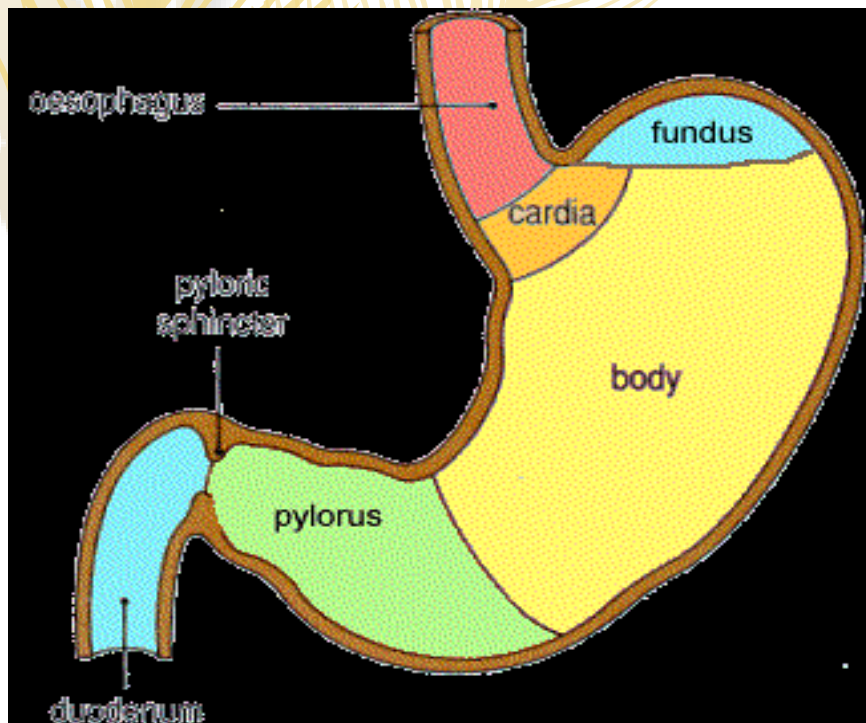


Inorganic pharmaceutical chemistry

Gastrointestinal Agents and Antacid

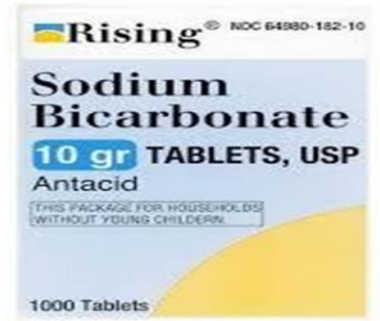
Lecture 5



Antacids products:

