

IN VITRO EVALUATION OF ANTACID

Assistant Lecturer: Aula Jawad



- Introduction to Antacids
- Types (criteria and general properties)
- Experimental Work

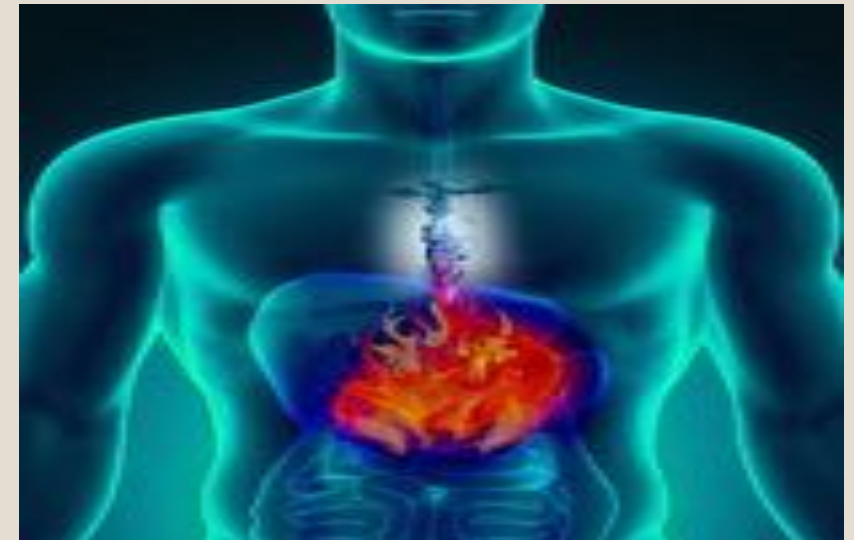


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- Antacids: Chemical substance when ingested act to neutralize the gastric hyper acidity in order to form neutral salt.
- Uses of antacids: Antacids are generally used to relieve dyspeptic symptoms and they are taken intermittently when symptoms occur.

