



اَوْبُوْ سَيِّدِي تَيْكُوْلُو كِي مَارَا  
UNIVERSITI  
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MARA

**FINAL YEAR PROJECT REPORT**  
**(EEE368)**

**Nitrate & PH Checker for Water Quality  
of Aquaponic System**

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## ABSTRACT

Aquarist, which also means a fishkeepers will use a lot of method in order to make the environment inside the aquarium is clean and safe for the aquatic animals. One of the methods are checking the nitrate in the water. The reason behind of checking the nitrates are that build-up of organic compounds and fish waste in your aquarium is indicated by high nitrate levels, which can lead to poor water quality and an increase in the growth of algae. On the other hand, fish and invertebrates are healthier when the nitrate level is kept low. Thus, using test kit for nitrates, there are a lot of instructions that needs to be followed to make sure the value we get is accurate. Therefore, this is where Nitrate Checker system and pH Checker comes in handy. Nitrate Checker system which uses Arduino Mega 2560, it will be consist of a timer(countdown) system that uses a motor and a buzzer. To make things easier, each countdown for the timer will be displayed on a 20x4 LCD display This Nitrate Checker system will help the aquarist in terms of getting ready the nitrate test solution by only using the machine. On the other hand, the pH Checker system that uses an ESP32S NodeMCU will be a portable system that checks the pH value of an aquarium water which can be checked on an app inside your smartphone (Blynk) and also store your data of your past pH value measurements.

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# CHAPTER ONE

## INTRODUCTION

### 1.1. BACKGROUND

Having aquatic animals as your hobby is becoming quite a known hobby by everyone nowadays, but if its something that you have as a career for, it will be a quite challenging for you to take care of it every single day. Testing a single aquarium might sounds easy, but for the big industries they have a lot of aquatic animal (aquariums/fish tanks) to take care of especially their nitrate level. Nitrate is a chemical compound composed of nitrogen and oxygen, with the chemical formula  $\text{NO}_3^-$ . It is an element that is frequently found in the environment and is essential to the nitrogen cycle. When it comes to aquariums and aquatic ecosystems, nitrates are generally created as a naturally occurring consequence of organic matter breaking down, including fish waste, uneaten food, and decomposing plant matter. According to a lot of aquarist, API test kit will be the one to go to for testing the nitrates in their aquarium. As an explanation, the reason behind this is because API testing kit reduces testing costs significantly, covers a larger area, is simpler to maintain, and yields results quickly.

Therefore, as API testing kit makes an aquarist life easier, it also take a quite hard work to make sure it works. The mixing of those solutions will be taking around 7 minutes of your time plus the fatigue to shake the solutions on your own. As times flies by, a hobby of your may become something that is tiring. This is where the project comes in for innovation. This project will help all the aquarist work becomes easier on handling the API testing kit.