" Sheel, Sharir, Adhyayan "
Aundh Shikshan Mandal, Aundh

# Raja Shripatrao Bhagawantrao Mahavidyalaya, Aundh. (Satara)

# Experiential Learning

## *B.SC. PART 3 CHEMISTRY*

RAJA SHRIPATRAO BHAGWANTRAO MAHAVIDYALAYA, AUNDH (SATARA)

**Chemistry Project**

**Name of project**

# To Determine Which Antacid Could Neutralize The Most Stomach Acid

**Class – B.Sc. Part- III**

## By


**Jadhav Ranjeet Shantaram**

**Magar Satyawan Dilip**

**Ingwale Nihal Anil**

Under the guidance of

Shri. BHUJBAL G.R.

M.Sc.NET, SET, GATE

Department of Chemistry

RAJA SHRIPATRAO BHAGWANTRAOMAHAVIDYALAYA, AUNDH (SATARA)


2015-2016

# Certificate

This is to certify that work presented in the project entitled "To Determine Which Antacid Could Neutralize The Most Stomach Acid" and being submitted to the Department Of Chemistry by Jadhav Ranjeet Shantaram. Has been carred out under my supervision. The work carried out as a part of B.Sc. Part- III project.

Place – **Aundh**

Ranjit Jadhav.

Mr. Jadhav Ranjeet Shantaram

21.2.16

**Shri. BHUJBAL G.R.**

(Project Guide )

Head

HEAD
Department of Chemistry
R. B. M. Aundh.

**Examinar** **Examinar** **Examinar**



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# Contents





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# ACKNOWLEDGEMENTS

It gives me immense pleasure to express of deep sense of gratitude to my Teacher and project guide Shri. BHUJBAL G.R. who has helped me a lot to learn and think more about chemistry. I think her for an excellent and inspiring guidance, Constant encouragement, sincerer advice and unstinted support during all the times.

I was blessed with an opportunity to work, in a most united, homogeneous and clean lab. My special thanks to lab-friends for their co-operation and maintaining conductive and lively atmosphere with humor in the lab.

We take this opportunity to thank our Honorable principle **Dr. Bamane S.R.**

Who has directly or indirectly helped our project and head of department Shri **Kalekar D.G Shri Kharatmol R.M.** I would to this project. We pay our Respects and love to our parents and all other family member and friends for their love and encouragement throughout our career.

# OBJECTIVE

The purpose of this experiment was to determine which antacid could neutralize the most stomach acid.

I became interested in this idea when I saw some experiments on medicines and wanted to find out some scientific facts about medicines.

The information gained from this experiment will help people know which antacid they should look for in the stores. It will also let them know which antacid will give them the most comfort .This could also save consumers money and provide better health.



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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 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 bicarbonate, hydroxides, and carbonate) that neutralize excess stomach acid thus alleviate symptoms of heartburn .the general reaction is:

Antacid (weak base) + HCl (stomach acid) ------→ Salts + $H_2O$ +$CO_2$

The hydrochlioric acid solution used in this experiment (0.1 M) approximates the acid conditions of the human stomach, which is typically 0.4 to 0.5% HCl by mass (pH~1). Antacids help people understand how stomach acid works and what antacid will help those most.



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# ACIDS

Acids are a group of chemicals, usually in liquid form. They can be recognized by their sour taste and their ability to react with other substances. Acids are confirmed as an acid by their pH. The pH of acids ranges from 0-6.9 (below 7).

The two main acids are:
1) Mineral Acid
2) Organic Acid

The three well knows acids that are sulphuric acid ($H_2SO_4$), nitric acid ($HNO_3$) and hydrochloric acid (HCl).

# STOMACH ACID

Stomach acid is very dangerous. If a person was to have an ulcer and the stomach acid was to escape it would irritate their other organs. Stomach acid is highly acidic and has pH of 1.6. Stomach acid is hydrochioric acid produced by stomach. If there is too much stomach acid it can cause heartburn.


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# SOME FOODS CONTAINING ACIDS

Almost all foods and drinks even medicines ingredients that are different acid.

Examples: 1) Aspirin (Acetylsalicylic Acid )

2) Orange Juice ( Ascorbic Acid/ Vitamin C )

3) Sour Milk ( Lactic Acid )

4) Soda Water (Carbonic Acid )

5) Vinegar ( Acetic Acid)

6) Apples (Mallic Acid)

7) Spinach ( Oxalic Acid)



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# ANTACIDS

An antacid is any substance that can be neutralize an acid. All antacids are bases. A base is any substance that can neutralize an acid. The pH of a base is 7.1-14 (above 7). All antacids have chemical in them called a buffer. When an antacid is mixed with an acid the buffer tries to even out the acidity and that is how stomach acid gets neutralized. In an antacids it is not the name brand that tells how well it works it is something called an active ingredient. Not all antacid have a different active ingredients. Some have one of the same active ingredients and some have all of the same active ingredients. Almost all the antacids that have the same ingredient work the same amount as the other. The active ingredient of most of the antacids is bases of calcium, magnesium and aluminium.


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# ACTION MECHANISM

Antacids perform neutralize reaction, i.e. they buffer gastric acid, raising the pH to reduced acidity in the stomach. When gastric hydrochloric acid reaches the nerves in the gastrointestinal mucosa, they signal pain to the central nervous system. This happens when these nerves are exposed, as in peptic ulcers. The gastric acid may also reach ulcers in the esophagus or the duodenum.

Other mechanism may contribute, such as the effect of aluminium ions inhibiting smooth muscle cell contraction and delaying gastric emptying.

Antacids are commonly used to help neutralize stomach acid. Antacids are bases with a pH above 7.0 that chemically react with acids neutralize them. The action of antacids is based on the fact that a base reacts with acid to form salt and water.



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# INDICATIONS

Antacids are taken by mouth to relieve heartburn, the major symptom of gastro esophageal reflux disease, or acid indigestion. Treatment with antacids alone is symptotic and only justified for minor symptoms. Peptic ulcers may require $H_2$- receptor antagonists or proton pump inhibitors.

The usefulness of combinations of antacids is not clear, although the combination of magnesium and aluminium salts may prevent alteration of bowel habits.



