

DR .BRR GOVERNMENT DEGREE COLLGE, JADCHERLA

DEPARTMENT OF PHYSICS



STUDY PROJECT

2021-22

Title : “A study on variation of conductivity of distilled Water added with different substances”

Submitted by

S.No.	Name of the student	H.T.No.	Group
1.	SABHAVAT RAJKUMAR	19033006441024	MPC EM III Year
2.	SULIGIRI KAVERI	19033006441025	MPC EM III Year
3.	G NAVEEN	19033006441508	MPC TM III Year
4.	UMANAMONI PRAVEEN	19033006468029	MPCS EM- III Year
5.	KUKUTLA ANJANEYULU	19033006441018	MPC EM III Year


Name of the Supervisor/s

Sri. B. Uday kumar

Asst. Prof. of Physics, HOD

&

Smt. K. Manjula, Asst. Prof. of Physics

  
PRINCIPAL  
Dr.B.R.R. Government Degree College  
Jadcherla

## ACKNOWLEDGEMENTS

We wish to express our sincere thanks to Sri.B.Uday Kumar , Assistant professor of physics ,HOD , DR.BRR GOVERNMENT DEGREE COLLEGE,JADCHERLA, Project guide, for his kind help, personal interest , suggestions and Inspiring Guidance through the project. We are expressing our thanks from bottom of our hearts to K.Manjula Assistant professor of physics , who always motivates ,encourages us in tuning and updating ourselves according to society changes.

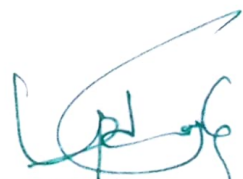
It is pleasure to have the opportunity to extend our gratitude towards all the faculty members in the department of PHYSICS, who helped right from the collection of study material to complete the project. and thankful to all those who helped in making the project successful. We would like to express our deepest gratitude to Smt. Dr. Ch.Appiya Chinnamma , Principal, DR.BRR GOVT. DEGREE COLLEGE,JADCHERLA for her support in carrying out this project.

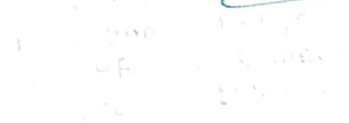
  
Principal

**PRINCIPAL**  
Dr.B.R.R. Government Degree College  
Jadcherla

  
Supervisor

**INCHARGE**  
Department of Physics  
Dr.BRR Govt. College  
Jadcherla-509 301

  
Head of the department



## CERTIFICATE

This is certify to that, the project work entitled “ **A study on variation of conductivity of distilled water added with different substances** “ is bonafide work done by

S.No.	Name of the student	H.T.No.	Group
1	Sabavath rajKumar		B.Sc Mpc T/m III year
2	Sulgiri Kaveri		B.Sc Mpc T/m III year
3	G.Naveen		<del>B.Sc Mpc E/m III year</del>
4	Umanamoni Praveen		B.Sc Mpc E/m III year
5	Kukutla anjaneyulu		B.Sc Mpes E/m III year

The result embedded in this work has not been submitted to any other university or institute for the award of any degree.

  
HOD

B.Udaya Kumar, Asst. Prof. of Physics

**INCHARGE**  
Department of Physics  
Dr.BRR Govt. College  
Jadcherla-509 301

  
Principal

Dr.Ch. Appiya Chinnamma

## **CONTENTS:**

1.Introduction-

2.Statement of the problem

3. Materials-Methodology

4.Results-Findings

5.Conclusions

## I. Introduction

Energy is stored in the bonds of molecules. When these bonds split apart, the energy released can be used to do work. Breaking apart liquid water molecules into hydrogen and oxygen gas creates an enormous amount of energy, which can be turned into useful electricity to power our homes and cars.

To break these bonds, some amount of energy is required to get the atoms in water molecules active enough to break apart from each other. At home, we can supply this energy with a battery. All batteries have two **terminals**, or ends: a positive terminal and a negative terminal. The water then connects these terminals, so energy can flow between them. As the electricity passes through the water, it splits the water.

## II. Research Problem :

Pure water itself is not a good conductor of electricity, so for this experiment baking soda will be added to make the solution an electrolyte. An **electrolyte** is a part of a solution that can be broken up by electrolysis. *Electro* refers to energy and electricity and **Electrolysis** refers to splitting apart. Electrolytes are important both in batteries and in our bodies.

## II. Materials :

- Distilled water
- Tap water
- 2 silver-colored thumb tacks
- 9V battery
- Small, clear plastic container (a plastic to-go sauce container from a restaurant would work great)
- 2 test tubes
- Stopwatch
- Baking soda
- Table salt
- Lemon
- Dishwashing detergent

## Methodology :

Insert the thumb tacks into the bottom of the plastic container so that the points push up into the container. Space them so that they're the same distance apart as the two terminals of the 9V battery.

1. Place the plastic container with the thumb tacks over the terminals of the battery.

Slowly fill the container with distilled water. Add a pinch of baking soda.

2. Hold two test tubes above each push pin to collect the gas being formed.
3. Discard the solution, and repeat the procedure with a different combination:

- Distilled water and lemon juice
- Distilled water and table salt
- Distilled water and dish detergent
- Distilled water (no additive)
- Tap water

## III. Results and discussions :

Distilled water will not conduct current, while tap water will conduct a small current. The solution with baking soda will facilitate a good amount of electrolysis. The solution with table salt will facilitate electrolysis the best.

Baking soda, known by chemists as **sodium bicarbonate** ( $\text{NaHCO}_3$ ), isn't an electrolyte on its own. When dissolved in water, it lets current flow through the water between the terminals of the battery. In the water-baking soda solution, the gases that are produced are **hydrogen** ( $\text{H}_2$ ), **oxygen** ( $\text{O}_2$ ) and **carbon dioxide** ( $\text{CO}_2$ ).

Table salt, or **sodium chloride** ( $\text{NaCl}$ ), is also a good additive to form electrolytes. In water, salt actually splits into  $\text{Na}^+$  and  $\text{Cl}^-$  ions, which are very good at carrying **current**, or



the flow of electric charges. In the water-salt solution, the gases that are produced are hydrogen, oxygen and **chlorine gas** ( $\text{Cl}_2$ ).

Lemon juice is a decent electrolyte because it is an acid. The acid dissociates in water and the current will be carried by the ions. Distilled water on its own will not carry any current. However, tap water is often able to conduct current because of minerals and impurities.

#### IV. Conclusions:

Different amounts of gas are produced from each reaction because each reaction will carry a different amount of current. The amount of gas produced is directly proportional to the current that flows in the system.

*K. Singh*

*K. Singh*  
**PRINCIPAL**  
Dr.B.R.R. Government Degree College  
Jadcherla

*K. Singh*  
**INCHARGE**  
Department of Physc  
Dr.BRR Govt. College  
Jadcherla-509 301