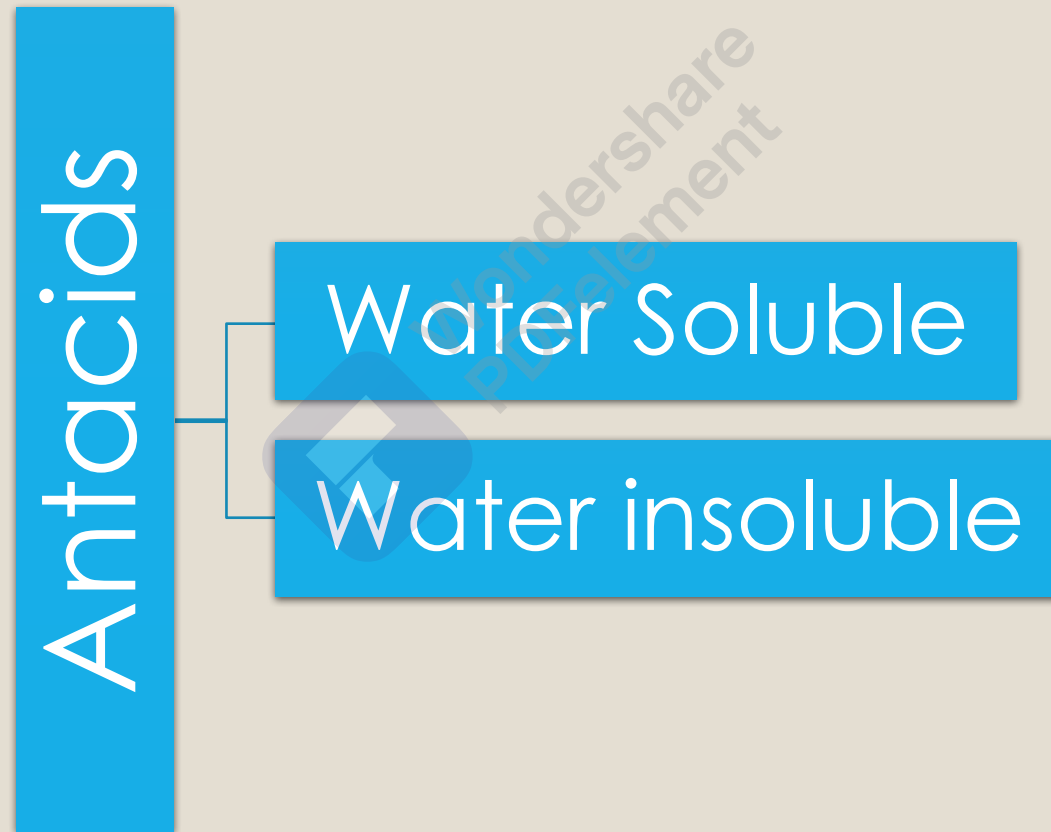


- Typical pH values in the stomach
- fasted state are within the range of 1.4–2.1.
- In the fed state, the pH of gastric fluid increases to 3.0–7.0
- In case of hyperacidity, the pH of the stomach drops to 1.2 causing the symptoms of dyspepsia and heartburn.



- According to the FDA antacids are substances that contain not less than 5 meq / dose unit of acid neutralizing agent and raise the pH of gastric section to 3.5 or greater within 10 min. .
- Continuous increase of pH by intermittent administration is limited by gastric emptying. If the gastric contents are liquid, half will have left in about 30 min, whatever their volume

They are two types of Antacids:



1-Water soluble (systemic type) :

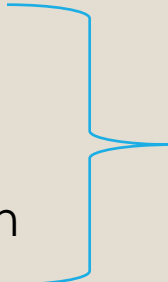
- Have rapid onset
- Short duration of action
- like: sod bicarbonate which on prolong use causes systemic alkilosis.
- Reaction with HCl causes evolution of CO_2 resulting in flatulance and blenching.

2-Water in soluble (non systemic type)

- Slow onset but
- prolong duration of action
- They are non-absorbable and dose not causes systemic alkalosis
- like Magnesium oxide , Mg hydroxide, Mg trisilicate and Aluminium hydroxide and.

Note :

- Magnesium salts cause diarrhea
- While aluminium containing salts cause constipation



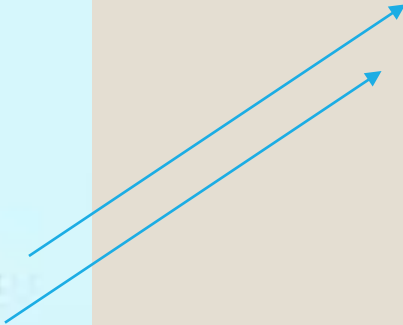
When combined , the cancel the effect of each other

