PROJECT REPORT

BACTERIA DETECTION IN WATER – A KIT

INTRODUCTION

Access to clean and safe drinking water is a growing concern around the world. Waterborne diseases, which are caused by harmful bacteria and microbes in water, lead to serious health risks. Groundwater, a major source of water for drinking, farming, and industry, can easily become contaminated by bacteria, faecal matter, and other microbes. Unfortunately, current testing methods cannot detect them easily and time consuming. This makes it important to have a simple, reliable, and affordable way to test water quality.

Most current water testing kits only check basic factors like pH levels or chlorine content, but they do not detect harmful bacteria or other microbes. To fill this gap, we propose a portable water testing kit that can detect bacterial and microbial contamination in groundwater. The kit uses an Electrochemical Analysis Technique (EAT), which measures changes in the water's electrical conductivity caused by the presence of microbes. The ability to test water for contamination on the spot could greatly help in preventing waterborne diseases and improving overall water quality.

IDEA APPROACH

When the kit is placed in the water, it uses electrodes to measure any changes in the electrical current. If bacteria or other microbes are present, they cause a change in conductivity, which is detected and processed. The kit then uses LED indicators to show the level of contamination, helping users understand how safe the water is to drink or use.

This portable testing kit can be used in remote areas or places where laboratory testing is not available, making it an easy-to-use and cost-effective solution for monitoring water quality. It provides a fast, simple, and reliable way to detect harmful microbes and ensure water safety, reducing the risk of waterborne diseases.

TECHNOLOGY

The technology used is electrochemical analysis. The cell consists of 3 electrodes such as working, reference and counter electrodes.

- Working - Graphite
- Reference - Silver
- Counter – Platinum

The I-V converter uses an operational amplifier (IC 741) and resistors to convert changes in current due to microbial activity into a measurable voltage. The comparator, implemented as a window detector circuit, compares this voltage against set thresholds, while the inverting amplifier (also using IC 741) processes and inverts the output signal for accurate detection and response.

REASEARCH STACK

Water Samples	Current (μA)	Resistance (KΩ)
Stagnant Rain Water	350	2.1
Algae Water	600	2
Canal Water	750	0.85
Ground Water	1000	0.75
Salt Water	4800	0.17

FLOW DIAGRAM