UNIVERSITI TEKNOLOGI MARA

EFFECT OF ARTIFICIAL LIGHTING ON GROWTH OF IPOMOEA AQUATIC FOR INDOOR HYDROPONIC FARMING

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ABSTRACT

It is fundamental to every plant requires sunlight to perform photosynthesis. Energy from the sunlight is to convert carbon dioxide and water into molecules needed for growth. Sunlight can be replaced with artificial light with the combination of certain color to replicate the properties of the ray. This way can prevent natural disaster and cloudy days by indoor farming. The effect of artificial light intensity on growth and quality of *Ipomoea aquatic* using hydroponic system were studied in a low natural light environment. The purposes of this study are to study the growth of *Ipomoea aquatic* with the suitable combination of LEDs, measure the suitable light intensity and design an automatic LEDs by calibrating the growth with ultrasonic sensor. For the experimental work, the crops were grown in 30 days with the different value of light intensity and number of blue and red LEDs. The result of the experimental work will be used in hardware design. Calibration between the height of the plant with pulse width modulation using ultrasonic sensor and light intensity sensor for the sensors and Arduino Uno as the microcontroller. The design will reduce the work for the user by statically maintain the intensity level in the suitable mode and control the production rate of the crops.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Cultivation of the land including forest and farm to provide food and resources to sustain human life is the definition of agriculture. Including breeding animals and hunting them. Back in thousand century before, human salvage wild grains and the origin of crops from more than 11 regions of the world. Estimation of 2 billion people still lay on subsistence agriculture and agriculture has been modernize. Morden agronomy, the usage of pesticides and fertilizers have increased drastically in term of cultivation, but land and enviroment damage widely spread due to lack of awareness.

Majority of agricultural product can be divided into raw materials such as rubber and food including carbohydrate source like oats. Raw materials are the main source of economy for developing country like Malaysia. Nowadays in modernization, agriculture is essential to provide resources for every countries to sustain the food chain and balance the citizen lifestyle. To cope with this demand, improvising the current agriculture system with automation and latest technology with the increment of population for a certain developing country.

In general, plants get energy from sunlight through a process called photosynthesis. The energy is needed for plants to grow. Normally, plants need lots of sunlight and should therefore be placed outside on a sunny environment. Plants with insufficient sunlight will affect the growths which indicate signs such as leaves turn yellow, stem will be leggy or