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# SIDE EFFECT

- ALUMINIUM HYDROXIDE: May lead to the formation of insoluble aluminium phosphate complexes, with a risk for hypophosphate and osteomalacia. Although aluminium has a low gastrointestinal absorption, accumulation may occur in the presence of renal insufficiency. Aluminium containing drugs may cause constipation.
- MAGNESIUM HYDROXIDE: Has a laxactive property. Magnesium may accumulate in patients with renal failure leading to hypo magnesia, with cardiovascular and neurological complications.
- CALCIUM: Compounds containing calcium output in the urine, which might be associated to renal stones. Calcium salts may cause constipation.
- CARBONATE: Regular high doses may cause alkaiosis, which in turn may result in altered excretion of other drugs, and kidney stones.


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## PROBLEMS WITH REDUCED STOMACH ACIDITY:

Reduced stomach acidity may results in an impaired ability to digest and absorb certain nutrients, such as iron and the B vitamins. Since the low pH of the stomach normally kills ingested bacteria, antacids increase the vulnerability to infection. It could also result in the reduced bioavailability of some drugs.

- For Example: The bioavailability of ketocanazole (antifungal), is reduced at high intragastic pH (low acid content).


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## • AIM:-

To determine which antacid could neutralize the most stomach acid.

## • MATERIAL REQUIRED:-

Burette, Pipette, Conical Flask, Beaker, Weighting Balance, Conc.HCl, Methyl Orange, Antacid Samples.


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# PROCEDURE

1. Prepare half litre of 0.1 N HCl solution by diluting 9 ml of the conc. HCl to 1 litre.
2. Prepare 0.1 N sodium carbonate solution by weighing exactly 1.325 g of anhydrous sodium carbonate and then dissolving it in water to prepare exactly 250 ml of solution.
3. Standardize the HCl solution by titrating it against the standard sodium carbonate solution using methyl orange as indicator.
4. Take 25 ml of standardized HCl in the conical flask; use the methyl orange as indicator and see the amount of base used for neutralization.
5. Powder the various sample of antacids tablets and weigh 10 mg of each.
6. Take 25 ml of standardized HCl solution in the conical flask; add the weighed sample to it,
7. Add two drops of methyl orange and warm the flask till most of the powder dissolve.
8. Titrate the solution against the standardized Na2CO3 solution till the permanent red tinge appears.
9. Note the amount of base used for titration and note reduction in the amount of base used.
10. Repeat the experiment with different antacids.


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## OBSERVATIOS:-

### A] Standardization of HCl Solution

1) solution in burette : 0.1 N sodium carbonate

2) solution by pipette : 25 cm3 of 0.1 N HCl solution

3) Indicator : Methyl Orange

4) End Point : Pink to pale Yellow

## OBSERVATION TABLE:-

| SR. NO. | READING | BURETTE READING IN cm3 | | | CONSTANT BURETTE READING IN cm3 |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | |
| 1. | Final | 26.4 | 26.5 | 26.4 | 26.4 |
| 2. | Initial | 0.0 | 0.0 | 0.0 | |
| 3. | Differance | 26.4 | 26.5 | 26.4 | |



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## CALCULATION:-

Applying Normality Equation,

$$N_1V_1 = N_2V_2$$

(Acid) (Base)

$$N_1 \times 25 = 0.1 \times 26.4$$

$$N_1 = 0.1 \times 26.4/25 = 0.105N$$

Normality of HCl solution, $N_1 = 0.105$ N



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# OBSERVATION:-

## B] ANALYSIS OF ANTACIDS TABLETS

1) Weight of the antacid tablet powder = 10 mg

2) Volume of HCl solution added = 25 ml

# OBSERVATION TABLE:-

| SR. NO. | ANTACID | INITIAL BURETTE READING | FINAL BURETTE READING | VOLUME OF SODIUM CARBONATE USED |
|---|---|---|---|---|
| 1 | OCID 10 | 0.0 | 16.6 | 9.8 |
| 2 | FANTAC 20 | 0.0 | 25.6 | 0.8 |
| 3 | GELUSIL | 0.0 | 25.0 | 1.4 |
| 4 | ACILOC 150 | 0.0 | 16.2 | 9.9 |
| 5 | OMEE | 0.0 | 16.5 | 10.2 |



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# RESULT

The most effective antacid out of the taken samples is ACILOC 150.

The less effective antacid out of the taken samples is FANTAC 20.



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## PRECAUTIONS

- All apparatus should be clean and washed properly.
- Burette and pipette must be rinsed with the respective solution to be put in them.
- Air bubbles must be removed from the burette and jet.
- Last drop from the pipette should not be removed by blowing.
- The flask should not be rinsed with any of the solution, which are being titrated.



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# RAJA SHRIPATRAO BHAGWANTRAO MAHAVIDYALAYA, AUNDH (SATARA)

## Chemistry Project

## Name of project

**To Determine Which Antacid Could Neutralize The Most Stomach Acid**

**Class- B.Sc. Part- III**

**By**

**Nikam Swati Bhalchandra**

**Magar Punam Uttam**

**Karande Anita Somanath**

Under the guidance of

**Shri.Kalekar D.G.**
(M.Sc.M.Ed )

**Department of Chemistry**
**RAJA SHRIPATRAO BHAGWANTRAO MAHAVIDYALAYA,**
**AUNDH (SATARA)**

2016 - 2017



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"SHEEL SHARIR ADHYAYAN"

AUNDH SHIKSHAN MANDALS AUNDH

# RAJA SHRIPATRAO BHAGWANTRAO MAHAVIDYALAY AUNDH (SATARA)

**Department of Chemistry**

## CERTIFICATE

This is to certified that Ms. Nikam Swati Bhalchandra, Ms. Magar Punam Uttam, Ms.Karande Anita Sonanath have satisfactorily completed the project work in Chemistry for B.Sc.-Part III (as prescribed by Shivaji University Kolhapur) entitled 'To Determine which Antacid could Neutralize the most Stomach Acid' in the year 2016-17.

Place :- Aundh

Date:-

**( Project Guide)**

HEAD
Department of CHEMISTRY
R. B. M. Aundh.
**( Department Head)**

**External Examiner**



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# Contents





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I was blessed opportunity to work, in a most united, homogeneous and clean lab. My special thanks to lab friends for their cooperation and maintaining conductive and lively atmosphere with humor in the lab.