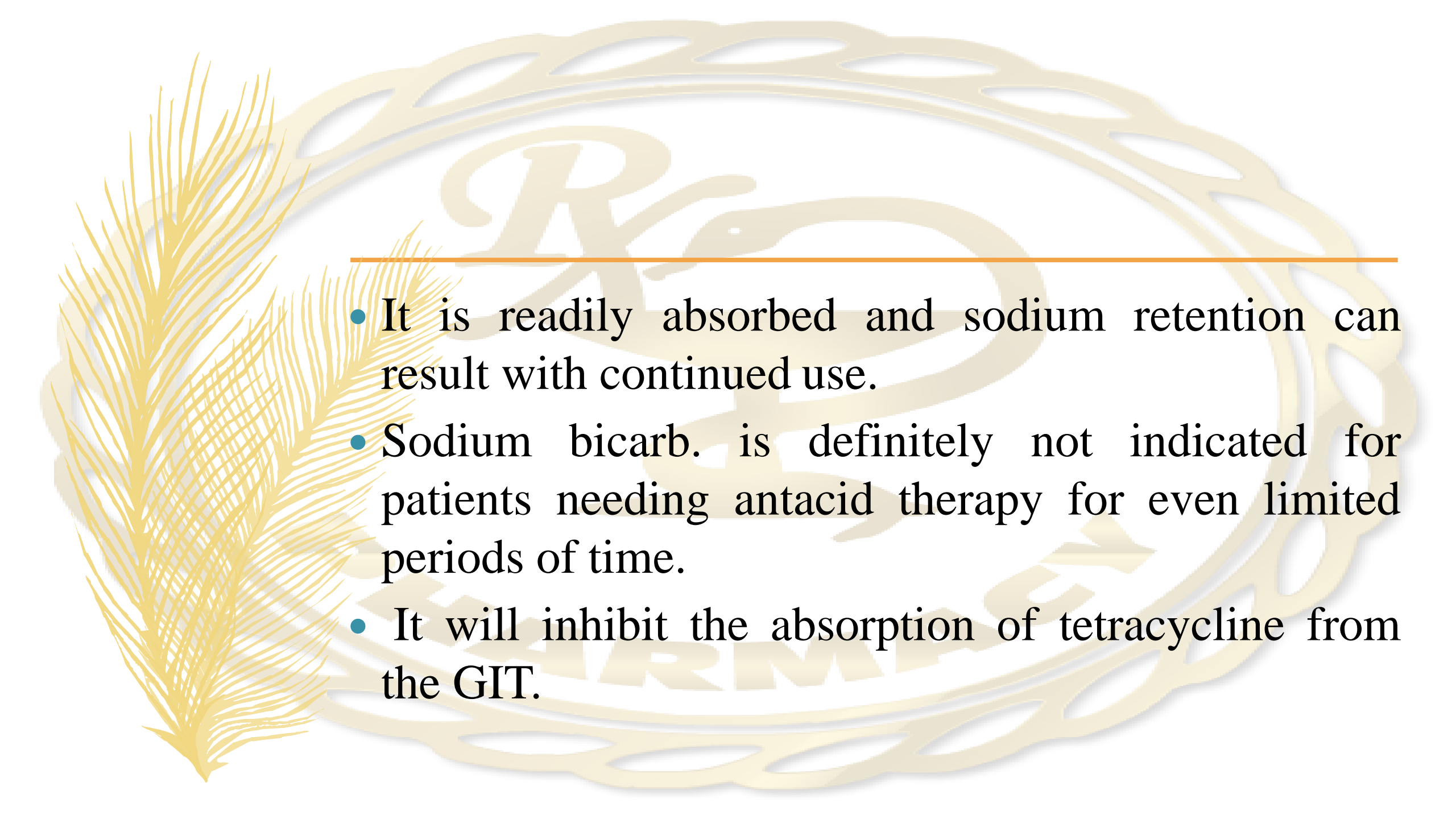
1. Sodium containing antacids.
2. Aluminum containing antacids.
3. Calcium containing antacids.
4. Magnesium containing antacids.





1. Sodium containing antacids.

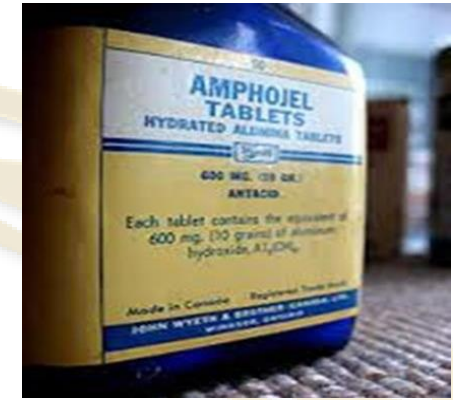
- **Sodium Bicarbonate as an antacid**
- It can cause a sharp increase in gastric pH up to or above pH 7.
- Because of the evolution of carbon dioxide in the presence of acid, sodium bicarbonate can cause belching and flatulence.
- $\text{NaHCO}_3 + \text{HCl} \longrightarrow \text{NaCl} + \text{CO}_2 + \text{H}_2\text{O}$

- 
-
- It is readily absorbed and sodium retention can result with continued use.
 - Sodium bicarb. is definitely not indicated for patients needing antacid therapy for even limited periods of time.
 - It will inhibit the absorption of tetracycline from the GIT.

