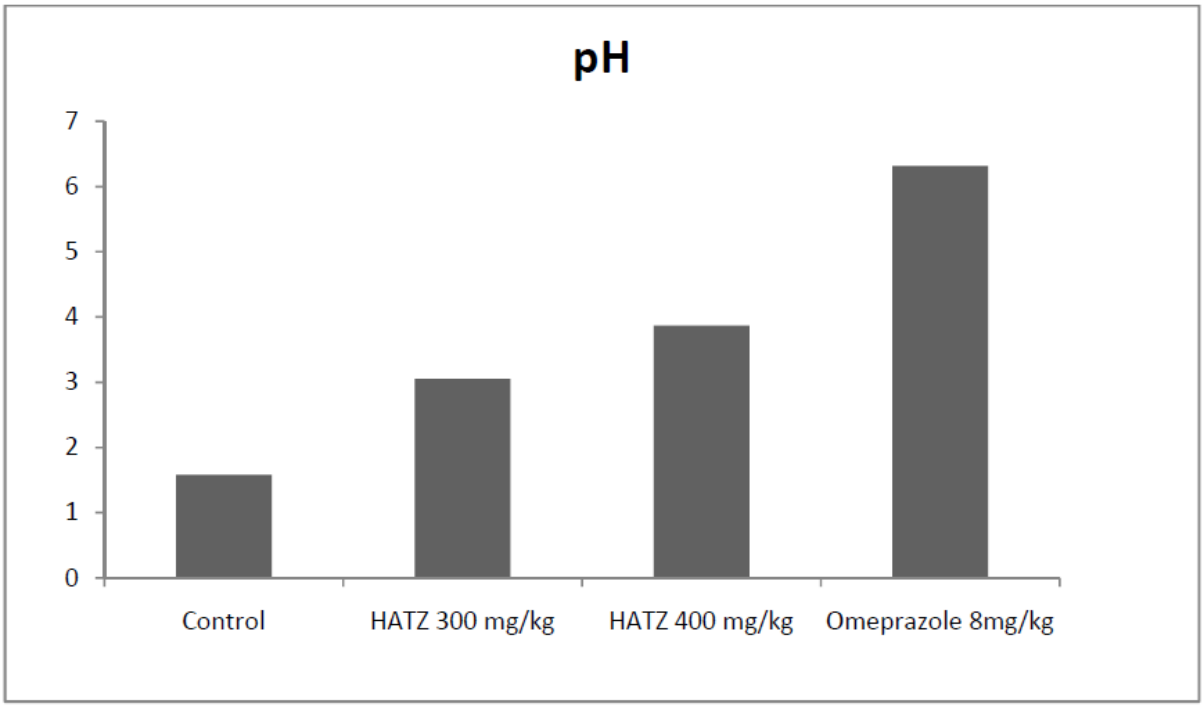

Figure: Effect of Hydroalcoholic extract of *Trichopus zeylanicus* on pH.

