# PHYTO CHEMICAL EVALUATION AND ANTI-ULCER ACTIVITIES OF TERMINALIA ELLIPTICA

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***Abstract*- This research looked at how well AETE worked as an antioxidant and an antiulcer agent. Evidence from this study suggests that AETE can protect against aspirin-induced ulcers and act as an antioxidant. The presence of alkaloids, carbohydrates, glycosides, tannins, proteins, and amino acids was detected in the early phytochemical screening of whole plant extracts. An NSAID-induced anti-ulcer study was conducted to screen the antiulcer impact of Terminalia elliptica's ethanol extract. According to the findings of these studies, Terminalia elliptica ethanol extract has an antiulcer effect.When compared to the control group, the aspirin-induced model showed improvements in the following areas: ulcer index, total acidity, total volume of stomach contents, total protein concentration, pH of gastric secretion, and glutathione content. The standard comparison agent was famotidine.**

***Keywords:*** **Evaluvation, Anti-Oxidant, Anti-Ulcer, EthanolicExtract, Terminalia elliptica, *Invitro* Methods.**

## INTRODUCTION

An imbalance between aggressive and protective elements causes gastric hyperacidity, a chronic global condition that affects millions of people.[1] Acid, pepsin, bile acids, medicines, and bacterial products (Helicobacter pylori) are among the potentially harmful agents that the stomach mucosa is constantly exposed to. Antimuscarinics, proton pump inhibitors, and H2 receptor antagonists are the mainstays of peptic ulcer treatment today. Nevertheless, the majority of these treatments come with side effects like hypersensitivity, irregular heartbeat, inability to erection, gynecomastia, and disorders affecting the blood cells.[2]

In Cancer, heart disease, and diabetes are characterized by oxidative assaults; antioxidants seem to protect the biological system from these.[3] ROS such superoxide, hydrogen peroxide, hydroxyl, and nitric oxide (NO) radical are responsible for this oxidative damage.[4] In a biological organism, these ROS accumulations directly promote mast cell histamine production and destroy important macromolecules as DNA, lipids, proteins, polyunsaturated fatty acids, carbohydrates, and nucleic acids.[5] Vitamins C and E, carotenoids, flavonoids, and tannins are among the most abundant antioxidants found in vascular plants.There has been a lot of research on the powerful antioxidant capabilities of naturally occurring polyphenolic chemicals, particularly flavonoids [6-7].

Our phytochemical analysis of Terminalia elliptica plant extracts will help in the plant's authentication and identification for both commercial and academic uses, particularly in areas pertaining to its antioxidant activity. Pharmacological systems rely on antioxidants for their ability to scavenge free radicals. Antioxidants are gaining traction as potential medicinal and preventative agents. Therefore, the powerful extract was also tested for its antioxidant properties. Now I'm employing invitro methods to evaluate the anti-oxidant and antiulcer properties of plant extracts from Terminalia elliptica.

## MATERIALS & METHODS

### Collection and Authentication of Plant

The whole plant of Terminalia elliptica collected in the month of June, 2023 from chittur dist. The plant materials were identified and authenticated.

### Aspirin Induced Ulcer

**Table No 1 : Dose dependent studies: (Animal: rats)**

| SI NO | DRUG | DOSE | ROUTEOF | NO.OF ANIMALS | PARAMETERSFOR STUDY |
|---|---|---|---|---|---|
| 1. | Control (water) | ---------- | Oral administration | 6 | 1.Ulcer index& Ulcer score 2.Total acidity 3.Acid volume 4.pH 5.Glutathione 6.Total protein |
| 2. | Standard (famotidine) | 3mg/kg | Oral | 6 | |
| 3. | AETE | 100mg/kg | Oral | 6 | |
| 4. | AETE | 200mg/kg | Oral | 6 | |
| 5 | AETE | 400 mg/kg | Oral | 6 | |

## RESULTS AND DISCUSSION

**Soxhlet Extraction of *TERMINALIA ELLIPTICA***

The percentage yield of the Terminalia elliptica was found to be 20.88 %w/v.

