Evaluation of anti-ulcer effect of root of *Curcuma zedoaria* in rats

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*Curcuma zedoaria* is the chief ingredient in several Unani preparations used to treat peptic ulcer. Therefore antiulcer activity of root of *C. zedoaria* was studied in pyloric-ligated albino rats. The effect of root powder (200 mg/kg oral) on the volume of gastric juice, gastric pH, total acid, free acid and ulcer index in the pyloric-ligated rats was studied for the assessment of anti-ulcer activity.

The root powder (200 mg/kg) reduced the gastric pH, free acid, total acid and ulcer index significantly and the results were comparable to that of standard drug omeprazole (30 mg/kg i.p.). It may be concluded that the root is effective in protecting against hyperacidity and gastric ulcers. This study justifies the use of *C. zedoaria* in various formulations of Unani system of medicine for the treatment of peptic ulcer.

**Keywords:** *Curcuma zedoaria*, Unani system, Peptic ulcer, Omeprazole.

Gastric disorders like hyperacidity and ulcers require treatment for a prolonged period. However, use of drugs for such a period may alter various normal physiological functions of the body i.e., they may influence pharmacokinetic parameters of other concomitantly used drugs by inhibiting drug metabolizing enzymes¹.

But traditional system of medicines like Ayurveda and Unani offer safer and cheaper remedies in such cases. *Curcuma zedoaria* Rosc. is one of the ingredients of Unani formulations used for treating gastrointestinal disorders. The other ingredients normally incorporated in such preparations are various demulcents, protective and astringent agents that protect the gastric mucosa. However, *C. zedoaria* is suspected to have inhibitory effect on gastric secretion. A perusal of literature revealed that *C. zedoaria* possesses antifungal², cytotoxic³, hepatoprotective⁴ and antibacterial activity⁵. There are no reports regarding its influence on the gastric acid secretion. Hence, the present study was conducted to evaluate the influence of root powder of *C. zedoaria* on the gastric acid secretion.
Materials and methods

Collection and preparation of root suspension

The commercially marketed dried pieces of root were identified organoleptically and further confirmed by Unani practitioners of the Department of Pharmacology, Govt. Nizamia Unani Medical College and Hospital, Hyderabad. The root was powdered and 100 mg/ml suspension was prepared in 3% gum acacia suspension.

Housing and handling of animals

All the animals were housed in the central animal house of the institution and were housed and handled in accordance with the prescribed guidelines.

Antiulcer activity

Adult Wistar rats of either sex weighing between 180 and 200 gm procured from National Institute of Nutrition, Hyderabad were used. They were fed a standard diet and water ad libitum in clean polypropylene autoclavable cages under standard laboratory conditions. The animals were fasted for 24 hours and water was given ad libitum. The animals were divided into 4 groups of 6 animals each. Animals of the group I, II, III and IV were administered with 3% gum acacia suspension (control), the standard drug omeprazole (30 mg/kg i.p.) and C. zedoaria root powder 100 mg/kg and 200 mg/kg, respectively, in 3% gum acacia suspension, orally, one hour prior to the pyloric ligation. Pyloric ligation was performed as described by Shay et al. After four hours of pyloric ligation the animals of all the groups were sacrificed and gastric contents were collected. The total gastric secretion volume and pH were measured. The free acid and total acid content was determined by titrimetric method using 0.01N NaOH as described by Kulkarni. In addition, the ulcer index was determined by opening the stomach on greater curvature and the scores were given 0 to 3 depending upon the severity of ulcers (normal coloured stomach = 0, red colouration = 0.5, ulcer spots <3 = 1, ≥ 3 but ≤ 5 = 2 and ulcer spots >5 = 3).

Statistical analysis

The results were analyzed using unpaired Students’ ‘t’ Test and the p value of <0.05 was considered as significant.

Results

The results are presented in Table 1. The results indicate that the pH, free acid, total acid, volume of gastric juice and the ulcer index were reduced significantly in the animals pretreated with C. zedoaria root powder and omeprazole. However, the total gastric volume was significantly reduced by omeprazole while C. zedoaria failed to do so.

Discussion

There are contradictory claims by Unani practitioners regarding the benefit of incorporation of C. zedoaria in formulations for gastric disorders. Upon literature review it was found that no reports were available regarding its effect on acid secretion and ulcer inhibition. The present study shows that pretreatment with C. zedoaria root powder (200 mg/kg oral) reduced the pH, acid content (total and free) and ulcer index in rats.
Table 1—Effect of *Curcuma zedoaria* on gastric acid and ulcer production in albino rats

<table>
<thead>
<tr>
<th>Treatment/dose</th>
<th>Gastric volume in ml</th>
<th>pH</th>
<th>Free acid mEq/l/100g</th>
<th>Total acid mEq/l/100g</th>
<th>Ulcer index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>2.42 ± 0.101</td>
<td>3.39</td>
<td>49.00 ± 6.51</td>
<td>78.23 ± 3.929</td>
<td>3.75 ± 0.75</td>
</tr>
<tr>
<td>(0.5 ml of 3% gum acacia suspension)</td>
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<tr>
<td>Omeprazole</td>
<td>1.72* ± 0.209</td>
<td>7.1*</td>
<td>19.5* ± 0.428</td>
<td>46.00* ± 0.365</td>
<td>1.74* ± 0.170</td>
</tr>
<tr>
<td>(30 mg/kg i.p.)</td>
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<tr>
<td><em>C. zedoaria</em></td>
<td>2.11 ± 0.007</td>
<td>3.66</td>
<td>55.00 ± 1.594</td>
<td>75.83 ± 2.62</td>
<td>3.5 ± 0.288</td>
</tr>
<tr>
<td>(100 mg/kg p.o. in 3% gum acacia suspension)</td>
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<tr>
<td><em>C. zedoaria</em></td>
<td>1.96 ± 0.162</td>
<td>6.09*</td>
<td>28.23* ± 0.916</td>
<td>47.23* ± 2.84</td>
<td>1.5* ± 0.258</td>
</tr>
<tr>
<td>(200 mg/kg p.o. in 3% gum acacia suspension)</td>
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</tbody>
</table>

* = p<0.05
n = 6 in each group

The effect is comparable to that of omeprazole (30 mg/kg i.p.). *C. zedoaria* root powder failed to reduce the volume of gastric juice significantly. In addition the pH of 10% suspension of *C. zedoaria* is 8.66. Hence, it is not clear whether the reduction in pH and acid content is due to mere neutralization effect of the *C. zedoaria* suspension or its inhibitory effect on acid secretion. Research in our laboratory is progressing to ascertain the same. However, the present study shows that root powder is useful in treating hyperacidity and gastric ulcers. The use of *C. zedoaria* in Unani formulations used in treating gastrointestinal disorders is therefore justifiable.

References