We take this opportunity to thanks our honorable principal **Dr. Bamane S. R.** who has directly or indirectly helped our project and head of department **Shri Kalekar D. G.** and **Shri Kharatmol R. M.** I would to this project. We pay our respects and love to our parents and all other family member and friends for their love and encouragement through out our career.



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# OBJECTIVE

The purpose of this experiment was to determine which antacid could neutralize the most stomach acid.

I became interested in this idea when I saw some experiment on medicines and wanted to find out some scientific facts about medicines.

The information gained from this experiment will help people now which antacid they should look for in the stores. It will also let them know which antacid will give them the most comfort. This could also save consumers money and provide better health.



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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 is also needed to dissolve minerals and kill bacteria that may enter the stomach along with food. However, excessive acid production (hyper acidity) results in the unpleasant symptoms of heart burn and may contribute to ulcer formation in the stomach lining. Antacids are weak bases (most commonly bicarbonate, hydroxides and carbonate) that neutralize excess stomach acid thus alleviate symptoms of heart burn. The general reaction is:

Antacid (weak base)+HCl(stomach acid)➡Salts+$H_2O$+$CO_2$

The hydrochloric acid solution used in this experiment (0.1M)approximates the acid condition of the human stomach, which is typically 0.4 to 0.5% HCl by mass (pH~1).Antacid help people understand how stomach acid works and what antacid will help those most.



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# ACIDS

Acids are a group of chemicals, usually in liquid form. They can be recognised by their sour taste and their ability to react with other substances. Acids are confirmed as an acid by their pH. The pH of acids ranges from 0 to 6.9(below 7).

The two main acids are:

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2. Organic Acid

The three well known acids that are sulphuric acid ($H_2SO_4$), Nitric acid ($HNO_3$)and hydrochloric acid (HCl).

# STOMACH ACID

Stomach acid is very dangerous. If a person was to have an ulcer and the stomach acid was to escape it would irritate their other organs. Stomach acid is highly acidic and has pH of 1.6. Stomach acid is hydrochloric is produced by stomach. If there is too stomach acid it can cause heart burn.



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5. Vinegar ( Acetic Acid )
6. Apples (Mallic Acid )
7. Spinach ( Oxalic Acid )



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An antacid is any substance that can be neutralize an acid. All antacids are bases. A base is any substance that can neutralize an acid. The pH of a base is 7.1-14 ( above 7 ). All antacids have chemical in them called a buffer. When an antacid is mixed with an acid the buffer tries to even out the acidity and that is how stomach acid gets neutralized .In an antacids it is not the name brand that tells how well it works it is something called an active ingredient. Not all antacid have a different active ingredient. Some have one of the same active ingredients and some have all of the same active ingredients. Almost all the antacids that have the same ingredient work the same amount as the other. The active ingredient of most of the antacids is bases of calcium, magnesium and aluminum.



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Antacids are taken by mouth to relieve heartburn, the major symptom of gastro esophageal reflux disease or acid indigestion. Treatment with antacids alone is asymptotic and only justified for minor symptoms. Peptic ulcers may require $H_2$ receptor antagonists or proton pump inhibitors.

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# SIDE EFFECTS

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* **MAGNESIUM HYDROXIDE:** Has a laxative property. Magnesium may accumulate in patients with renal failure leading to hypo magnesia, with cardiovascular and neurological complications.

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## PROBLEMS WITH REDUCED STOMACH ACIDITY

Reduced stomach acidity may result in an impaired ability to digest and absorb certain nutrients, such as iron and the B vitamins. Since the low pH of the stomach normally kills ingested bacteria, antacids increase the vulnerability to infection. It could also result in the reduced bioavailability of some drugs.

For example: The bioavailability of ketoconazole, is reduced at high intragastic pH.



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- AIM:-

To determine which antacid could neutralize the most stomach acid.

- MATERIAL REQUIRED:-

Burette, Pipette, Conical flask, Breaker, Conc. HCl, Methyl orange, Antacid samples.



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# PROCEDURE

1. Prepare half litre of 0.1 N HCl solution by diluting 9 ml of the conc. HCl to 1 litre.

2. Prepare 0.1 N sodium carbonate solution by weighing exactly 1.325 g of anhydrous sodium carbonate and then dissolving it in water to prepare exactly 250 ml of solution.

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8. Titrate the solution against the standardized $Na_2CO_3$ solution till permanent red tinge appears.

9. Note the amount of base used for titration and note reduction in the amount of base used.

10. Repeat the experiment with different antacids.

# OBSERVATIONS

## A] Standardization of HCl solution

1) Solution in burette : 0.1 N sodium carbonate
2) Solution by pipette : 25 $cm^3$ of 0.1 N HCl solution
3) Indicator. : Methyl Orange
4) End Point. : Pink to pale yellow

OBSERVATION TABLE:-

| Sr. No. | Reading | Burette reading in $cm^3$ | | | Constant burette reading in cm3 |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | |
| 1. | Final | 22.6 | 22.6 | 22.6 | 22.6 |
| 2. | Initial | 0.0 | 0.0 | 0.0 | |
| 3. | Difference | 22.6 | 22.6 | 22.6 | |



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# CALCULATION:-

Applying Normality Equation,

$$N_1V_1 = N_2V_2$$

$$N_1 \times 25 = 0.1 \times 22.6$$

$$N_1 = 0.1 \times 22.6/25 = 0.0904\ N$$

Normality of HCl solution, $N_1$ = 0.0904 N



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## OBSERVATIONS :-

### B ] ANALYSIS OF ANTIACIDS TABLES

1) Weight of the antacid tablet powder = 10 mg
2) Volume of HCL solution added = 25 ml

### OBSERVATION TABLE :-

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| 5 | OMEE | 0.0 | 16.5 | 10.2 |



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# RESULT

The most effective antacid out of the taken Samples is ACILOC 150.

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# PRECAUTIONS

- All apparatus should be clean and washed properly.
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- Air bubbles must be removed from the burette and jet
- Last drop from the pipette should not be removed by blowing.
- The flask should not be rinsed with any of the solution,which are being titrated.



