

Anti-ulcer activity of methanol extract of *Tectona grandis* Linn

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ABSTRACT

PUD is the most common disease that affects a majority of the population in the world and young people being the most affected out of all the ulcer patients. This disease involves a large number of causes like NSAID, malnutrition and deficiency, unhealthy lifestyles like chronic smoking and stress. In recent years, a rapid progressive understanding had been made concerning the mechanism of ulcers and its treatment protocols. Given the side effects of the available synthetic drugs, it calls for an investigation of newer medications which are of herbal origins. As per the literature, survey says *Tectona grandis* ethanol extract has been proved to show the anti-ulcer activity and considering the solubility and extractive capabilities of methanol over ethanol; the current research was performed to determine the anti-ulcer potency of methanol extract of *Tectona* roots. The results showed that *Tectona* methanol extract is way more efficient in treating ulcers in comparison to the standard drug omeprazole.



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INTRODUCTION

PUD is the most common disease that affects a majority of the population in the world and young people being the most affected out of all the ulcer patients. This disease involves a large number of causes like NSAID, malnutrition and deficiency, unhealthy lifestyle like chronic smoking and stress in. The mechanisms of ulcer formation include an acid imbalance to a greater extent and pepsin and *H.pylori* in minor contributions. The protective fac-

tors like PG's, carbonates, NO, mucins etc. also are reported to cause ulcers in humans. There had been many stated approaches to treat PUD and the majority of them being the reduction of gastric acid secretion of activity. There are others also like strengthening the mucosal layer in the stomach [1].

In recent years, a rapid progressive understanding had been made concerning the mechanism of ulcers and its treatment protocols [2, 3]. Current trends in ulcer treatment include the PPI's, H2 blockers, drugs that affect the mucosa barriers and PG2 and analogues [4, 5]. The development of rapid tolerance to the ulcer treating drugs and the occurrence of relapse and adverse effects of medications with investigations will always question the clinical stability and safety of the drugs. In view of the side effects of the available synthetic drugs, it calls for an inquiry of newer medications which are of herbal origins [6].

As per the literature sources and relevant scientific documentation, *Tectona grandis* has been claimed to show the anti-ulcer properties in the ethanolic

extract which was known to contain glycosides and alkaloids which are responsible for the activity [7]. As the research says, the solubility of alkaloids in methanol is more excellent than ethanol. Hence, the current research focusses on proving the anti-ulcer activity in the methanol extract of roots of *Tectona grandis* [8].

MATERIALS AND METHODS

Animals

Albino Wistar rats around 150–200g of either sex were procured from a caretaker from Bangalore and were well maintained in a 12 h light/dark cycle at 25 °C of conditioned air with free access to food and water. Ethical committee clearance was obtained from the IAEC (Institutional Animal Ethics Committee) of CPCSEA [9].

Toxicity estimation

The oral toxicity of methanol extract of roots of *Tectona Grandis* has been tested as per OECD guidelines 423 methods. The tests were carried out at a starting dose of 2000mg/kg bodyweight. There was no sign of adverse effect or any lethal issue to rats at that dose. Hence two treatments have been used to proceed for further investigations of ulcer potential [10].

Anti-ulcer activity

Ethanol-induced method

The anti-ulcer activity of the roots of *Tectona grandis* was tested using the ethanol-induced gastric ulceration method in which the ethanol os used as ulcerating agent. The animals were divided randomly into groups of rats each [11].

Group A is treated with one %w/v of CMC (10 ml/kg p.o), Group B, C, D and E were ulcerated using ethanol commonly on eh 14th day of the study. Before the induction of ethanol, all the groups are treated with one %w/v of CMC (10 ml/kg p.o), methanol extract of roots of *Tectona grandis* (METG) at 100mg/kg PO, methanol Extract of roots of *Tectona grandis* (METG) at 200mg/kg PO and Omeprazole (20 mg/kg p.o) respectively were administered 30min before induction of gastric ulcer [12]. All the rats were anaesthetized with ether and stomachs were separated to calculate the ulcer index.

Ulcer index calculations

The stomachs are isolated and viewed for lesions in the mucosa. The ulcer index is calculated according to the formula

$$\%I = \frac{(USc - USt)}{USc} \times 100$$

Where USc = ulcer surface area in control and USt = ulcer surface area in treated animals.

RESULTS AND DISCUSSION

METG exhibited control on ulcers in ethanol-induced gastric ulceration method.

Table 1: Effect of METGin ethanol-8ml/kg induced gastric ulcer in rats

Group	Design of Treatment	Ulcer Index	Percentage Inhibition (%)
A	Control	—	—
	1%w/vCMC-10ml/kg p.o	18.57±0.18	—
C	METG-100mg/kg	10.67±1.34*	34.91
D	METG-200mg/kg	5.28±0.84**	70.85
E	Omeprazole-20mg/kg	5.01±0.67**	71.24

The Data is in theform of mean±S.E.M. *P<0.01 & **P<0.001when in comparison with control

The methanol extract of the roots of *Tectona* at a dose of 200mg/kg showed comparably significant results with the standard omeprazole drug. It showed the anti-ulcer activity, which is dependant on the treatment of the extract. The percentage inhibition of the standard drug was 71.24, which is near to extract at a dose of 200mg/kg with 70.85. Comparing the quantity and numbers of the gastric components, the pH is also significantly lowered by the standard drug which is almost similar to the extract with 4.88 which is way neutral than that of the negative control or gastric juice pH of 1.33.

The volume of gastric juice is also significantly lowered with the extract along with the standard drug (Table 1). So, it can be advocated that the plant extract has potentially reduced the ulcer forming capacity of ethanol in rats [13]. There is evidence of increase int eh free radicle generation in gastric mucosa with the administration of ethanol that causes injury to the mucosal layers in the stomach [14]. From the mechanism of ethanol generating reactive species, the extract was competent enough to fight and scavenge the free radicles that are caused by the ethanol (Table 2). It was comparatively significant with the standard drug.

Table 2: Effect of METG in ethanol-8ml/kg induced gastric ulcer in rats

Group	Design of Treatment	GSH ($\mu\text{g}/\text{mg}$ protein)	ALP (IU/L)	Gastric volume (ml/100g)	pH (Unit)
A	Control	2.360.36	59.852.93	0.370.01	5.480.18
B	1%w/vCMC-10ml/kg	0.680.57	175.442.97	2.130.11	1.470.08
C	METG-100mg/kg	1.330.62*	116.274.28*	1.020.24*	3.980.43*
D	METG-200mg/kg	1.790.91**	69.873.26**	0.510.12**	4.880.57**
E	Omeprazole-20mg/kg	1.980.31**	63.244.87**	0.470.02**	5.170.84**

The Data is in the form of mean \pm S.E.M. *P<0.01 & **P<0.001 when in comparison with control

CONCLUSION

As per the literature, survey says *Tectona grandis* ethanol extract has been proved to show the anti-ulcer activity and considering the solubility and extractive capabilities of methanol over ethanol; the current research was performed to determine the anti-ulcer potency of methanol extract of *Tectona* roots. The results showed that *Tectona* methanol extract is way more efficient in treating ulcers in comparison to the standard drug omeprazole.

CONFLICT OF INTEREST

Authors declared no conflict of interest.

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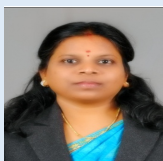
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