SINDHI HIGH SCHOOL- Hebbal

CHEMISTRY

INVESTIGATORY PROJECT

2020-21



Name: Shreyas R

Class: XII ‘A’

Registration No:18608789

**CERTIFICATE**

This is to certify that Shreyas R of Class XII ‘A ‘of Sindhi High School, Hebbal has successfully completed his chemistry project prescribed by the AISSCE for the academic year 2020-2021.

*Board Registration Number: 18608789*

*Date: ……………………………*

*Internal Examiner External Examiner*

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**INTRODUCTION**

Digestion in the stomach results from the action of gastric fluid, which includes secretions of digestive enzymes, mucous and hydrochloric acid. The acidic environment of the stomach makes it possible for inactive forms of digestive enzymes to be converted into active forms (i.e, pepsinogen into pepsin) and acid is also needed to dissolve minerals and kill bacteria that may enter the stomach along with food.

However , excessive acid production(hyperacidity) results in the unpleasant symptoms of heartburn and may contribute to ulcer formation in the stomach lining. Antacids are weak bases( most commonly bicarbonates, hydroxides and carbonates) that neutralize excess stomach acid and thus alleviate symptoms of heartburn.

**General Equation**

Antacid(weak base) + HCl (produced in stomach)

Salts + H2O + CO2

**AIM**

To analyze the given samples of commercial antacids by determining the amount of hydrochloric acid they can neutralize.

**MATERIALS REQUIRED**

* Materials required
* Burette
* Pipette
* Titration Flask
* Measuring flasks
* Beakers
* Chemicals Required
* Sodium Hydroxide
* Sodium Carbonate
* Hydrochloric acid
* Indicators
* Phenolphthalein
* Methyl Orange
* Antacids Used
* Digene
* Gelusil
* Zinetac
* Rantac
* Pantop

**PROCEDURE**

1. Prepare 1 litre of approximately 0.1N HCl solution by diluting 10ml of the concentrated acid to one litre.
2. Similarly, make 1 litre of approximately 0.1N NaOH solution by dissolving 4.0g of NaOH to prepare one litre of solution.
3. Prepare 0.1N Na2C03 solution by weighimg exactly 1.325 g of anhydrous sodium carbonate and then dissolving it in water to prepare exactly 0.25 litre (250 ml) of solution.
4. Standardize the HCl solution by titrating it against the standard Na2C03 solution using methyl orange as indicator.
5. Similarly, standardize NaOH solution by titrating it against standardized HCl solution using phenolphthalein as indicator.
6. Powder the various samples of antacid tablets and weigh 1.0 g of each.
7. Add a specific volume of standardized HCl to each of the weighed samples taken in a conical flask. The acids 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 flash till most of powder dissolves. Filter off the insoluble material.
9. Titrate this solution against the standardized NaOH solution, till a permanent pinkish tinge is obtained.

10. Repeat this experiment with different antacids.

**OBSERVATIONS**

* Titration of HCl against Na2C03:

Volume of Na2CO3 taken = 10ml

|  |  |  |  |
| --- | --- | --- | --- |
| S.No | Initial Burette Reading | Final Burette Reading | Difference |
| 1. | 0 | 7.5 | 7.5 |
| 2. | 7.5 | 15 | 7.5 |
| 3. | 15 | 22.5 | 7.5 |

Volume of HCl= 7.5ml

* Titration of HCl against NaOH:

Volume of NaOH = 10ml

|  |  |  |  |
| --- | --- | --- | --- |
| S.No | Initial Burette Reading | Final Burette Reading | Difference |
| 1. | 0 | 9 | 9 |
| 2. | 9 | 18 | 9 |
| 3. | 18 | 27 | 9 |

Volume of HCl=9.0ml

* **Digene:**

Volume of HCl = 10ml

|  |  |  |  |
| --- | --- | --- | --- |
| S.No | Initial Burette Reading | Final Burette Reading | Volume of acid used(ml) |
| 1. | 0 | 6 | 10 |

Volume of NaOH used for neutralizing HCl=6.0ml

* **Gelusil:**

Volume of HCl = 10ml

|  |  |  |  |
| --- | --- | --- | --- |
| S.No | Initial Burette Reading | Final Burette Reading | Volume of acid used(ml) |
| 1. | 0 | 5 | 10 |

Volume of NaOH used for neutralizing HCl=5.0ml

* **Zinetac:**

Volume of HCl = 10ml

|  |  |  |  |
| --- | --- | --- | --- |
| S.No | Initial Burette Reading | Final Burette Reading | Volume of acid used(ml) |
| 1. | 0 | 14 | 10 |

Volume of NaOH used for neutralizing HCl=14.0ml

* **Rantac:**

Volume of HCl = 10ml

|  |  |  |  |
| --- | --- | --- | --- |
| S.No | Initial Burette Reading | Final Burette Reading | Volume of acid used(ml) |
| 1. | 0 | 18 | 10 |

Volume of NaOH used for neutralizing HCl=18.0ml

* **Pantop:**

Volume of HCl = 10ml

|  |  |  |  |
| --- | --- | --- | --- |
| S.No | Initial Burette Reading | Final Burette Reading | Volume of acid used(ml) |
| 1. | 0 | 9 | 10 |

Volume of NaOH used for neutralizing HCl=9.0ml

**CONCLUSION**

* Weight of antacid tablet powder=1.0g

|  |  |  |
| --- | --- | --- |
| Antacid | Volume of NaOH solution used for neutralizing unused HCl | Volume of HCl solution used for neutralizing 1.0g of antacid matter |
| Digene | 6.0 | 10ml |
| Gelusil | 5.0 | 10ml |
| Zinetac | 14.0 | 10ml |
| Rantac | 18.0 | 10ml |
| Pantop | 9.0 | 10ml |

**RESULTS**

The antacid which requires the least amount of NaOH solution for neutralizing the unused HCl , is the most effective antacids amongst the rest. This also shows that the antacid is very fast in its action and provides immediate relief from acidity.

From the above observation table, it is clear that gelusil requires least amount of NaOH for neutralized the unused HCl. Thus , Gelusil is the most effective antacid compared to other antacids used.

The order of decrease in effect by each antacid is as follows:

**Gelusil>Digene> Pantop>Zinetac>Rantac**

**PRECAUTIONS**

* Acids must be handled with caution and must not be accidentally spilled
* Precise amounts of reagents should be added
* Test Tubes should be clean
* Avoid keeping inflammable material near the burner

**BIBLIOGRAPHY**

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