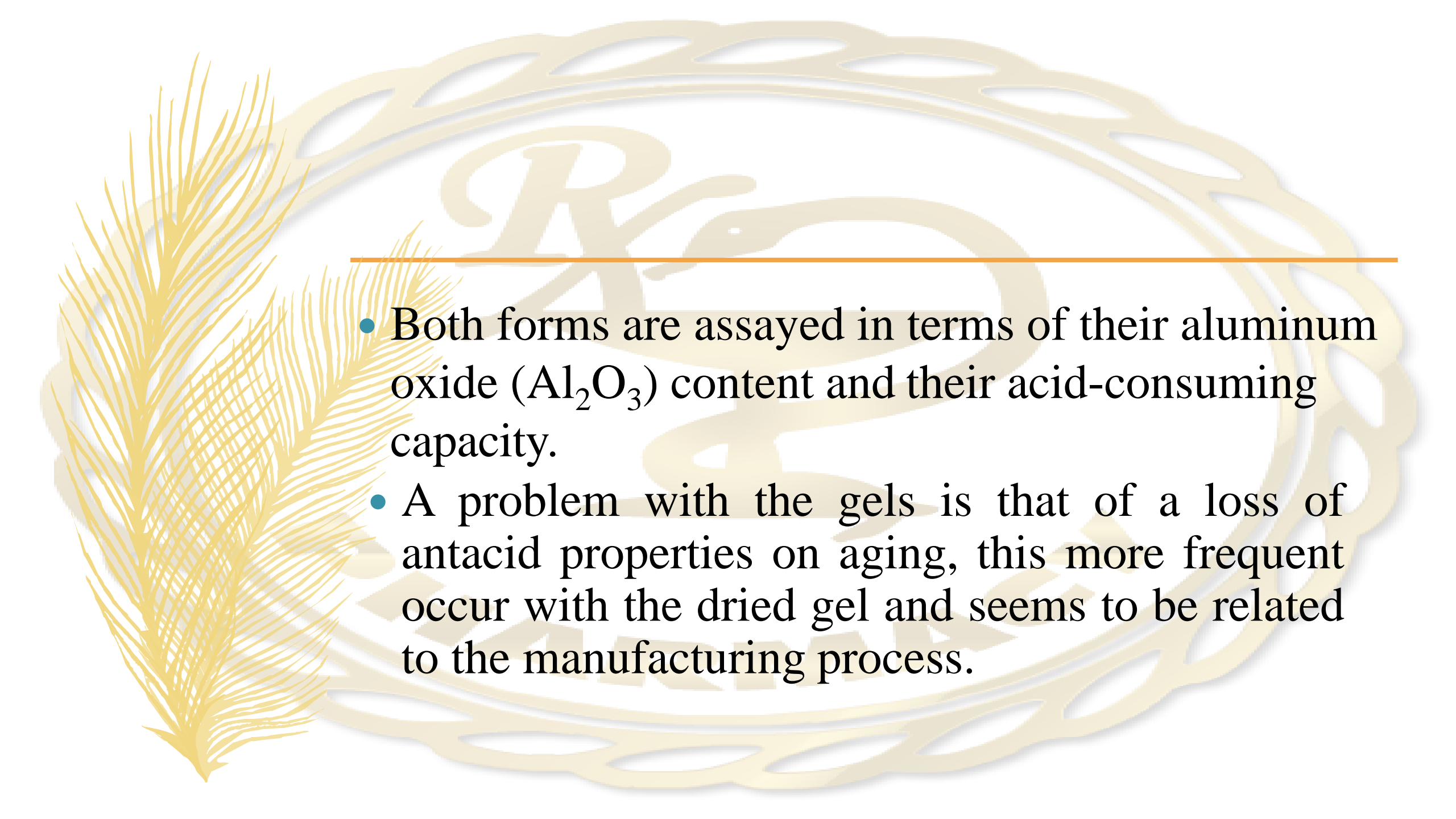
2. Aluminum containing antacids.

