**ORIGINAL ARTICLE**

# Comparison between the Effects of Extract from Medicinal Plant "Olea Europea" and Cimetidine on the Volume and Acidity of Stimulated Gastric Secretion in Fasting Rabbits

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## ABSTRACT

**Aim:** To find out the effectiveness of extract from medicinal plant Olea europea as compared to Cimetidine for the treatment of diseases associated with hyper gastric acidity conditions.
M**ethods:** Thirty rabbits of local breed, weighing 1-1.5kg were used as group A,B &C. The animals were kept on fasting for 48 hours, after which the pylorus of each animal was ligated. Carbachol 600μg/kg to group A, Cimetidine 2.5 mg/kg to group B, Olea europea 500 mg/kg to group C and Carbachol 600μg/kg body weight were administered intra peritoneally after 15 minutes to group B&C. Gastric contents obtained & titrated
**Results**: Both the extract & Cimetidine reduced the volume, free and total acidity of gastric secretions which were statistically highly significant when compared with Carbachol (P<0.01). When extract was compared with that of cimetidine, all these differences were found statistically significant(p< 0.05) indicating that the extract has less effect as compared to cimetidine on all parameter.
**Conclusion:** The extract can be used effectively and safely in the treatment of hyper acidity conditions and peptic ulcer after evaluation of its effect in human.
**Keywords:** Olea europea & Cimetidine, gastric secretion

## INTRODUCTION

Peptic ulcer is one of the most common ailments in the clinical practice. Increased acid production from gastric mucosa is responsible for peptic ulceration in most of the patients. Ulcers are not found in achlorhydric patients and mostly occur in patients with Zollinger-Ellison (Z.E) syndrome which is characterized by very high acid secretion[1].

Inhibition of over production of acid is a desirable therapeutic goal in the treatment of peptic ulcer. Histamine is a potent stimulus for gastric acid secretion. Parietal cells of the stomach contain $H_2$-receptors. $H_2$- antagonist Cimetidine effectively blocks gastric acid secretion[2].

Histamine stimulation produces a rise in the gastric acid secretion[3].It has been documented that 38 medicinal plants including Olea europea have natural calcium channel blockers[4]. Thirty percent ethanol extract from the leaves of Olea europea has significant calcium channel blocking activity[5].The calcium channel blocking agents like Verapamil, nifedipine and diltiazem are commonly used in the treatment of hypertension, angina, myocardial infarction and supraventricular tachycardia[6].Induction of hypercalcaemia through intravenous administration of calcium, is usually associated with increased gastric volume and acidity.[7] The acid stimulating ability of calcium is well known and there is extreme sensitivity to calcium in patients with Z-E syndrome.[8] Calcium channel blocker like Verapamil may interfere with $H^+K^+$ ATPase due to its high affinity for the site $H^+K^+$ ATPase system which is accessible from luminal side of the stomach. Histamine release from peritoneal mast cells is critically dependent upon extra cellular $Ca^{++}$ concentration, so non-availability of $Ca^{++}$ may cause reduced effects of histamine on acid production in the stomach. In the stomach, motility and acid secretion have been shown to be dependent upon calcium ion[9].

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## METHODOLOGY:

Thirty rabbits of local breed were selected for the present study. Healthy animals of both sexes weighing 1-1.5 kg were used in the study. All the animals were kept fasting for 48 hours with free availability of water before they were subjected to experimental procedure. The animals were divided into 3 groups, each containing 10 animals. Group A was Carbachol treated, Group B was Olea europea+ Carbachol treated and Group C was Cimetidine + Carbachol treated.