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" Sheel, Sharir, Adhyayan "
AundhShikshanMandal, Aundh

# "To analyze available Honey for Presence of Different minerals and Carbohydrates"

A Project submitted to

**Shivaji University , Kolhapur**

For the partial Fulfillment Bachelor of Science

In

**Chemistry**

By

**Miss.Katkar Shivani Sugandhrao**
**Miss.Chavan Ruchita Anil**
**Miss.Pawar Ashwini Gorakh**

Under the Guidance of

**Bhise S.N.**

Raja Shripatrao Bhagwantrao Mahavidyalaya,

Aundh

Maharashtra, India.

(2017-2018)



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"SHEEL SHARIR ADHYAYAN"

ANUNDH SHIKSHAN MANDAL'S AUNDH

# RAJA SHRIPATRAO BHAGAWANTRAO MAHAVIDYALAY, AUNDH
## Tal. Khatav, Dist. Satara

DEPARTMENT OF CHEMISTRY

## CERTIFICATE

This is to certify that,

**Miss.Pawar Ashwini Gorakh**
**Miss.Katkar Shivani Sugandhrao**
**Miss.Chavan Ruchita Anil**

of class **B.Sc.III (2017-2018)** has satisfactorily carried out required project work entitled **"To analyze available Honey for Presence of Different minerals and Carbohydrates "** for **B.Sc.III Chemistry** in the year **2017-2018**. The project is done under my guidance and supervision.

**Bhise S.N.**
**Project Guide**

**Kalekar D.G.**
**Department of Chemistry**

Examiner



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# Theory

Honey, thick, sweet, super saturated sugar solution manufactured by bees to feed their larvae and for the subsistence during winter.

Bee honey is composed of fructose ,gluose and water, in varying proportions. It also contains several enzymes and oils. The color & flovor depends on the age of the honey and the sources of the nectar. It colored honeys are usually of higher quality than dark coloured honeys. Other high grade honeys are made by bees from orange blossoms, clover and Alfalfa.a well known, poorer grade honey is produced from buckwheat.honey has a fuel value of about 3307 cal/kg (1520cal/lbs). it readily picks up moisture from the air and is consequently used as a moistioning agent for Tobacco and in baking. Glucose crystallizes out of honey on standing at room temperature, leaving on uncrystallized layer of dissolved fructose. Honey to be Marketed is usually heated by a special process to about 66°C(150.01F ) to dissolve the crystals and is sealed to prevent crystallization. The fructose in crystallized honey ferments readily at about 16°C.



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# REQUIREMENTS

## APPARATUS

TEST TUBE

TEST TUBE STAND

BURNER

WATHER BATH

## CHEMICALS

FEHLING SOLUTION A

FEHLING SOLUTION B

AMMONIUM CHLORIDE SOLUTION

AMMONIUM OXALATE SOLUTION

AMMONIUM PHOSPHATE

CONC.NITRIC ACID

POTASSIUM SULPHOCYANIDE SOLUTION



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# PROCEDURE

Test for minerals:-

**1. Test for potassium:-**

2ml of honey is taken in a test tube and picric acied solution is added yellow precipitate indicates the presence of $K^+$.

**2. Test for Calcium:-**

2 mi of honey is taken in a test tue and $NH_4Cl$ solution and $NH_4OH$ solution are added to it . the solution is filtered and to the filtrate 2 ml of ammonium oxalate solution is added. White ppt. or milkiness indicates the presence of $Ca^{2+}$ ions.

**3. Test for Mangnesium:-**

2 ml of honey is taken in a test tube and $NH_4Cl$ solution is added to it and then excess of Ammonium phosphate solution is added. The side of the test tube is scratched with a glass rod. White precipitate indicates the presence of $Mg^{2+}$ ions



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**4. Test for iron**

2 ml of honey is taken in a test tube and a drop of conc. $HNO_3$ is added and it is heated. It is cooled and 2-3 drps of potassium sulphocyanide solution is added to it. Blood red colour shows the presence of iron.



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# OBSERVATION TABLE

**Substance taken :Honey**

| SL. NO. | TESTS | OBSERVATION | INFERENCE |
|---|---|---|---|
| 1. | **Test for Potassium:-** Honey + picric Acid solution | Yellow ppt.is Observed | Potassium is Present |
| 2. | **Test for Calcium:-** Honey + $NH_4Cl$ Soln. + $NH_4OH$ Sol.filtered+ $(NH_4)_2C_2O_4$ | White ppt.or Milkiness is not Observed | Calcium is Absent. |
| 3. | **Test for Magnesium:-** Honey + $NH_4OH$ (till solution becomes alkaline) $+(NH_4)_3Po_4$ | White ppt.is not Observed | Magnesium Is absent |
| | | | |



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| | | | |
|---|---|---|---|
| 4. | **Test for Iron:-** Honey+ cocn. $HNO_3$ Heated and cooled,+ potassium sulphocyanide | Blood red colour is observed | Iron is present |
| 5. | **Fehling's test:-** Honey+ 1mL each of Fehling's solution A and Fehling's solution B | Red ppt.is observed | Reducing sugar is present. |
| 6. | **Tollen's test:-** Honey + 2-3 mL Tollen's reagent test tube in water bath for 10 minutes | Shining silver mirror is observed | Reducing carbohydrate is present |



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# TEST FOR CARBOHYDRATES

**1. Fehling's test:**

2ml of honey is taken in a test tube and 1ml each of Fehling' solution A and Fehling's solution B are added to it and boiled. Red precipitate indicates the presence of reducing sugars.

**2. Tollen's test:**

2-3 ml of aqueous solution of honey is taken in a test tube. 2-3 ml of Tollen's reagent is added. The test tube is kept in a boiling water bath for about ten minutes. A shining silver miroor indicates the presence of reducing carbohy drates.



