IJBPAS, December, Special Issue, 2021, 10(12): 56-60

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

COMPARATIVE STUDIES OF DIFFERENT COMMERCIAL ANTACIDS BY DETERMINING THE AMOUNT OF HCI THEY CAN NEUTRALIZE

KHOUND P[1] AND SAIKIA A[2*]

1: Department of Chemistry, Moridhal College, Dhemaji, Assam

2: Department of Statistics, Dibrugarh University, Dibrugarh, Assam

***Corresponding Author: E Mail: Dr. Achinta Saikia: achintasaikia373@gmail.com**

Received 19th Aug. 2021; Revised 20th Sept. 2021; Accepted 29th Oct. 2021; Available online 1st Dec. 2021

https://doi.org/10.31032/IJBPAS/2021/10.12.2005

ABSTRACT

Antacids are chemically basic in nature. It contains some bases such as Aluminium hydroxide $Al(OH)_3$, Magnesium hydroxide MG $(OH)_2$, Sodium bicarbonate juice ($NaHCO_3$) etc. More is the basic strength of Antacids more will be the tendency of Antacids to neutralize the gastric juice (HCl solution). Alternatively the volume of a definite strength of HCl (Gastric Juice) required to neutralize the different Antacids are not same.

In general greater is the neutralization power of Antacids, greater will be the strength of Antacids.

INTRODUCTION

An antacid is any substance generally a base or basic salt, which neutralize stomach acidity. They are used to relieve acid indigestion, upset stomach, sour stomach and heartburn.

Antacid will not be able to neutralize the acid in the stomach by itself and will need another ingredient to help to increase P^H levels. This ingredient can be sodium, magnesium, calcium or aluminum. Some over the counter antacids a H_2 blocker or proton pump inhibitors. These medication help to reduce the amount of acid produced by the stomach while they may not give immediate relief from the symptoms that will last much longer.

OBJECTIVES

To analysis different commercial antacids by determining the amount of hydrochloric acid they can neutralize.

VARIOUS TYPES OF ANTACIDS :

1. Magnesium Antacids
2. Sodium Antacids (Alkali-Seltzer, Bromo seltzer and ether)
3. Calcium Antacids (Tums, Mylanta, Gelusil)

MATERIALS AND METHOD

Materials

Burette, pipette, measuring flask, beakers, Electronic balance, sodium carbonate, sodium hydroxide, Phenolphthalein, methyl orange, distilled water and HCl.

Method

1. 1 litre of approximately N/10 HCl solution is prepared by diluting 10 ml of the concentrated acid for one litre.
2. Similarly 1 litre of approximately N/10 NaOH solution is prepared by dissolving 4. Gm of NaOH in one litre of water.
3. Prepare N/10Na_2CO_3 solution by weighing exactly 1.32 gm of anhydrous sodium carbonate and then dissolving it in water to prepare exactly 250ml of solution.
4. Standardized the HCl solution by titrating it against the standard Na_2CO_3 solution using methyl orange as indicator.
5. Similarly, standardized NaOH solution by titrating it against standardized HCI solution using phenolphthalein as indicator.
6. Then powder the various samples of antacid tables and weight 1.00 gm of each.
7. Add a specific volume of standardized HCI to each of the weighted sample is taken in conical flasks. The acid should be in slight excess, so that it can neutralize all the alkaline component of the tablet.
8. Add 2 drops of phenolphthalein and warm the flask till most of powder dissolves and filter off the insoluble materials.
9. Then solution was titrated against the standardized NaOH solution, till a permanent pink colour is obtained. Repeat the experiment with different antacids.

After carrying out the experiment, following results are found.

Table 1 : Standardization of HCl solution :

Volume of N/10 Na_2CO_3 solution taken = 20ml

Burette Reading (Volume of Used HCl)

Sl. No.	Initial	Final
1	0ml	15.0ml
2	0ml	15.1ml
3	0ml	15.0ml

Concordant volume = 15ml

Applying normality equation here,

N_1 = strength of HCl solution =?