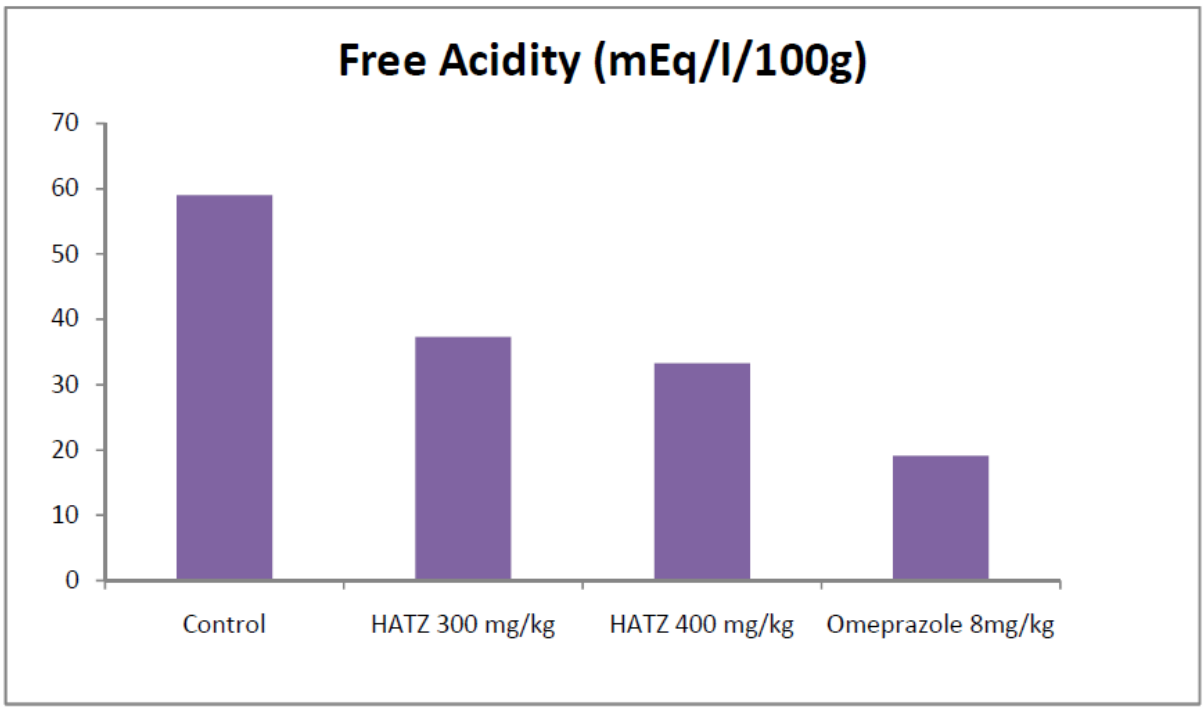

Figure: Effect of Hydroalcoholic extract of *Trichopus zeylanicus* on free acidity.

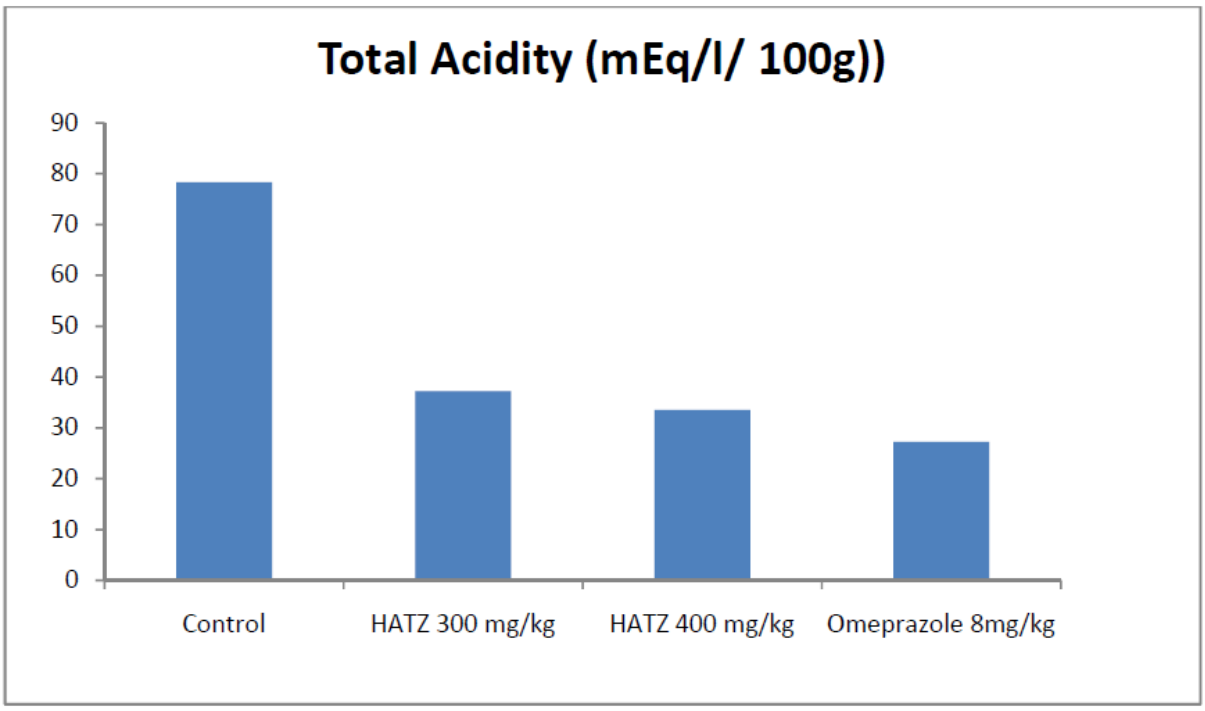

Figure: Effect of Hydroalcoholic extract of *Trichopus zeylanicus* on Total acidity.