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# RESULT

- Potassium is present.
- Iron is present.
- Calcium is absent
- Honey contains reducing sugar



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# REFERENCE


- www.projects.icbse.com/chemistry
- www.projectsyapa.com/chemistry
- comprehensive Practical Chemistry
- Google Images




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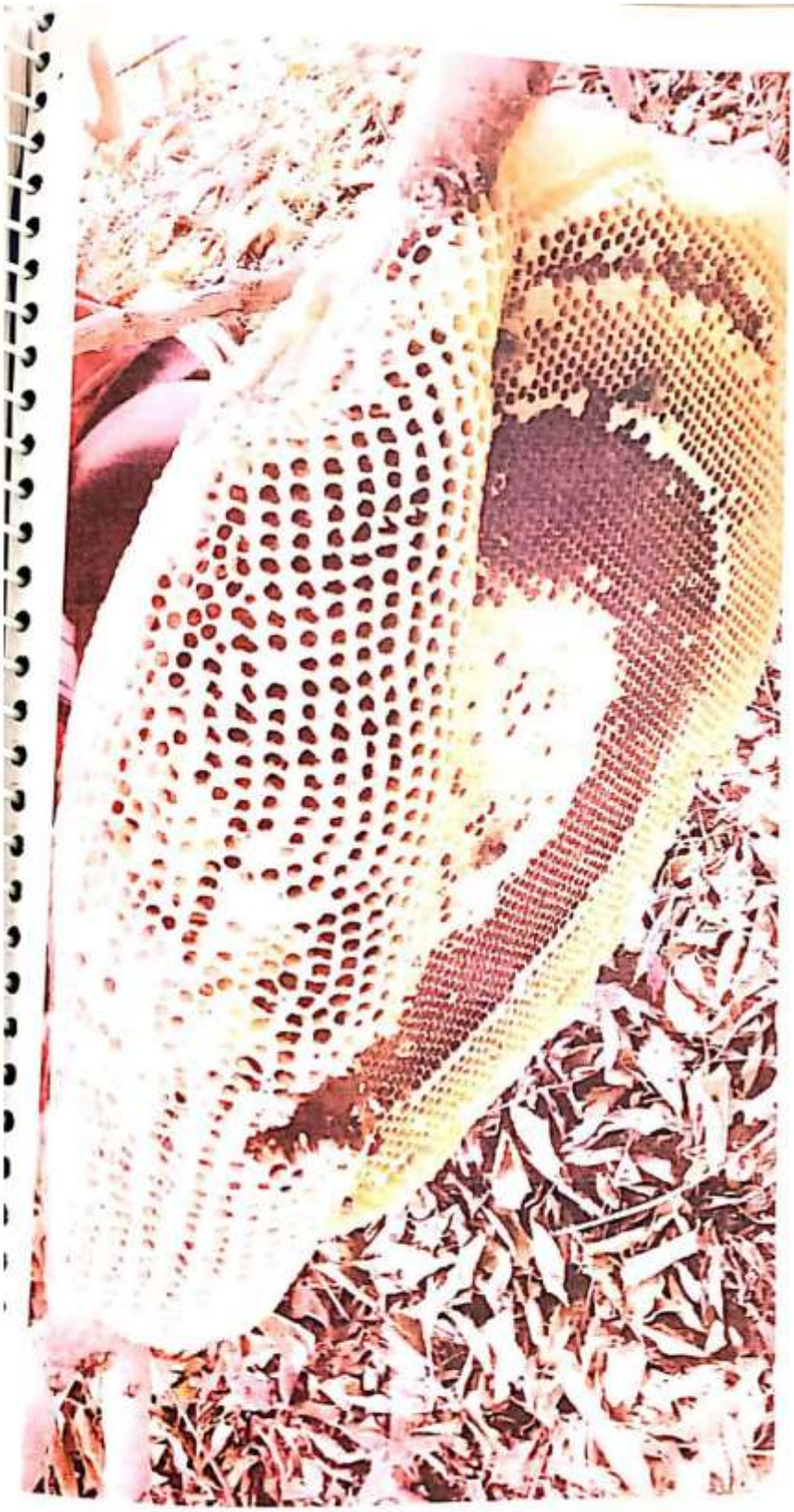

# "APPLICATION OF DISSOLVING RATE OF ROCK SALT & CHEMICALS DIFFERENT TEMPERATURE"

Project submitted to

***SHIVAJI UNIVERSITY KOLHAPUR***

For partial fulfillment bachelor of science

In

Chemistry

***By***

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Under the Guidance of

***Shri. R. M. Kharatmol***

Raja Shripatrao Bhagwantrao

Mahavidyalay, Aundh. (Satara)

(2018-2019)



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SHEEL, SHARIR, ADHYAYAN

AUNDH SHIKSHAN MANDAL AUNDH RAJA

SHIPATRAO BHAGWANTRAO MAHAVIDYALAY,

AUNDH TAL-KHATAV, DIST-SATARA

DEPARTMENT OF CHEMISTRY

# CERTIFICATE

This is to certify that,

***Mr. Phadatare Dnyaneshwar Mohan***

***Mr. Kadam Suhas Mohan Mr. Kadam***

***vaibhav Hanmant Mr. Dhole***

***Govardhan Shivaji***

Of class ***B.sc.III (2018-19)*** has satisfactory carried out required project work entitled ***'Application of dissolving rate of rock salt & chemicals and different temperature'*** for ***B.Sc.III Chemistry*** in the year 2018-2019. The project is done under my guidance & supervision.

18-3-19.

**Shri. R.M. Kharatmol**

Project Guide

**Mr. kalekar D.G.**

Department of Chemistry

Examiner

**Examiner**

Department of CHEMISTRY
R. B. M. Aundh.



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# INDEX

# Introduction

**(Initial observation)**

Most solid chemicals need to be dissolving in water or solvent before they can use. Knowing the best temperature for dissolving each specific chemical can help as save time and energy in dissolving process.

Scientist often perform there of test in order to learn about effect of temperature in rate of dissolving and create a graph that can help them for future reference.

In this project, we will study the effect of temperature on rate of dissolving and specific chemical in water. The chemical that you select can be among the chemicals that are low hazard and can be found at home.





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# Introduction

**(Initial observation)**

Most solid chemicals need to be dissolving in water or solvent before they can use. Knowing the best temperature for dissolving each specific chemical can help as save time and energy in dissolving process.