**Table No 2: Extraction of *Terminalia elliptica***

| Plant | Partused | Method of Extraction | Solvents | Percentage Yield (%W/V) |
|---|---|---|---|---|
| ***Terminalia elliptica*** | Wholeplant | Maceration | Ethanol(95%) | 20.88 |

**Table 3: phytochemical evaluation**

| Parameters | value |
|---|---|
| 1. Alkaloid | + |
| 2. Carbohydrates | + |
| 3. Glycosides | + |
| 4. Flavonoids | + |

| | |
|---|---|
| 5. Tannins & Phenolic compounds | + |
| 6. Proteins & Amino acids | + |
| 7. Saponins | - |
| 8. Sterols or Triterpenes | - |

**In Vitro Antioxidant Activities**

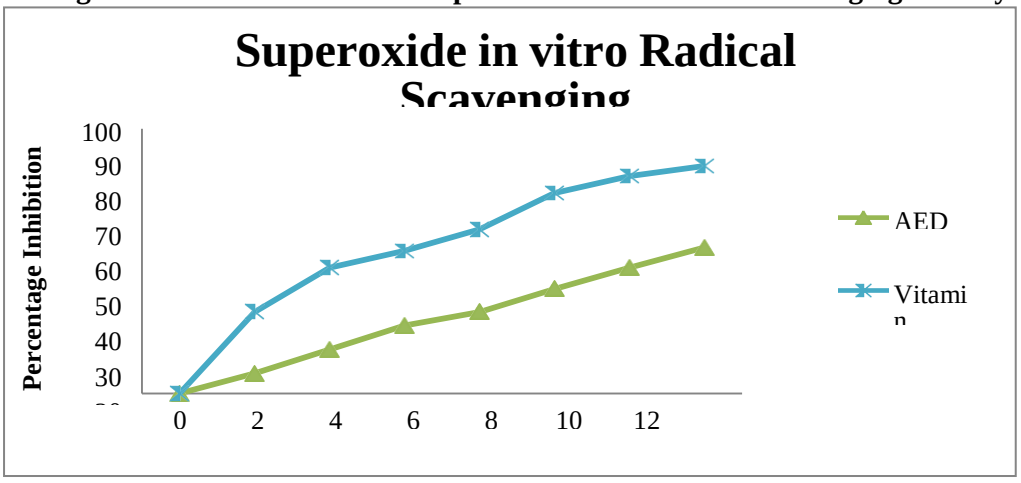
**Effect of superoxide radical scavenging activity:**

**Table No 4: Effect of AETE on Superoxide *in vitro* RadicalScavenging Activity**

| Concentration (µg/ml) | Absorbance | | Percentage inhibition | |
|---|---|---|---|---|
| | Ethanol extract | Vitamin C | Ethanol extract | Vitamin C |
| 0 | 0.78±1.22 | 0.78±1.5 | 0±0.00 | 0±0.00 |
| 2 | 0.72±2.31 | 0.54±3.5 | 7.6±1.35 | 30.76±0.71 |
| 4 | 0.65±3.1 | 0.41±0.78 | 16.6±4.71 | 47.43±1.79 |
| 6 | 0.58±1.27 | 0.36±1.55 | 25.64±3.6 | 53.84±2.53 |
| 8 | 0.54±1.72 | 0.28±2.3 | 30.76±1.55 | 61.94±4.22 |
| 10 | 0.47±5.5 | 0.19±3.6 | 39.47±2.44 | 75.64±1.67 |
| 12 | 0.41±3.7 | 0.14±2.3 | 47.43±3.39 | 82.05±2.36 |
| 14 | 0.35±1.78 | 0.11±3.2 | 55.12±0.67 | 85.89±0.37 |