SUMMARY

The hydroalcoholic extract of Trichopus zeylanicus leaves demonstrates significant potential as a natural remedy for ulcer treatment, as indicated by recent research. This extract contains high levels of total phenolic and flavonoid compounds, known for their antioxidant properties. The study found that Trichopus zeylanicus extract effectively inhibits ulcer formation induced by ethanol, with histological evidence showing protection against mucosal lesions and edema. The presence of flavonoids in the extract likely contributes to its anti-ulcer activity, supported by previous literature on flavonoids' antioxidant and anti-ulcerogenic effects. Toxicological studies suggest the extract's safety, with no signs of toxicity or mortality observed at high doses. Moreover, the stem extract of Trichopus zeylanicus exhibits significant anti-ulcer activity comparable to the reference drug omeprazole, without causing toxicity even at relatively high concentrations. Further research is underway to identify and understand the specific compounds responsible for these therapeutic effects.

ACKNOWLEDGEMENT

We express our sincere gratitude to all authors contributed to the completion of this paper.

CONFLICT OF INTEREST

No authors declared Conflict of Interest.

REFERENCES

1. Lanas A, Chan FKL. Peptic ulcer disease. Lancet, 2017; 390(10094): 613-624. doi:10.1016/S0140-6736(16)32404-7.
2. Malfertheiner P, Chan FKL, McColl KEL. Peptic ulcer disease. Lancet, 2009; 374(9699): 1449-1461. doi:10.1016/S0140-6736(09)60938-7
3. Alam MA, Al-Jenoobi FI, Al-Mohizea AM. Phytochemical and pharmacological approaches of rutin: A review. Pharmacogn Rev., 2015; 9(18): 52-56. doi:10.4103/0973-7847.156353
4. Sathasivampillai SV, Rajamanoharan PR, Muthulingam M, Jeyabalan S, Somasundaram S. A review on Trichopus zeylanicus. Int J Pharm Sci Rev Res., 2014; 24(1): 105-108.
5. Madaan R, Bansal G, Kumar S, Sharma A. Estimation of total phenols and flavonoids in extracts of Actaea spicata roots and antioxidant activity studies. Indian J Pharm Sci., 2011; 73(6): 666-669. doi:10.4103/0250-474X.100252
6. Lanas A, Chan FKL. Peptic ulcer disease. Lancet, 2017; 390(10094): 613-624.
7. Malfertheiner P, Chan FKL, McColl KEL. Peptic ulcer disease. Lancet, 2009; 374(9699): 1449-1461.
8. Fallone CA, Chiba N, van Zanten SV, et al. The Toronto Consensus for the Treatment of Helicobacter pylori Infection in Adults. Gastroenterology, 2016; 151(1): 51-69.
9. Aydin S, Zengin G, Mahomoodally MF, Mollica A, Aktumsek A. In vitro and in silico perspectives on the potential pharmacological benefits and drawbacks of Trichopus zeylanicus. J Ethnopharmacol, 2019; 235: 278-288.
10. Prakash S, Sundaram R, Muthu AK, Venkatesan K. A comprehensive review on Trichopus zeylanicus - an endangered medicinal plant species. Pharmacogn Rev., 2009; 3(6): 342-345.
11. Yadav V.K**,** Rai A.K., Ghosh A. K.: Encapsulation of Repaglinide into Eudragit RS Microspheres and

modulation of Their Release Characteristics by Use of Surfactants. International Journal of Pharmaceutical Sciences and research, 2017; 8(9): 3936-3947.
12. Alam MA, Al-Jenoobi FI, Al-Mohizea AM. Phytochemical and pharmacological approaches of rutin: A review. Pharmacogn Rev., 2015; 9(18): 52-56.
13. Gupta S, Srivastava S. Anti-Helicobacter pylori potential of a herbal preparation LAS containing Glycyrrhiza glabra, Allium sativum and Trichopus zeylanicus extracts. BMC Complement Altern Med., 2013; 13: 329.
14. Yadav V. K**,** Rai A.K., Ghosh A. K: "A study on the effects of different surfactants on morphology and drug release of Repaglinide Microspheres**"** International Journal of Research and Development in Pharmacy & Life Science, 2017; 6(5): 2786-2792.
15. Kokate, C.K., "Practical Pharmacognosy" 107-114, 123-125, 130. 2002: 1st edition, 2002; 405-406, 426-489.
16. Kokate, C.K., Evaluation of crude drug, Practical Pharmacognosy, Ist edition, 1985; 122-135.
17. Kokate, C.K., Purohit, A.P., Gokhale, S.B., Fluorescence analysis and qualitative Phytochemical analysis, Practical Pharmacognosy, 4th edition, 2000; 107-111.