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# *Information Gathering*

Find out about dissolving as a molecular level interaction between solid and liquid .you may also learn about some related subject such as the effect of polarity in dissolving and learn that ionic substance can only be dissolved in a polar liquid such as water and non-ionic substance can only be dissolved in non-polar liquid such as acetone. Read books, magazines or ask professional who might know in order to learn about the methods that you may test the rate of dissolving in certain temp. Keep track of where you got your information from

The following are sample of information that you may find





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***Experiment*** – Dissolving rate of salt in water at different temperature

***Introduction*** – The rate at which rock salt dissolves in water at 11 different temperatures observed.

***Procedure*** –

1. Label 11 beakers with numbers $0^0$c, $10^0$C, $20^0$C, $30^0$C, $40^0$C, $50^0$C, $60^0$C, $70^0$C, $80^0$C, $90^0$C and $100^0$C to represent the test temperature in which you're testing the dissolving rate. unit are degree of Celsius
2. Prepare 11 small practical bags with 100 grams rock salt crystal in each bag.
3. Prepare sufficient amount of ice water ( 0C) in a speared container .add 200ml water to the beaker labeled 0.add 100 grams of rock salt to the water and stir it for 5 minutes.
4. Carefully separate the remaining salt, then dry it and weigh it see how much salt did not dissolved in water. Then subtract it from 100ml to determine the amount of salt dissolves in water. Record your result.
5. Prepare 200ml water at 10 c. you may need to adjust the temperature by adding some ice water or some hot water to regular tap water to do this. Add 100 grams of rock salt to the water and stir it for 5 minutes.
6. Carefully separate, dry and mass any un-dissolved salt. Subtract it from 100 to determine the amount of dissolved water. record your result

# Observation table

| Water temperature ($^{U}c$) | Rock Salt dissolved in 200ml water (gm.) | Copper sulphate ($CuSo_4$) | Sodium Carbonate ($Na_2Co_3$) |
|---|---|---|---|
| 0 | 16.580 | 24.044 | 20.870 |
| 10 | 16.320 | 22.935 | 12.480 |
| 20 | 15.925 | 18.650 | 9.469 |
| 30 | 7.330 | 17.530 | 1.625 |
| 40 | 13.752 | 15.830 | 0.500 |
| 50 | 14.819 | 14.570 | Dissolve |
| 60 | 14.520 | 13.952 | |
| 70 | 14.170 | 10.170 | |
| 80 | 12.520 | 10.007 | |
| 90 | 10.856 | 9.777 | |
| 100 | 10.025 | 9.666 | |





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# Source

Why is it important to know the temperatures maximize solubility for each substance?

Solid chemicals do not react on each other. With exception of explosive, all other chemical reaction are done with liquid chemicals. You first make a solution of each ingredient, a react the solutions and then you separate the products by methods such as crystallization, filtration or precipitation.

In all such reaction, we attempt to use the minimum amount of water because later we need to remove the excess water. Removing the excess water require time, fuel and water other costs associated with separation process.





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# Identify Variables

The independent variable (manipulated variable) is the temperature ($0^0$c to $100^0$c).

The dependent variable (responding variable) is the rate in which salt (a solute) dissolved in water (A solvent)

The controlled variable an air presser and other environment factors.

1. The type of water
2. The type of salt
3. Experiment method
4. Experiment location
5. Tools & instrument used in experiment





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# *Summary*

Summarize what happened this can in the form of table of peroxide numerical data, by graph. It could be written statement of what occurred during experiment.





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# RAJA SHRIPATRAO BHAGWANTRAO MAHAVIDYALAYA, AUNDH

Tal- khatav,Dist- Satara

## DEPARTMENT OF CHEMISTRY

" ANALYSIS OF WATER FROM REGIONAL AREA AUNDH"


SUBMITTED BY

MR.GHARGE RUSHIKESH EKNATH

MR.PAWAR SOMNATH CHANGDEV

MR.GHADGE PRAJWAL SANJAY

MR.DESHMUKH PRAKASH SANJAY


Project Guide

Shri.kharatmol. R. M

Examiner

Head Of Chemistry Department

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Chapter No :- I

# Introduction

"The water is most precious and wonderful gift to human kind water is most vital resource for all kind of life."

Through the defilement of water as result of human activities of Phenomenon as old as hills the increasing industrialization urbanization & development activities.

Pollution of water is responsible for a very large no of mortalities & incapaciation in the world polluted.

State of resources has lead to the steady decline in fisheries & also affected the irritates lands water no larger remain 'Free Good'.

In Past few decals naturals & polluted water have been studied in the world over all cosiderable dadta are known available on most land of the pollutant & their effect of ecosystem as well as organism a large no of parameter signifying the quantity of water. In various uses have been proposed a regular monitoring & some them not only prevent disease & hazard but also checks water resources from going further polluted the most common deices spread through water are polio, cholera, gastro.

In Khatav Taluka Yerala river ia main source of potable water these are main factor responsible for pollution of portable water & also Yerala river the people living near by Yerala river use this water of drinking.

So we analyzed the potable water sample taken from various villages o bank of river to get the detail information of potable water under project of potable water analysis ia Khatav taluka for dept. of environmental science at RS.B.M. College Aundh





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# *Area study & Sample Collection*

1) The main source of water in Aundh is the well &bore well .the village is totally cover with Hills &Forest so well water become sufficient for all purpose use in village.

2) In summer some time if the well water would incised then water from tankers supply from Yeliv tank is used to all purpose in villages.

3) The main source of water in Aundh is the well&bore well .the village is totally cover with Hills &Forest so well water become sufficient for all purpose use in village.

4) 2)In summer some time if the well water would incised then water from tankers supply from Yeliv tank is used to all purpose in villages.


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## Materials And Methods

The potable water sample were collected in Feb. 2020 and from selected village related

to Aundh. Immediately analysed in laboratory of dept.of chemistry R.S.B.M. Aundh

The physico chemical character of water were analysed according to test of

Water consulting professor of laborator.

Chemicals used: 1) 0.001 M EDTA

2) 0.01 M Cacl2

3) Buffer solution

4) Erichrome black T indicator



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# Declaration

This project report and work it describes are essentially Original,except where the reference is made to working the other.

No part of this project report has been or is being submitted earlier

Or to any other universities

**Place: Aundh.**

**Mr: Pawar Somnath Changdev**

**Mr:Gharge Rushikesh Eknath**

**Mr:Ghadge Prajwal Sanjay**

**Mr: Deshmukh Prakash Sanjay**



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# *ACKNOWLEDGMENTS*

I am sincerely thankful to principal Mr. Bhandare S.I and Prof. Kharatmol R.M Raja Shripatrao Bhagwantrao Mahavidyalaya Aundh. Head of chemistry department, providing laboratory facilities and constant encouragement.