Results are mean ± SD of three individual experiments

**Fig. No 1: Effect of AETE on Superoxide *in vitro* RadicalScavenging Activity**



**Effect of AETE on DPPH radical reducing activity**

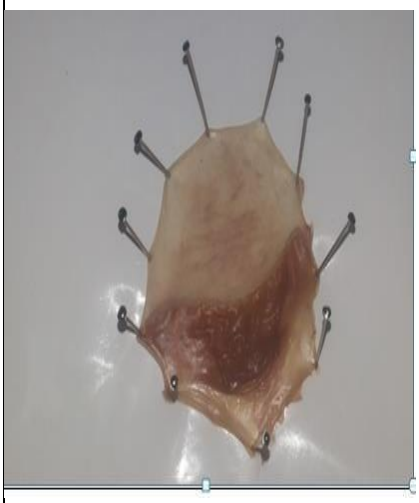
**Table No 5: study of *in vitro* DPPH Radical Scavenging Activity**

| Concentration (µL/ml) | Absorbance | | Percentage inhibition | |
|---|---|---|---|---|
| | Ethanol extract | VitaminC | Ethanol extract | VitaminC |
| 1 | 0.694±0.21 | 0.58±1.23 | 0.5±0.71 | 15.8±2.3 |
| 10 | 0.676±1.31 | 0.487±3.5 | 4.35±.56 | 29.9±2.9 |
| 20 | 0.640±3.22 | 0.361±1.23 | 9.03±0.78 | 49±5.6 |
| 30 | 0.60±1.52 | 0.121±1.5 | 14.2±1.3 | 67.8±4.9 |
| 40 | 0.566±4.35 | 0.101±3.2 | 19.2±1.27 | 87.3±4.3 |
| 50 | 0.530±2.33 | 0.046±4.2 | 23.4±1.32 | 97.3±4.2 |
| 60 | 0.461±3.5 | 0.06±4.9 | 29.2±.79 | 96.1±3.2 |
| 70 | 0.459±3.6 | 0.05±4.1 | 36.3±0.96 | 96.2±4.56 |
| 80 | 0.40±4.6 | 0.05±0.22 | 41.9±0.95 | 96.2±4.32 |
| 90 | 0.36±2.5 | 0.04±0.3 | 48.13±1.32 | 97.5±3.78 |
| 1OO | 0.327±3.72 | 0.03±.52 | 54.23±1.56 | 98.3±3.96 |

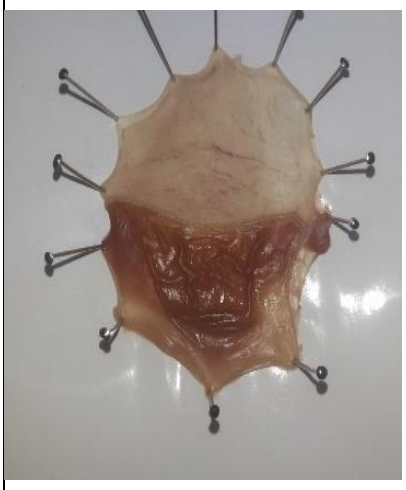
Results are mean ± SD of three individual experiments.

**Pharmacological Study**

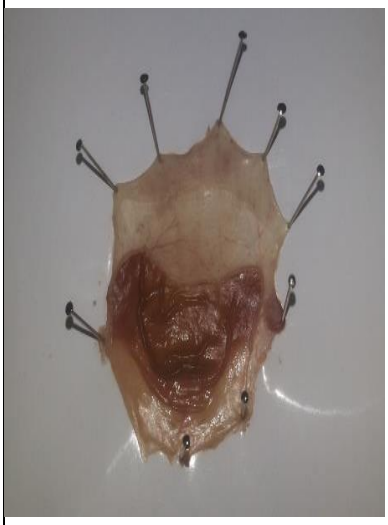
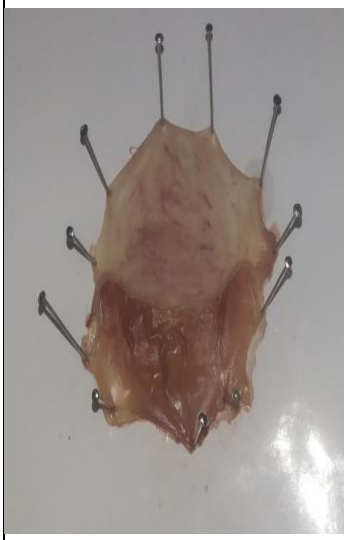
**Fig. No 2: Photographs Showing Aspirin Induced Gastric Ulcers**