V_1 = volume of HCl solution = 15ml

V_2 = volume of Na_2Co_3 solution

N_2 = strength of Na_2Co_3 solution = 0.1 N

Table 2 : Standardization of NaOH solution :

Volume of the given NaOH solution taken = 20ml

Burette Reading (Volume of used HCl solution)

Sl. No.	Initial	Final
1	0ml	26.6ml
2	0ml	26.8ml
3	0ml	26.6ml

Concordant Volume = 26.6 ml

Applying normality equation

Volume of NaOH solution V_2 = 20ml

Strength of NaOH (N_2) =?

V_1 = Volume of HCl = 26.6ml

N_1 = Strength of HCl = 0.133N

Dissolving 1gram of each Antacid with 50ml of 0.1N HCl and titrated against 0.1N NaOH solution.

Analysis of antacid Table :

1. Aluminium hydroxide and magnesium trisilicate

Table 4:

Sl. No.	Amount of Antacid	Buratte Reading (Volume of 0.1N NaOH)	
		Initial	Final
1	1gm	0ml	6.5ml
2	1gm	0ml	6.3ml
3	1gm	0ml	6.5ml

Concordant Volume = 6.5ml
6.5ml 0.1M NaOH can neutralized 50ml 0.1M HCl
Volume of unused NaOH = (50-6.5)ml = 43.5ml here
V_2 = Volume of HCl = 50ml
S_2 = Strength of HCl = 600ml
V_1 = Volume of NaOH
S_1 = Strength of NaOH

$$S_2 = \frac{s1v1}{V2} = \frac{6.5x0.1}{50}$$

= 0.013N
Aluminium hydroxide and magnesium trisilicate decrease the strength of HCl from 0.1N to 0.013N.
Hence, the strength of Aluminium hydroxide and magnesium trisilicate
(0.1N-0.013N) = 0.087N
Strength HCI is reduced from 0.1N

2. Aciloc:

48.5ml 0.1M NaOH can neutralized 50ml 01M HCl
Volume of unused NaOH = (50-48.5) = 1.5ml
$S_1V_1 = S_2V_2$
S_1 = Strength of NaOH = 0.1M
V_1 = Volume of NaOH = 48.5ml
V_2 = Volume of HCl = 50ml

$$S_2 = \frac{S1V1}{V2} = \frac{0.1 \text{ x } 48.5}{50}$$

Aciloc decrease the strength of HCl from (0.1-0.097) = 0.003N

3. Ranitidine :

42.1ml 0.1M NaOH can nutralyze 50ml 0.1M HCl
Volume of unused NaOH = (50-42.1)ml = 7.9ml
S_1 = Strength of NaOH = 0.1M
$S_1V_1 = S_2V_2$
V_1 = Volume of NaOH = 42.1ml
V_2 = Volume of HCI = 50ml

$$S_2 = \frac{S1V1}{V2}$$

$$S_2 = \frac{0.1\ x\ 42.1}{50} = 0.084$$

Ranitidine decrease the strength of HCl from (0.1 – 0.084) = 0.016N

4. Digene

11ml 0.1M NaOH can neutralize 50 ml 0.1M
Volume of unused NaOH (50-11) = 39ml
$S_1V_1 = S_2V_2$
S_1 = Strength of NaOH = 0.1M
V_1 = Volume of NaOH = 11ml
V_2 = Volume of HCI = 50ml

$$S_1 = \frac{S1V1}{V2} = \frac{0.1 \text{ x } 11}{50}$$

= 0.022N
Digene decrease the strength of HCl from (0.1-0.022) = 0.078N.

The antacid which requires the minimum volume to neutralize HCI is Aluminium hydroxide and magnesium trisilicate and hence it is more effective.

Table 5: Strength of HCL solution used to neutralize different antacids.

Sl. No.	Antacid	Strength of 0.1N HCL after the addition of Antacids	Volume of 0.1N of NaOH solution to neutralized 0.1N HCI solution containing Antacids	Volume of unused NaOH solution (ml)	Strength of HCI solution used to neutralize antacid (N)
1	Aluminium hydroxide	0.013N	6.5	43.5	0.087
2	Aciloc	0.097N	48.5	1.5	0.003
3	Ranitidene	0.084N	42.1	7.9	0.016
4	Digene	0.022N	11	39	0.078