It gives me a great pleasure to express my deep sense of graduate to my project guide Mr. Kharatmol R.M department of chemistry for his keen interest, valuable guidance and encouragement, throughout the work.

I also express my sincere thanks to Mr. Bhujbal G.R and Mr. Kalekar D.G. who have extended a helping hand,kind co-operation and faithfull discussion which I required during to all the phases of my project work.

I must thanks to all the members of teaching and non teaching staff of chemistry department.

For their kind co-operation, timely help encouragement for completion of this project work.

**Place : Aundh**

**Mr. Ghadge Prajwal Sanjay**

**Mr. Gharge Rushikesh Eknath**

**Mr. Pawar Somnath Changdev**

**Mr. Deshmukh Prakash Sanjay**

**Conductivity Cells**

Most conductivity meters have a two-electrode cell (see illustration) available in either dip or flow-through styles. The electrode surface is usually platinum, titanium, gold-plated nickel, or graphite.

The four-electrode cell uses a reference voltage to compensate for any polarization or fouling of the electrode plates. The reference voltage ensures that measurements indicate actual conductivity independent of electrode condition, resulting in higher accuracy for measuring pure water.

**PH :-**

**PH Mercury method :-**

**Principle :-**

PH is the -ve logarithm to base 10 the H ion conc. In the solution

It can be measured by coloromatric method are less convenient & less accurate.

For accurate measurement of PH Electronic method are used. employing the H ion sesitive electrode.

**pH of water**

Simply put the pH of pure water is 7. All acids have a pH that is lower than 7 and all bases have a pH that is higher than 7. But why is water the reference point for pH?

As you might know, water is not considered to be an acid or a base. It is neutral. This can be seen if we look at the chemical formula of water when compared with acids/bases.

Acids such as HCl, HNO3, and H2SO4 have a positively charged hydrogen atoms combined with a negatively charged ions:

$$H^+ + Cl^- = HCl$$





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# Test And Analysis

For analysis of water by conducting following test:

1) TDS

2) PH

3) conductance

4) Water hardness



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# TDS

TDS stands for total dissolved solids,and represent the total concentration of dissolved substance in water common inorganic salts that can be found in water included calcium, magnesium, potassium and sodium ,which are all cations and carbonates,nitrates,carbonates, chlorides and sulphates which are all anions.

| **Level of TDS** (mg/litre): | Rating: |
|---|---|
| Less than 300 | Excellent |
| 300-600 | Good |
| 600-900 | Fair |
| 900-1200 | Poor |
| Above 1200 | Unacceptable |

| **Samples:** | **TDS** (mg/litre) |
|---|---|
| 1) Lake water | 260 |
| 2) Drinking water | 351 |
| 3) Used water | 436 |
| 4)Sea water. | 553 |
| 5) Industrial water | 757 |



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Bases such as NaOH and KOH usually have a positively charged ions combined

With negatively charged hydroxide ions:

NA+. + (OH)- = NaOH

Water or H2O can also be described by the chemical formula HOH.

Water can be viewed as a positively charged ion(hydrogen) combined with a

Negatively charged polyatomic ion(hydroxide).

H+ + (OH)- = HOH = Water

As you can see, water has the chemical formula of an acid and base.

Instead of acting as both , water displays the characteristic of a natural substances, as acid and base cancel each other out.

| Solutions: | PH: |
|---|---|
| 1)Lake water | 5.80 |
| 2) Drinking water | 5.70 |
| 3) Used water | 6.0 |
| 4) Sea water | 5.3 |
| 5) Industrial water | 2.4 |



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# Conductivity

Principal: Electrical conductance is ability of substance

to conduct the electric current in water is the

Property used by presence of various ionic sps.

It is generally measured with help of the conductivity meter having conductance cell. Containing electrode of platinum are mountained rigidly and placed

Parallel at fixed distance conductance.it is unit is mhos cm-1 is now shall be much aprropriate. As the ionisation of solute depend on the temperature. Conductivity the result are reported at 25 oC

| Solutions: | Conductivity: |
|---|---|
| 1) Lake water | $0.528 \times 10^{-3}$ |
| 2) Used water. | $0.822 \times 10^{-3}$ |
| 3) Sea water. | $45.2 \times 10^{-3}$ |
| 4) Industrial water. | $1.44 \times 10^{-3}$ |



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# *Hardness Of Water*

**Aim** : Determination of total hardness of water using 0.01M EDTA solution

**Apparatus** : Burette, pipette,250cm³volumetric flask,conical flask,etc

**Chemicals** : Approx 0.01 M EDTA,0.01M Cacl, solution,buffer solution, Eriochrome black T indicator .

**Principal** : Hardness in water is caused by calcium and magnesium ions present in water polyvalent ions of some other metals like strontium,iron, aluminum,zinc and maganese can also precipitate soap thus contributing to hardness.However the concentration of these ions is very low in natural waters.So hardness is generally measured as concentration of only calcium and magnesium as calcium carbonate, which are higher in quantities over other hardness producing ions. The hardness is determined by titrating the sample of hard water against standard EDTA solution by maintaining proper pH.

**Procedure :**

**A) Standardisation Of EDTA Solution :**

Pipette out 25cm³of the 0.01M calcium ion ($caCl_2$) solution into 250cm³ conical flask,dilute it with about 25cm³ of distilled water,add 2cm³buffer (pH=10) and 4-6 drop of Erik black T indicator.Titrate with the standard 0.01 M EDTA solution until the colour changes from wine red to clear blue.No tinge of radish blue should remain at the epuivalence point.Titrate slowly near the end point.Take two more readings and find out constant burette reading as X cm³