**Control**



**Standard**

| | |
|---|---|
|  |  |
| **Low dose** | **High Dose** |

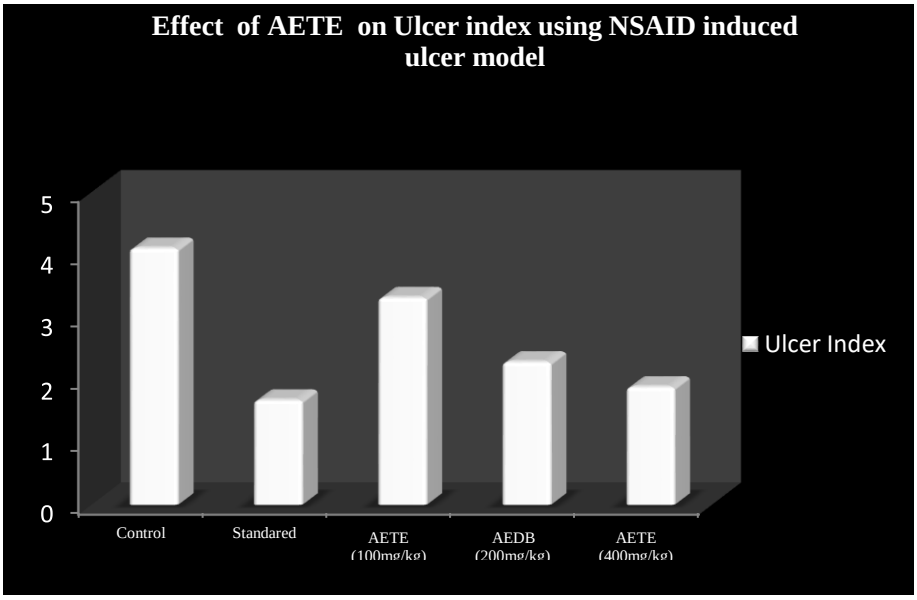
**Effect of AETE on Ulcer Index on NSAID induced Ulcer model**

**Table No 6: Effect of AETE on Ulcer Index on NSAID inducedUlcer model**

| S.No | Treatment | Dose | Ulcer Index |
|---|---|---|---|
| **1** | Control(water) | - | 4.11±0.25 |
| **2** | Famotidine | 3mg/kg | 1.68±0.42** |
| **3** | AETE | 100mg/Kg | 3.32±0.28 |
| **4** | AETE | 200mg/Kg | 2.29±0.21* |
| **5** | AETE | 400mg/Kg | 1.89±0.11** |

AETE - *Alcoholic Extract ofTerminalia elliptica*
**P<0.001, *P<0.05, compared with control

**Fig. No 3: Effect of AETE on Ulcer Index on NSAID induced Ulcermodel**




**Effect of AETE on Total Acidity on NSAID induced Ulcer model**

**Table No 7: Effect of AETE on Total Acidity on NSAID induced Ulcermodel**

| S.No | Treatment | Dose | Total Acidity(m Eq/L) |
|---|---|---|---|
| **1** | Control(water) | - | 73.14±1.13 |
| **2** | Famotidine | 3mg/kg | 28.1±0.84** |
| **3** | AETE | 100mg/Kg | 75.6±0.22* |
| **4** | AETE | 200mg/Kg | 67.06±0.516* |
| **5** | AETE | 400mg/Kg | 40.20±0.21** |

AETE - *Alcoholic Extract of Terminalia elliptica*
**P<0.001, *P<0.05, compared with control

