UNIVERSITI TEKNOLOGI MARA

PH LEVEL MEASUREMENT FOR LETTUCE AND SPINACH GROWTH

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Bismillahirrahmanirrahim,

In the name of Allah, the Beneficient, the Merciful.

Praise to be to Allah S.W.T. creator of the universe, I have managed to complete and present my final year project.

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ABSTRACT

The title of this project is pH Level Measurement For Lettuce And Spinach Growth. This project will make the measurement of pH level became more accurate and more easily for lettuce and spinach growth. This is because this system will display exactly the reading of pH level of the nutrient solution and can notify the user when the pH level is out of desired range by implementing together sensors and microcontroller. The objective of this project is to study the effect of pH level changing on lettuce and spinach plant growth in hydroponic cultivation and the second objective of this project is to design and develop a pH level measurement system using Arduino as the microcontroller, last objective of this project is to evaluate the functionality of the system. The problem statement of this project is about , for most commonly grown hydroponic crops, an optimal pH range is between 5.5 and 6.5. If the pH of a solution is not within the correct range the plant will not have the ability to absorb some of the essential elements required for proper plant growth. Due to that reason, high acidity and alkalinity will causing stunted growth of the plant. For this study, the experiment are conducted within four weeks to study the subject growth pattern on pH level changing. The height of the plant are measure and record every weeks. The experimental work is conducted accordingly and the result is tabulated. It is found that pH in a range of 5.5 – 6.5 is the optimum level for plant growth. The growth rate is in average 4.3 and 4.4 for spinach and lettuce respectively. As conclusion, pH level measurement system is successfully designed and developed.

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CHAPTER 1

INTRODUCTION

1.0 BACKGROUND OF STUDY

Hydroponic is an increasingly common method of growing plant nowadays. It is the soilless culture of plants in a nutrient solution that contains of all the necessary elements for plant growth. Hydroponics offers a number of advantages over conventional farming that are making it a more and more attractive option for the agricultural industry. One obvious advantage is that no soil is required in a hydroponic system. That means that hydroponic can grow vegetables anywhere, even in a desert. Not only can grow crops in areas where soil-based farming is impossible, but can also grow them closer to market. This cuts down on the energy and transportation costs that come with getting produce to consumers. In a hydroponic setup, plant roots get their nutrients directly from a nutrient solution. In soil, plants have to expend energy to develop complex root systems. Futhermore, Some hydroponically grown plants, such as lettuce, can grow twice as fast as soil-based plants.