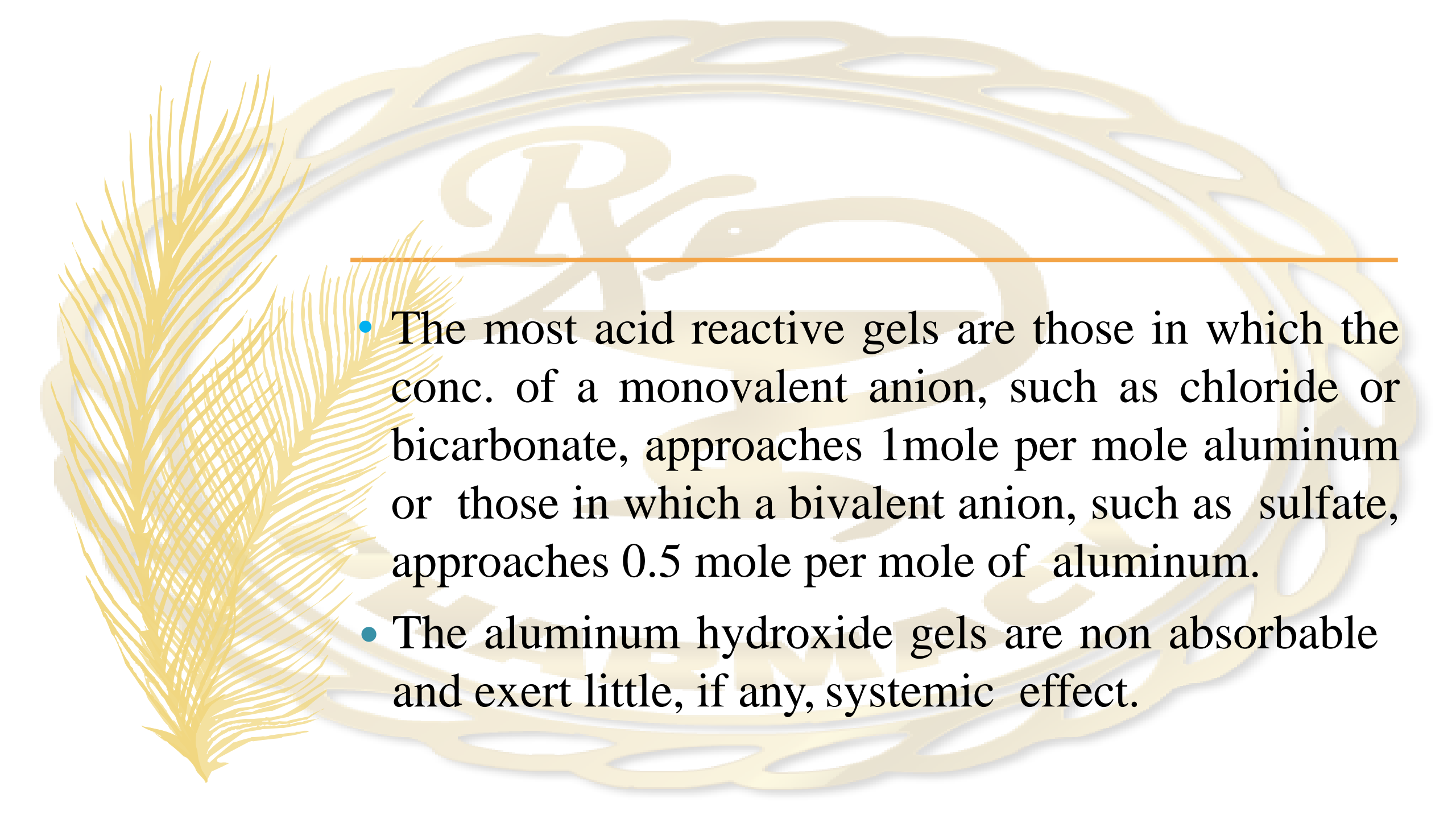
- The aluminum containing antacids are widely used.
- They are non systemic.
- buffering range in PH 3-5 region.
- They tend to be constipating because of liberation of astringent aluminum cations.

