



## Short Communication

### Preliminary *in vitro* evaluation of some traditional Ayurvedic antacids

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#### SUMMARY

A preliminary *in vitro* acid neutralizing capacity test of twelve traditional Ayurvedic antacids were performed in this study. Five traditional preparations of ash of conch shell, ash of oyster, ash of pearl, limestone, and ash of cowrie showed high acid neutralizing capacity similar to standard antacid combination of Al(OH)<sub>3</sub> and Mg(OH)<sub>2</sub>. Among these the ash of conch shell found the highest acid neutralizing capacity. The ash of tamarind and ash of *Achyranthus aspera* showed moderate acid neutralizing capacity. The acid neutralizing capacity of red ochre; ash of iron; mixture of niter, alum and ammonium chloride; saltpeter; and ash of mica found below the USP 23 limit.

**Key words:** Acid neutralizing capacity; Antacid; Ayurvedic

#### INTRODUCTION

The inhibition of gastric secretion has been a therapeutic objective for decades. A variety of pharmacological and non-pharmacological approaches have been proposed throughout history. Among the non-pharmacological proposals, gastric surgery was widely used until effective drugs were available. Initially antacids and later anticholinergics, H<sub>2</sub> blockers and proton pump inhibitors took the predominant position. Finally, *Helicobacter pylori* eradication has been the milestone for the cure of peptic ulcers (Diaz-Rubio, 2005). However, peptic ulceration has traditionally been managed by antacid therapy, drugs that raise the pH of stomach contents by directly neutralizing acid, or by blocking

acid production. This classic form of therapy has proved successful in the treatment of both uncomplicated damages to the mucus membranes and of ulcers, and are still now one of the best choices (Katzung, 1995). Therefore, significance of antacid products is inevitable in the treatment of gastrointestinal problems. Ayurvedic antacids are used for ulcer diseases for many decades (Anonymous, 1978). Their usefulness in peptic ulcer diseases appears to lie in their ability to reduce gastric acidity (Katzung, 1995). The objective of this study was to preliminary evaluate the traditional claim of Ayurvedic antacids in respect of acid neutralizing capacity.

#### MATERIALS AND METHODS

##### Preparation and source of antacids

The Ayurvedic antacids were prepared according to the Bangladesh National Ayurvedic Formulary (Anonymous, 1992). The in-process and quality

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control for the preparation was strictly controlled and monitored by the experienced officials of Shakti Aushodhalaya. The Ayurvedic antacids were purchased from Shakti Aushodhalaya, Dhaka, Bangladesh a licensed Ayurvedic formulation manufacturer. The standard antacid contains combination of 250 mg Al(OH)<sub>3</sub> and 400 mg Mg(OH)<sub>2</sub>.

#### Determination of acid neutralizing capacity

Acid neutralizing capacity was determined in triplicate by the method USP 23, 1995. One gram Ayurvedic antacid powder or standard antacid was taken to a 250 ml beaker and 70 ml of water was added and mixed on the magnetic stirrer for 1 min. 30 ml of 1.0 N HCl was pipetted into the sample solution while stirring on the magnetic stirrer at 3,000 rpm. The stirring was continued for exactly 15 min after addition of acid. Titration was started immediately and in a period not to exceed additional 5 min, the excess 1.0 N HCl was titrated with 0.5 N NaOH solution to stable pH of 3.5. The sample solution was checked 10 to 15 min after obtaining a pH of 3.5 to make sure the pH was stable. The number of mEq. of acid neutralized by the sample was calculated as follows:

$$\text{Total mEq.} = (30 \text{ ml HCl}) \times (\text{strength of HCl}) \\ - (\text{Required ml of NaOH}) \times (\text{strength of NaOH})$$

**Table 1.** Acid neutralizing capacity of Ayurvedic antacids

Composition	Local Name	Acid neutralizing capacity (mEq. HCl)
Al(OH) <sub>3</sub> 250 mg and Mg(OH) <sub>2</sub> 400 mg	-	23.28 ± 3.53
Ash of <i>Achyranthus aspera</i>	Apang bhashma	12.22 ± 2.42
Ash of conch shell	Shonkho bhashma	21.29 ± 3.87
Ash of cowrie	Cowrie bhashma	20.52 ± 3.33
Ash of iron	Lauha	2.472 ± 0.68
Ash of mica	Avra bhashma	1.507 ± 0.46
Ash of oyster	Jhinuk bhashma	21.0 ± 5.78
Ash of pearl	Mukta bhashma	20.72 ± 4.58
Ash of tamarind	Tentul bhashma	17.25 ± 3.97
Limestone	Khorimati	20.57 ± 6.21
Niter 80 g, Alum 20 g, NH <sub>4</sub> Cl 10 g	Shuvra parpati	2.30 ± 1.11
Red ochre	Goireek	2.72 ± 0.63
Salt peter	Jobokhar	1.85 ± 0.49

## RESULTS AND DISCUSSION

Ashes (*bhasmas*) are unique Ayurvedic preparations, known in the Indian subcontinent since the seventh century BC and widely recommended for treatment of a variety of chronic ailments. In this research a preliminary *in vitro* evaluation of twelve traditional Ayurvedic antacids were performed by acid neutralizing capacity test. The acid neutralizing capacity of antacid is significant for pharmacological actions rather than the amount of active ingredients, because the efficacy of antacid means how much volume of acid is neutralized by antacids. Acid neutralizing capacity is an important test to evaluate the gastric antacids, and has been widely used to assess the efficacy of antacids (Agarwal *et al.*, 1988; Suresh and Gupta, 1992; Kafedjiisky and Spasova, 1998). The results were categorized in this study as highly active, active and inactive to the test.

Seven traditional Ayurvedic preparations the ash of conch shell, ash of oyster, ash of pearl, ash of cowrie, limestone, ash of tamarind and ash of *Achyranthus aspera* conforms the USP 23 limit of acid neutralizing capacity test not less than 5 mEq of acid consumed by the minimum single dose. In order of their efficacy five traditional preparations of the ash of conch shell, ash of oyster, ash of pearl,

ash of cowrie, and limestone showed high acid neutralizing capacity similar to standard antacid combination of  $\text{Al}(\text{OH})_3$  and  $\text{Mg}(\text{OH})_2$ . The most active preparation was ash of conch shell. The ash of tamarind and ash of *Achyranthus aspera* showed moderate acid neutralizing capacity. The acid neutralizing capacity of red ochre; ash of iron; mixture of niter, alum and ammonium chloride; saltpeter and ash of mica found below the USP 23 limit (Table 1).

The antacids which showed high acid neutralizing capacity ash of conch shell, ash of oyster, ash of pearl, ash of cowrie, and limestone all contains calcium carbonate and thus it is assumed forms the basis of acid neutralizing capacity of these drugs. The weak bases present in the samples can react with gastric acid to form water and salt thereby diminishing gastric acidity. Only of ash of conch shell has been reported previously in the literature to have antacid activity (Richa *et al.*, 1997). From this preliminary *in vitro* study simulated to compare the antacid effects, we can conclude that some Ayurvedic antacids possess beneficial acid neutralizing capacity and justify its traditional uses. Further studies are suggested for the active preparations. The beneficial effects observed under *in vitro* simulations remains to be investigated *in vivo* as well as at the biochemical level to understand the mechanisms involved.

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