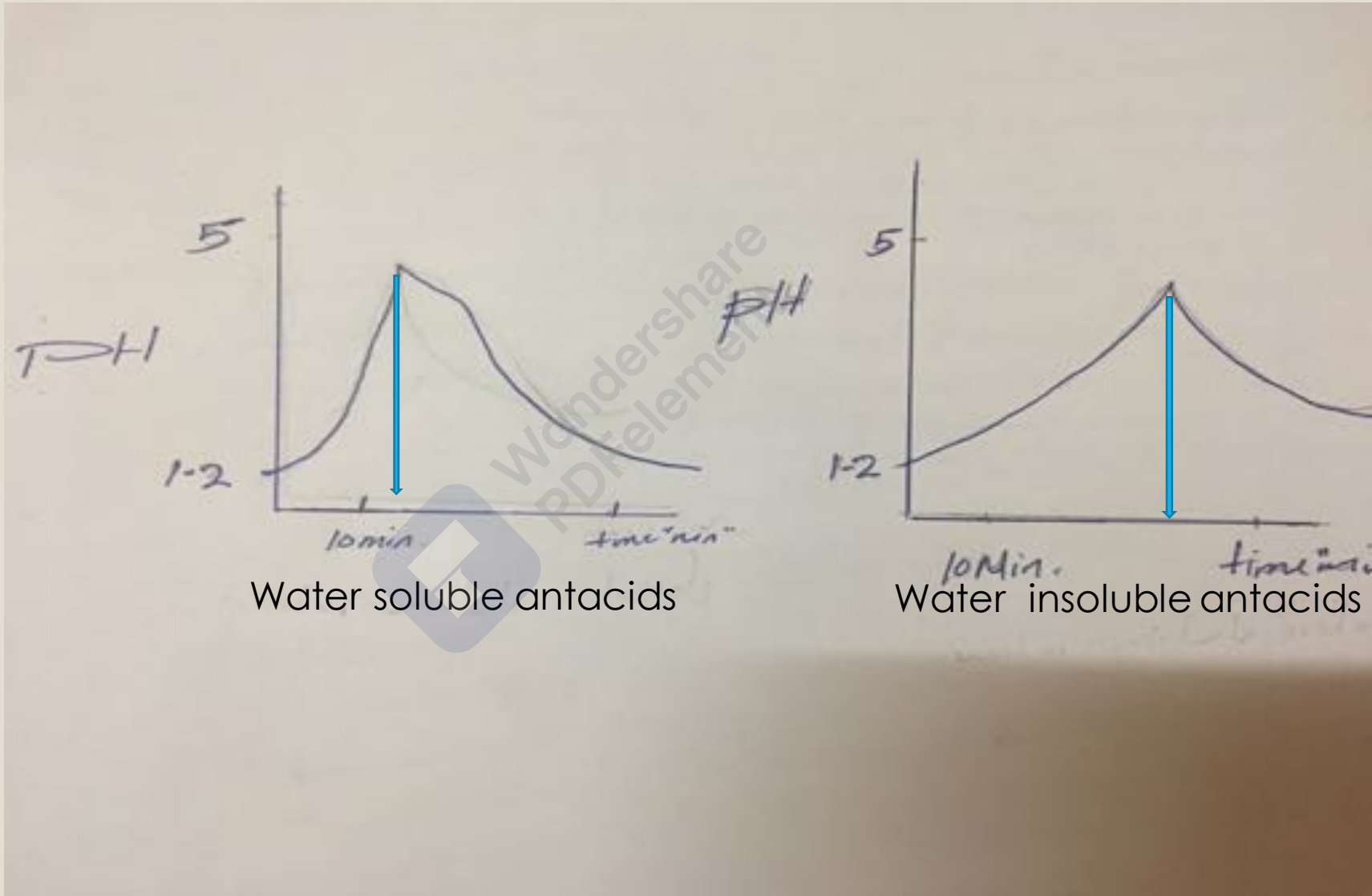
Reactions of antacids

Reaction of Antacid

- Antacids react with HCl in the stomach
- Some common antacid reactions include:
 - ◇ $\text{CaCO}_3 + 2 \text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$
 - ◇ $\text{NaHCO}_3 + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O} + \text{CO}_2$
 - ◇ $\text{Al}(\text{OH})_3 + 3 \text{HCl} \rightarrow \text{AlCl}_3 + 3 \text{H}_2\text{O}$
 - ◇ $\text{Mg}(\text{OH})_2 + 2 \text{HCl} \rightarrow \text{MgCl}_2 + 2 \text{H}_2\text{O}$
 - ◇ $\text{MgO} + 2 \text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2\text{O}$

Co₂
evolution





Water soluble antacids

Water insoluble antacids

Properties of ideal antacid

- 1- Rapid onset of action , long duration of action
- 2- they should not have neither constipating nor laxative effect.
- 3- The antacid should buffered the pH between 3.5 to 5.5 (Why?)
- 4- The antacid should be non-absorbable and not cause systemic alkalosis.
- 5- The antacid reaction with HCl should not evolve large amount of CO_2

DH



NOTE 1 : Antacids interferes with drug absorption in a number of ways:

1-Antacids changes gastric emptying rate

2- Antacids changes gastric pH Which interferes with the ionization of the drug.

NOTE 2: Antacids interferes with drug excretion

Systemic alkilosis Ionization of drugs Not re-absorbed
Increasing their excretion .



Experimental work



Aim of experiment

Evaluation the antacids activity of Maalox plus (mg and AL hydroxide suspension) and citogran.

Procedure

To initiate the physiological conditions in the stomach, artificial gastric juice is used

0.1 N HCL

HCl		??
D.W.	to	1000ml

Conc . HCL solution is 37% v/v


Initial pH

Fill a 50 ml burette with 0.1 N HCl and position it so that solution may be added to the beaker as desired and Record the initial pH of the juice



- **Add the antacid and stir the solution (3 gm of *citrogram* and 15 ml of *Maalox*) and Record the pH at 5 min. intervals**
- **Add 2ml of fresh juice from the burette each 2 min. (to stimulate stomach condition) , and at the end of each 10 min., withdraw 10 ml from the beaker using a pipette and record the pH.**
- **Continue recording until the pH reached to its maximum and then dropped significantly, record for 50 min**
- **Draw a curve by plotting pH versus time for both antacids on the same plot and compare.**

Time (min)	pH Maalox plus	pH citrogtan
0		
2		
4		
50		





Thank you

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