The operative procedure was the one adopted by Vischer et al.(1954)[10]. Animals were anaesthetized with ether, abdomen was opened and pylorus was ligated with silk suture. Then abdominal wall was closed with suture clamps and intraperitoneal (I.P) injection of Carbachol 600μg/Kg body weight were administered to group A, 500mg/ Kg body weight of Olea europea to group B and 2.5 mg/ Kg body weight of Cimetidine to group C, followed by Carbachol 600 μg/ Kg body weight after 15 minutes to group B and C. The contents of the stomach were collected. The volume of gastric juice was measured. Then the contents were centrifuged, filtered and subjected to titration for estimation of free and total acidity by the method described by Varley (1962)[11]. One ml of

centrifuged and filtered gastric secretion was titrated against 0.1 N NaOH using Topfer,s reagent as an indicator for determination of free acidity and 1% phenolphthalein for combined acidity. The data was analyzed statistically using student “t” test.

## RESULTS

The detail of results is given in tables 1, 2

Table 1: Extract from leaves of Olea europea and Cimetidine on the volume and acidity of gastric secretion induced by Carbachol

| Drugs | Volume of gastric secretion (ml) | Acidity(m.Eq/dl ml of gastric secretion) | |
|---|---|---|---|
| | | Free | Total |
| Carbachol | 28.7±0.65 (10) | 6.4±0.41 (10) | 7.6±4.41 (10) |
| Olea europea+Carbachol | 16.5±0.76 (10) | 3.2±0.38 (10) | 4.02±0.35 (10) |
| Cimetidine+ Carbachol | 13.1±0.33 (10) | 2.1±o.15 (10) | 3.2±0.41 (10) |

*Carbachol was injected 600 µg/kg body weight, Olea europea 500 mg/kg body weight and Cimetidine 2.5 mg/kg body weight intraperitoneally.

Table 2: Comparison of extract from Olea europea and Cimetidine on the volume and acidity of gastric secretion induced by Carbachol

| Drugs | Volume of gastric secretion (ml) | Acidity (m.Eq /dl ml of gastric secretion) | |
|---|---|---|---|
| | | Free | Total |
| Olea europea+Carbachol | 16.5±0.76 (10) | 3.15±0.38 (10) | 4.02±0.35 (10) |
| Cimetidine+ Carbachol | 13.12±0.33 (10) | 2.04±o.15 (10) | 3.21±0.41 (10) |
| P Values | P<0.05 | P<0.05 | P<0.05 |

## DISCUSSION

Acid secretion in the stomach is controlled at a variety of levels by neural, hormonal and paracrine mechanisms. When these regulatory mechanisms malfunction, acid and pepsin autodigest the mucosa resulting in the ulceration of esophagus, stomach and duodenum.[12] Histamine, acetylcholine or Carbachol are potent secretogogues for the parietal cells of gastric mucosa leading to the production of HCl[13].

In this study, we observed that Olea europea reduced the volume free and total acidity. This is due to the calcium channel blocking activity of natural calcium channel blocker present in the extract. All these reductions were statistically highly significant when compared with Carbachol treated group. Similar reductions were observed using Cimetidine. All these reductions were found to be statistically highly significant when compared with Carbachol alone. Our study is in consistent with other workers who concluded that Verapamil significantly reduces gastric acid secretion.[14.] It is due to the fact that Verapamil, a well known calcium channel blocker, inhibits the calcium influx, which may be responsible for the observed reductions in volume and acidity of gastric secretion. Release of histamine from mast cells is critically dependent on extra cellular calcium ions, so Verapamil by blocking calcium ions can block histamine release which is a potent agent for HCl secretion[15].

When we compared the differences of volume, free and total acidity by Olea europea and Cimetidine, they were all found significant. This indicates that the extract can block gastric acidity significantly but it is less effective as compared to the standard anti-ulcer drug Cimetidine in decreasing volume, free and total acidity of gastric secretion. All of these actions are due to the calcium channels blocking activity As the extract also contains calcium channel blocker, so it may be effective in the treatment of the above mentioned diseases

## CONCLUSION

The extract can be used effectively and safely in the treatment of peptic ulcer & hyper acidity conditions after evaluation of its effect in human.

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