Aluminum Hydroxide



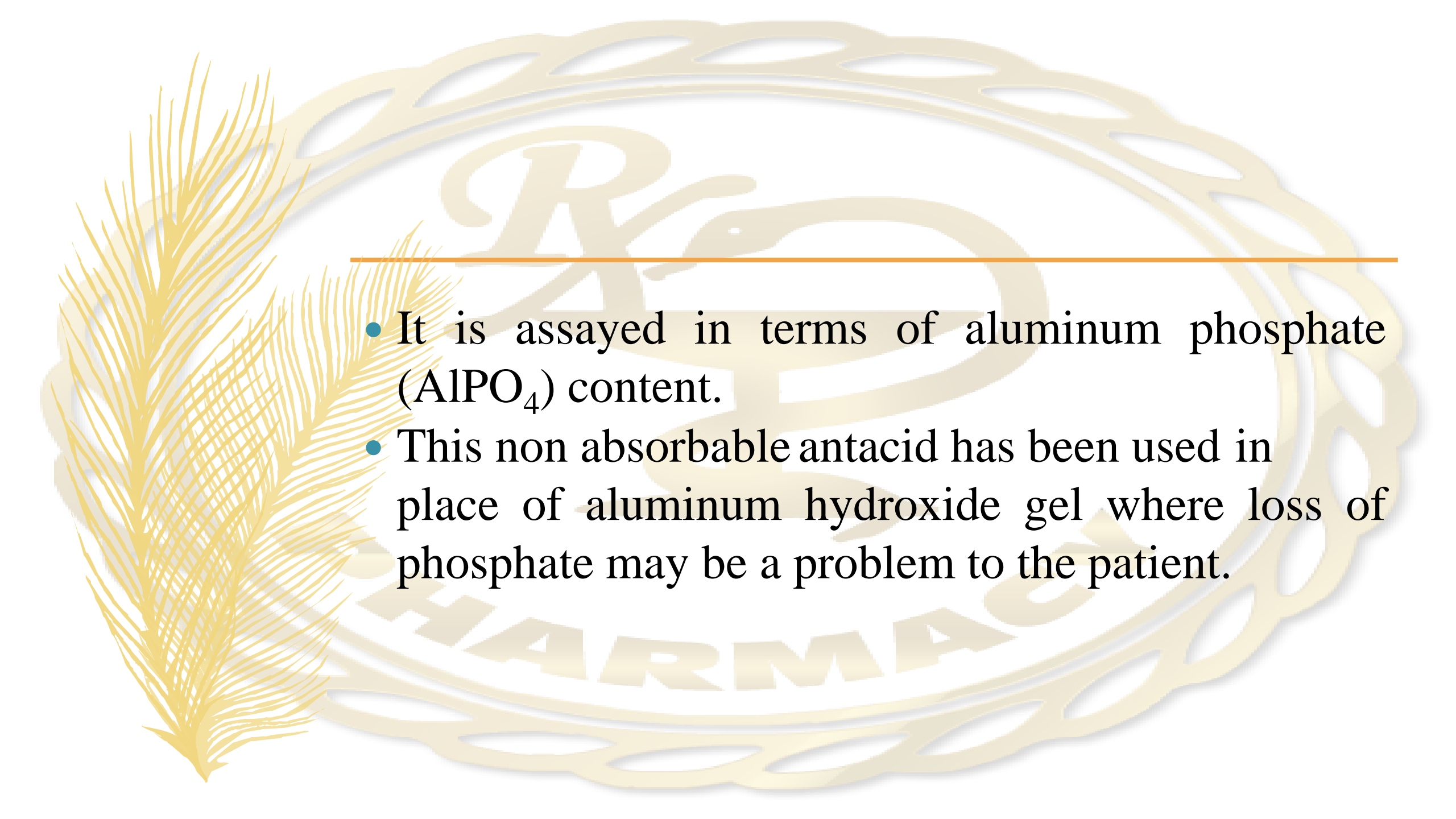
- It is recognized by the current U.S.P. in two physical forms plus one dosage forms.
 - (1) Aluminum hydroxide Gel (Amphogel) is a white viscous suspension, from which small amounts of clear liquid may separate on standing.
 - (2) Dried Aluminum Hydroxide Gel is not a typical gel but is a white odorless, tasteless amorphous powder. Also found as dried aluminum hydroxide gel tablets

- 
-
- Both forms are assayed in terms of their aluminum oxide (Al_2O_3) content and their acid-consuming capacity.
 - A problem with the gels is that of a loss of antacid properties on aging, this more frequent occur with the dried gel and seems to be related to the manufacturing process.

- 
-
- The most acid reactive gels are those in which the conc. of a monovalent anion, such as chloride or bicarbonate, approaches 1mole per mole aluminum or those in which a bivalent anion, such as sulfate, approaches 0.5 mole per mole of aluminum.
 - The aluminum hydroxide gels are non absorbable and exert little, if any, systemic effect.