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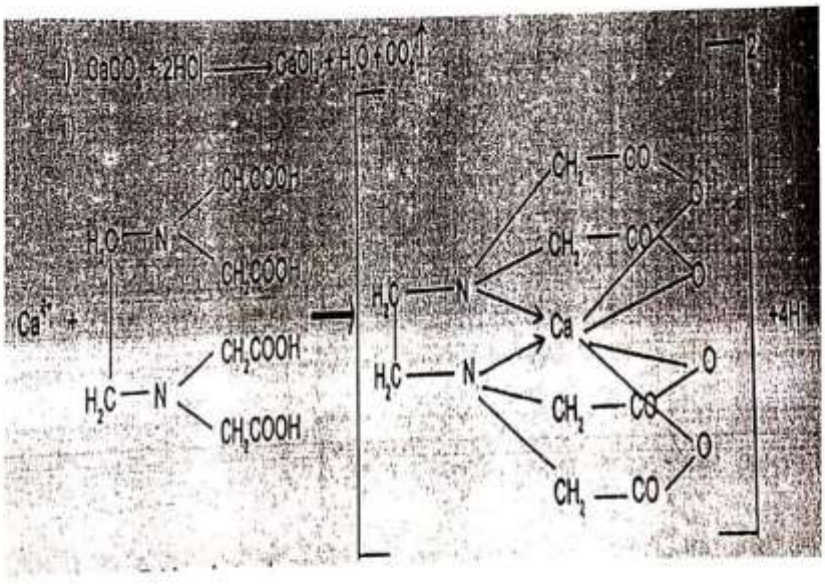
## B) Determination Of Hardness Of Water :

1. Take 25cm³ sample of water in a 250 cm³ conical flask.
2. Add 2cm³ of buffer solution to it.
3. Add 4-6 drop of Eriochrome black T indicator the solution turns wine red.
4. Titrate the contents against standardised 0.01 M EDTA solution.At the end Point colour changes from wine red to blue.
5. Take two more readings and frind out the constant burette reading as Y cm³

**Reaction :**



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Calculations: 1)EDTA Vs Ca 2+ solution

$N_1V_1 = N_2V_2$

$N_1 \times x = 0.01 \times 25$

$N_1 = 0.01 \times 25 \div 24.3$

$= 0.25 \times 24.3$

A = 0.01028 'A' M of EDTA

## 2) calculation of hardness of water :

1M EDTA = 1M CaCo3

1M 1000 $cm^3$ EDTA = 100 gm CaCo3

0.1M 1000 $cm^3$ EDTA 10 gm CaCo3

0.01M 1000 $cm^3$ EDTA = 1 gm CaCo3

0.01M 1 $cm^3$ EDTA = 0.001 g CaCo3

'A' M 1$cm^3$ EDTA = $0.001 \times 0.01028 \div 0.001$

B = 1.028 g CaCo3

'Y' $cm^3$ EDTA = 'B' × 'Y' g CaCo3

## Hardness of Lake water:

$Y = 8.3 cm^3$

$= 1.028 \times 8.3$

C =8.5324 g CaCo3

Now, 25 $cm^3$ water sample = 8.53240 g CaCo3

1000$cm^3$ water smaple = $8.53240 \times 40$



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E= 542.784 × 1000 mg/litCaCo3

E= 542784.00 mg/lit CaCo3

E = 542784.00/1000 CaCo3

F = 542.784 ppm CaCo3

Total hardness of Used water 542.784 ppm

## Hardness of sea water:

Y=24.5

1$cm^3$ EDTA=25.186× 24.5 g of CaCo3

= 25.186

Now, 25 $cm^3$ water sample= 25.186 g of CaCo3

1000 $cm^3$ Water sample = 25.186 × 40 CaCo3

D = 1007.44 g/lit CaCo3

E = 1007.44 × 1000 mg/lit CaCo3

E= 100744.00/1000 CaCo3

F = 1007.44 ppm

Total hardness of sea water 1007.44 ppm.



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D = 341.296 g/ litre CaCo3

E = 341.296 × 1000 mg/lit. CaCo3

E = 341296.00 mg/ lit. CaCo3

E= 341296.00/1000 CaCo3 ppm

F= 341.296 ppm CaCo3

Total hardness of Lake water = 341.296 ppm

- Hardness of drinking water: Y= 11.5

Y $cm^3$ EDTA = 1.028 × 11.5 gm of CaCo3

C = 11.822 g CaCo3

Now, 25 $cm^3$ water sample= 11.822 g CaCo3

1000 $cm^3$ water sample = 11=822× 40 CaCo3

D = 472.88 g/lit. CaCo3

E = 472880 mg/lit CaCo3

E = 472880 mg/lit CaCo3

E = 472.88/1000 CaCo3 ppm

F = 472.88 ppm CaCo3

Total hardness of drinking water 472.88 ppm

Hardness of Used water: Y=13.2

Y $cm^3$ EDTA = 1.028 × 13.2 g of CaCo3

C = 13.5696

Now, 25 $cm^3$ water sample 13.5696 g CaCo3

1000 $cm^3$ water sample= 13.5696 × 40 CaCo3

D = 542.784



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## Results :-

| Sr.No | Sample | Conductivity | Ph | TDS | Hardness |
|---|---|---|---|---|---|
| 1 | Lake water | 0.528×10-3 | 5.8 | 260 | 341.296ppm |
| 2 | Drinking Water | 0.651×10-3 | 5.75 | 351 | 472.88ppm |
| 3 | Used Water | 0.822×10-3 | 6.04 | 436 | 542.784ppm |
| 4 | Sea Water | 45.2×10-3 | 5.30 | 553 | 1007.44ppm |
| 5 | Industrial Water | 1.440×10-3 | 244 | 757 | - |



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# DISCUSSION

The yeliv tank is most vital source of water in Khatav Taluka in it originate at yeliv village so this tank is soul of village

This tank has fortunately been spread from unslought of wool mill chiefly because of uneven terrain & remoteness &place . This is only a wool mill in it's catchment area (Agriculture purpose) which is well designed west treatment plant &influent from this mill are deposited of land for irrigation no discharge are made to tank from Agriculture so small quantity of fertilizers are added in water .

Expect that in selected villages well are surrounded by extra plant which are dangerous causing pollution of bell water the leaves & other peats &plants dropping in water &also washing of vehicles cattle etc

&also hatning are the main cause of main cause of well pollution.

So potable water using without treatment is dangerous to

**AUNDH:-**

1) The main source of water in Aundh is the well &bore well. The Village is totally covers with hills &forest so well water becomes sufficient for all purpose use in village .



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# *Conclusion*

The pH value of selected site are closer to permissible vale of water.

All the vale of total conductivity free are lie in the range of permissible water in according with who but all vale are in within the range but due to close to lake.There is no need of trrot ment of drinking water before drinking.Industrial water need better treatment to water. Conductivity values of sea water & industrial water is vary high.



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