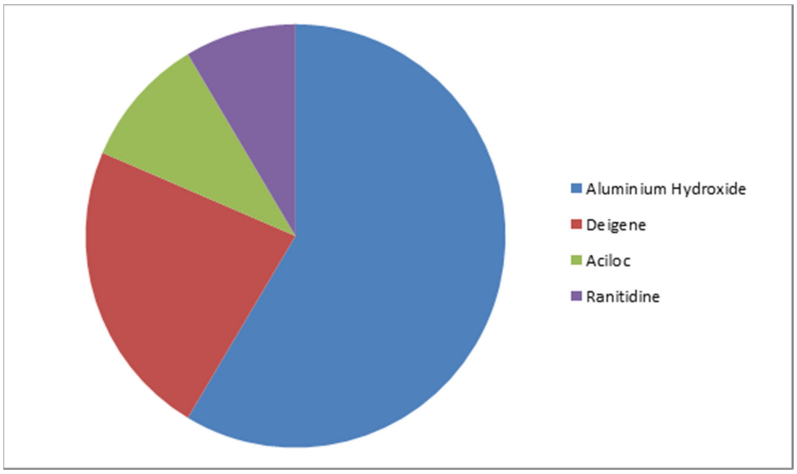

Figure 1: Representation of the effectiveness of different antacids we have analyzed

CONCLUSION

From the above experiment, we can easily predict the quality of antacids. In this way, we can easily determine which antacids is more useful for which types of acidity (hyper or hypso).

REFERENCE

[1] Antacid- http://enwikipedia.org/wihi/Antacid

[2] Antacid- http://gend.emedtv.com/antacid/antacids html.

[3] http.www.dangs.comdmg-clam>antacid.

[4] https://www.reference.com>health>difference types of antacid.

[5] http://www.drugs.com>ranitidine

[6] https://en.m.wikipedia.org>wiki>Ranitidius

[7] www.medschat.com>topic>use of aciloc

[8] Tablewise.com>aciloc-tablet

[9] www.catabg.m>drug>aciloc

[10] www.tablettree.com/p/aciloc-tablets

[11] https://www.practu,com>medicine-intq

[12] www.webmd.com>drug-1483>details

[13] www.tablewise.com>digene-tablet

[14] www.tabletwise.com>digene-gel

[15] https://en.m.wikimedia.org>wiki>digene

[16] www.digeneindia.com>tags

[17] https://www.drugs.com>...>indigestion

[18] www.neaithline.com>cbcwable.tablet

[19] Aluminium hydroxide/magnesium trisilicute-midscape reference.com

[20] https://www.medicineedia.org>.....>A

[21] www.rewiki.com>aluminium

[22] www.netdoctor.co.uk>digestive-health

[23] www.google.literature.com

[24] Postgraduate medicine, 1990

[25] Bone, 1998

[26] IMS Parkison, advance in Nephrology

[27] FIR Martin, JD Wark internal medicine journal

[28] J A Abraham, Sv kattapuram and related research

[29] R Boron, KL Insogna, The American Journal of medicine, 1984

[30] Eureka-Disease of the colon and Rectum 1992

[31] JK Oldring, DKerr, RG Daltlara Alementary-1998

[32] K. Yang, TUtich, JD Elashoff- The American Journal of 1984

[33] FP Vince- BJU International, 1970

[34] M. Shike- Annual review of nutrition, 1988

[35] Pharmatheropeutica, 1987

[36] S. Jongnipatvanich, S. Harikul- The southeast Asian- 1992

[37] S. Harikul, O.I. Ortholary- The Southeast Asian Journal – 1994

[38] MJ Forgeas. I. Rueno – Toxicology letters- 1987

[39] MT Droy Lefax, A. Allen- Gastroentrological Clinique *et al*. 1993

[40] JG Rateall- Gastroenterological Clinique et biologique, 1989

[41] J Froramonti-Dhmentary 1994

[42] S Gourgou, JF Seltz -2001

[43] MS Lat- Emergency medicine journal, 2006

[44] Al. Vecchi, MR Pirrozi- expert opinion on drug- 2009

[45] MT Droy, T Espinasse-Bulletin de L. Academic Vetrinnaize de,frame.no

[46] Senior Secondary Practical Chemistry, Dr. Kamalsh Choudhury and Dr. Satyendra Kumar Choudhury, 2002, page no. 163.