Aluminum Phosphate

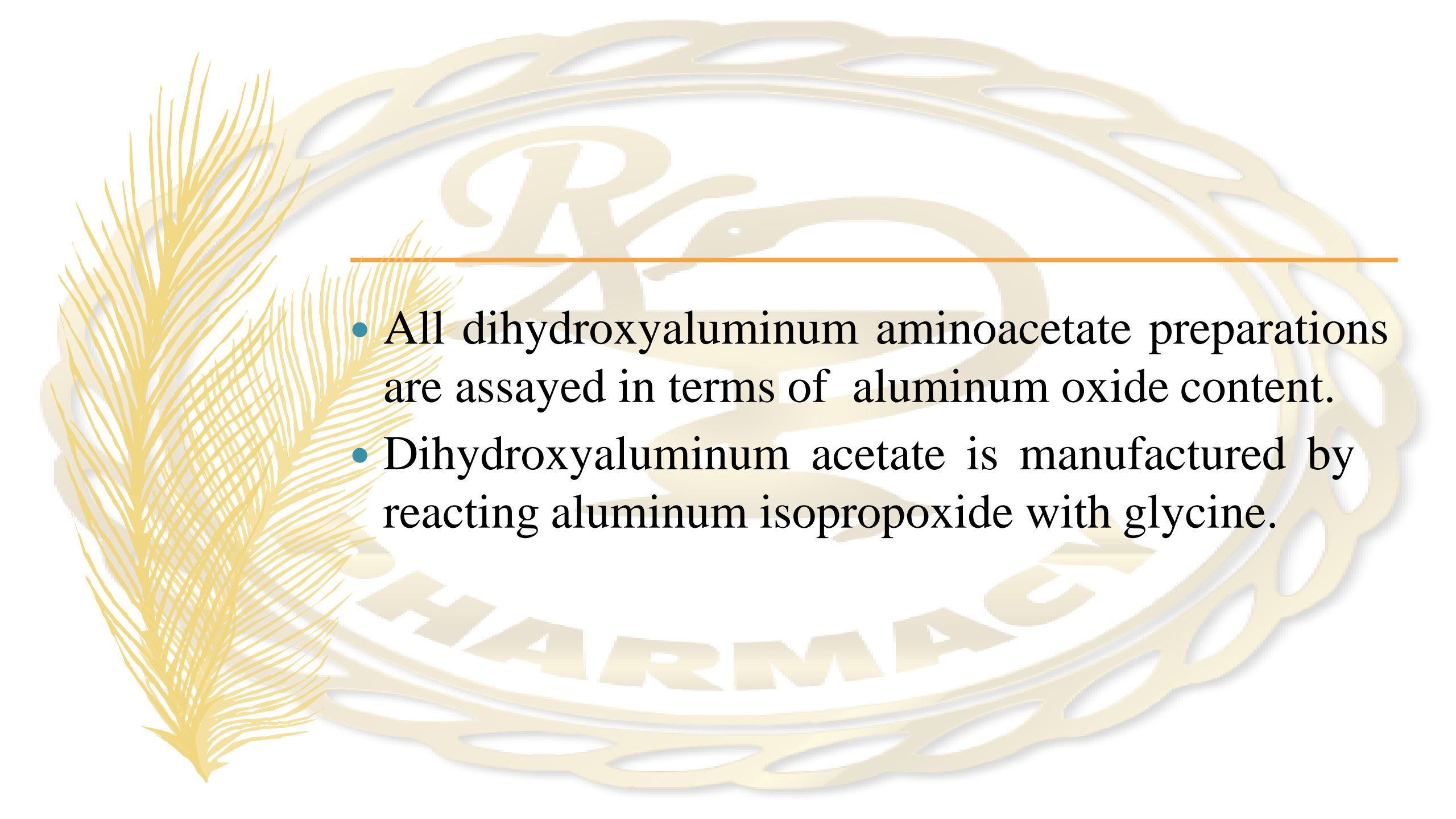
- Aluminum Phosphate is official as Aluminum Phosphate Gel (Phosphagel).
- It is a white, viscous suspension from which small amounts of water may separate on standing.
- It may contain suitable preservatives.

- 
-
- It is assayed in terms of aluminum phosphate (AlPO_4) content.
 - This non absorbable antacid has been used in place of aluminum hydroxide gel where loss of phosphate may be a problem to the patient.

Dihydroxyaluminum aminoacetate

It is recognized by the national formulary in two physical forms and one dosage form.

1. Dihydroxyaluminum aminoacetate.
2. Dihydroxyaluminum aminoacetate magma, it is a white viscous suspension from which small amounts of water may separate on standing, but may be readily reformed upon shaking.

- 
-
- All dihydroxyaluminum aminoacetate preparations are assayed in terms of aluminum oxide content.
 - Dihydroxyaluminum acetate is manufactured by reacting aluminum isopropoxide with glycine.