**Effect of AETE on Acid Volume on NSAID induced Ulcer model**

**Table No 8: Effect of AETE on Acid Volume on NSAID induced Ulcermodel**

| S.No | Treatment | Dose | Acid Volume (ml) |
|---|---|---|---|
| **1** | Control(water) | - | 5.30±0.21 |
| **2** | Famotidine | 3mg/kg | 3.93±0.33** |
| **3** | AETE | 100mg/Kg | 5.10±0.11* |

| | | | |
|---|---|---|---|
| **4** | AETE | 200mg/Kg | 4.32±0.09* |
| **5** | AETE | 400mg/Kg | 4.04±0.04** |

AETE - *Alcoholic Extract of Terminalia elliptica*
**P<0.001, *P<0.05, compared with control

**Effect of AETE on pH in NSAID induced Ulcer model**

**Table No 8: Effect of AETE on pH in NSAID induced Ulcer model**

| S.No | Treatment | Dose | PH |
|---|---|---|---|
| **1** | Control(water) | - | 2.15±0.10 |
| **2** | Famotidine | 3mg/kg | 4.88±0.16** |
| **3** | AETE | 100mg/Kg | 3.49±3.05 |
| **4** | AETE | 200mg/Kg | 3.82±4.77** |
| **5** | AETE | 400mg/Kg | 4.02±3.33** |

AETE - *Alcoholic Extract ofTerminalia elliptica*
**P<0.001, *P<0.05, compared with control

**Effect of AETE on Glutathione in NSAID induced Ulcer model**

**Table No 9: Effect of AETE on Glutathione in NSAID induced Ulcermodel**

| S.No | Treatment | Dose | Glutathione(mcg/gm) |
|---|---|---|---|
| **1** | Control(water) | - | 0.93±0.012 |
| **2** | Famotidine | 3mg/kg | 1.14±0.19* |
| **3** | AETE | 100mg/kg | 0.88±0.065 |
| **4** | AETE | 200mg/kg | 1.22±0.094 |
| **5** | AETE | 400mg/kg | 1.41±0.024* |

AETE - *Alcoholic Extract of Terminalia elliptica*
**P<0.001, *P<0.05, compared with control

**Effect of AETE on Total Protein in NSAID induced Ulcer**

**Table No 10: Effect of AETE on Total Protein in NSAID induced Ulcer**

| S.NO | Treatment | Dose | Totel ptoteingm/dl |
|---|---|---|---|
| **1** | Control(water) | - | 0.842±0.02 |

| | | | |
|---|---|---|---|
| **2** | Famotidine | 3mg/kg | 0.720±0.03* |
| **3** | AETE | 100mg/kg | 0.740±0.09 |
| **4** | AETE | 200mg/kg | 0.672±0.05* |
| **5** | AETE | 400mg/kg | 0.650±0.02* |

AETE - *Alcoholic Extract ofTerminalia elliptica*
**P<0.001, *P<0.05, compared with control

**CONCLUSION**

This research looked at how well AETE worked as an antioxidant and an antiulcer agent. Evidence from this study suggests that AETE can protect against aspirin-induced ulcers and act as an antioxidant.

The presence of alkaloids, carbohydrates, glycosides, tannins, proteins, and amino acids was detected in the early phytochemical screening of whole plant extracts. Reduced amounts of glutathione (g-glutamylcysteinylglycine, GSH) were discovered in the tissues of gastric ulcers. A decrease in cysteine concentration, which mediates the release of glutathione (GSH), is caused by the aspirin-induced generation of free radical concentration.This study's values are associated with the production of gastric lesions in rats and the depletion of gastric GSH. As a tripeptide with superoxide radical scavenging capabilities, GSH safeguards the thiol protein levels necessary for tissue integrity release from oxidation reactions. An increase in glutathione content was seen in my present investigation following AETE treatment. The AETE may have beneficial antioxidant and anti-ulcer effects, according to all these data. Future study should focus on establishing the mechanism of action and treatment necessity.

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