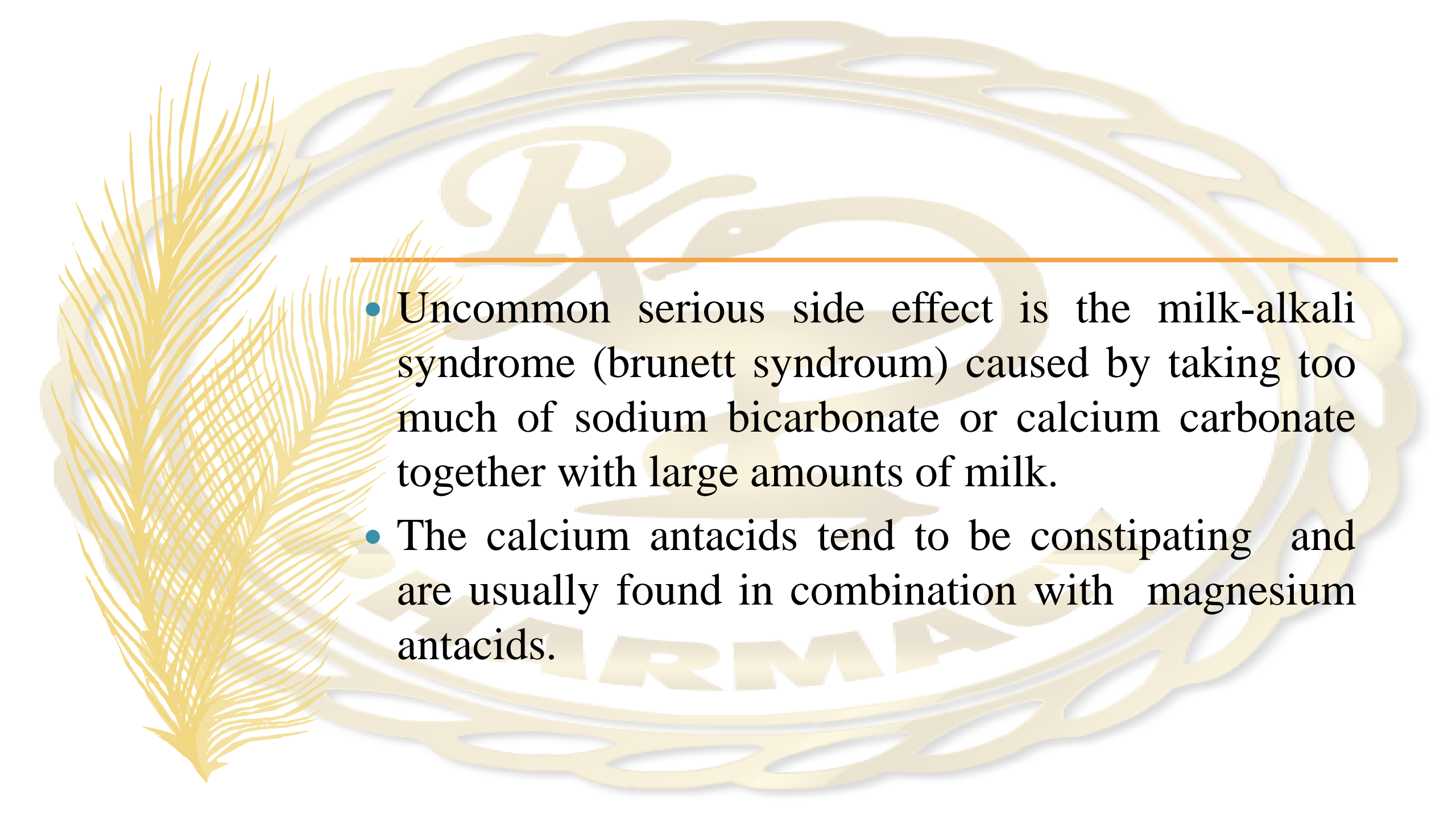
Dihydroxyaluminum Sodium carbonate

- It is assayed in terms of aluminum oxide.
- It is made by the reaction of aluminum isopropoxide and an aqueous solution of sodium bicarbonate.
- Potential drawbacks to this preparation would be the presence of sodium, evolution of carbon dioxide, and the usual problems associated with the aluminum antacids.



Calcium containing antacids

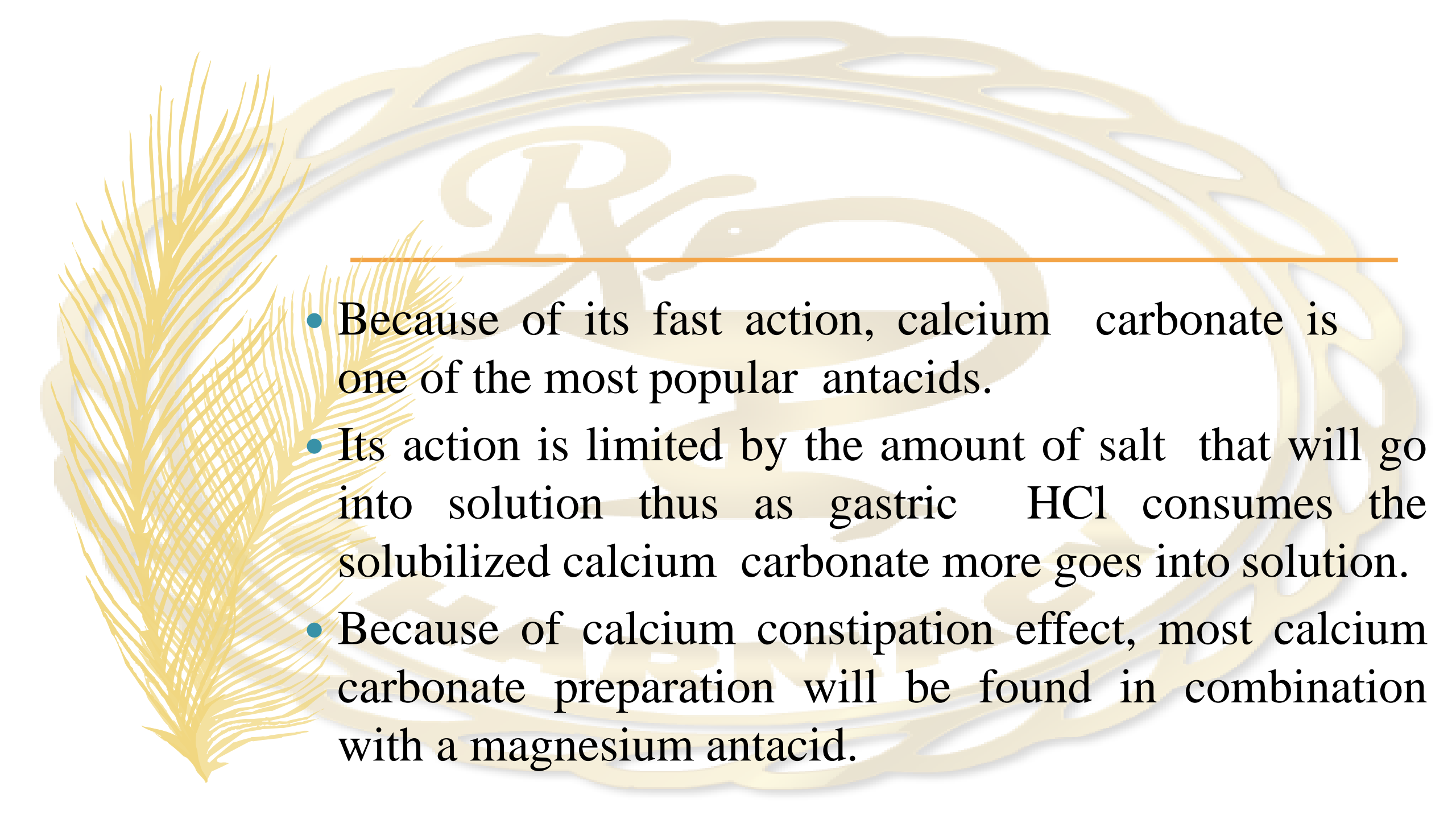
- They differ from the aluminum antacids in that their action is dependent upon their basic properties and not on any amphoteric effect.
- Studies show that calcium antacids raise the stomach pH to nearly 7.
- Calcium containing antacids particularly calcium carbonate are considered by some the antacids of choice.

- 
-
- Uncommon serious side effect is the milk-alkali syndrome (brunett syndroum) caused by taking too much of sodium bicarbonate or calcium carbonate together with large amounts of milk.
 - The calcium antacids tend to be constipating and are usually found in combination with magnesium antacids.



Calcium carbonate:

- Calcium carbonate is official as precipitated calcium carbonate.
- It is a fine white odorless, tasteless, microcrystalline powder which is stable in air.
- It is practically insoluble in water but its solubility is increased by the presence of any ammonium salt or carbon dioxide.

- 
-
- Because of its fast action, calcium carbonate is one of the most popular antacids.
 - Its action is limited by the amount of salt that will go into solution thus as gastric HCl consumes the solubilized calcium carbonate more goes into solution.
 - Because of calcium constipation effect, most calcium carbonate preparation will be found in combination with a magnesium antacid.

Tribasic calcium phosphate

- It is occasionally used as antacid.
- The principle of its action is that the phosphate ion reacts with the water present in stomach liberating hydroxide which then reacts with the gastric hydrochloric acid.