UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF WATER PH STABILIZER FOR SMART GARDEN

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electronic Engineering Technology (Industrial Electronics) with Honours.

by

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APPROVAL

This report is submitted to the Faculty of Mechanical and Manufacturing Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as partial fulfilment of the requirements for the degree of Bachelor of Mechanical Engineering Technology (Industrial Electronics) with Honours. The member of the supervisory is as follow:

Signature: …….

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ABSTRAK

Pada hari ini, penggunaan sistem pertanian, penanaman & penyiraman hari ini adalah contoh penyiraman automasi yang telah melintasi papan dan di seluruh dunia. Mengenai susunan diskriminasi, penubuhan dan penggunaan sistem pertanian di setiap ladang, kebun dan kebun di Malaysia berkembang pesat. Penambahbaikan yang berbeza telah dibuat untuk sistem menstabilkan paras pH dalam air kepada petani supaya kerengsaan keracunan air dalam tumbuhan dapat dikurangkan. Infrastruktur pH air amat bimbang dengan petani juga perlu memantau setiap masa sebelum memberikan kepada tumbuhan. Projek ini adalah untuk Penstabil pH Pembangunan Air untuk Taman Pintar dan membolehkan petani untuk memilih tahap pH air yang diperlukan oleh loji menggunakan sistem IoT. Konsep IoT adalah satu medium untuk membolehkan penghantaran dan menerima maklumat pada jarak jauh dengan menggunakan perisai Wi-fi dan juga permohonan pemantauan adalah untuk pemantauan. Kaedah yang digunakan adalah dengan melaksanakan kedua-dua perkakasan dan perisian untuk membina penstabil pH air. Produk ini beroperasi pada 70 peratus daripada internet perkara. LCD pada projek sebenar dan Blynk akan menunjukkan pH masa nyata dan nilai pH yang ditetapkan oleh pengguna. Untuk analisis, parameter yang diambil ialah menukar pH air, masa nyata dan voltan. Secara amnya projek ini mengukur tempoh masa sementara pH air berubah dari neutral ke asid atau neutral ke alkali.

ABSTRACT

Nowasdays, the use of agricultural systems, planting & watering today is an example of watering the automation that has crossed the board and across the globe.Regarding the arrangement of discrimination, the establishment and use of agricultural systems on every farm, garden and orchard in Malaysia are growing rapidly. Different improvements have been made to the system stabilize pH levels in water to farmers so that irritation to water poisoning in plants can be reduced. Water pH infrastructure is very worry to the farmers also need to monitoring everytime before giving to the plants. This project is to DevelopmentWater pH Stabilizer for Smart Garden and allows the farmer to choose the pH level of water needed by the plant using the IoT system. The IoTconcept is one medium to allowcate transmit and receive the information at the long distance by using the Wi-fi shield and also blynk application is to monitoring.The methode that used isby implement both of hardware and software to construct the water pH stabilizer. This product operates on 70 percent of the internet of things. The LCD on the actual project and Blynk will show the realtime pH and the pH value set by the user.For the analysis, parameter that was taken is changing of the water pH, realtime and voltage. Generally this project measure the duration of time while water pH is changing from neutral to acid or neutral to alkaline.

DEDICATION

I dedicate this project to Allah Almighty my creator, my strong pillar, my wellspring of motivation, shrewdness, learning and comprehension. He has been a wellspring of my quality all through this program and on His wings just have I taken off. I also dedicate this project to my family who has supported me the distance and whose consolation has ensured that I give it everything necessary to complete what I have begun. This project also is particularly committed to my supervisor, for his ability to manage me to the accomplishment of undertaking for my degree.

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As a matter of first importance, I might want to offer my thanks to my supervisor Mr Khairul Anuar bin A.Rahman for his careful supervision and direction that have guided me in achieving this project. His wide information in this contemplated territory has contributed to influencing this project to succeed. Other than that, I am thankful for having beloved people like my companion while dealing with this project, they have given me the best help appropriate from the earliest starting point and it has given me the boldness to proceed onward when not able to through further while developing in this project. At last, thanks a lot to my family who have been supporting and giving me endless consolation and encouragement. Without the spirit and support that I got all through this way, the high possibility of my project will not be successfully completed.

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MCU	Microcontroller unit
LCD	Liquid crystal display
RSC	relative soil water content
PIC	Peripheral interface controller
CO2	Carbon dioxide

CHAPTER 1

INTRODUCTION

1.1 Background

pH value is one of characteristic that we can measure in daily life and it is also important because that entailed blood in our bodies, growing vegetable, and rains that can bleach the colour for building and car. Many waters treatment process is available today such as disinfection, coagulation and corrosion control.

pH refers to the amount of hydrogen ions (H+) in a solution. pH is calculated from the formula $pH = -log10[H+]$. The balance of the H+ (hydrogen ion) and OH- (hydroxide ion) determines the pH of water.

- H+ > OH- = acidic solution
- H+ < OH- = basic (alkaline) solution
- H+ = OH- = neutral solution.

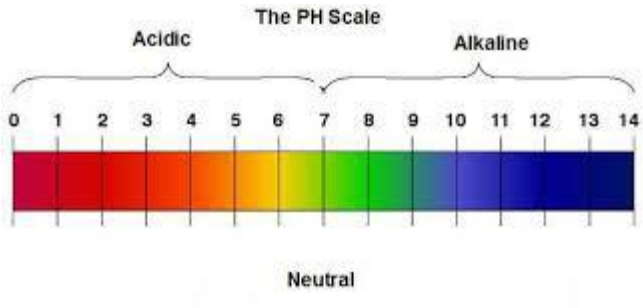

Figure 1. 1*pH scale.*

Measuring Tools is as a litmus paper, pH tape/paper, liquid indicators, pocket pH meters, pH meter and result will transform as pH scale in variable or in the colour like figure 1.1

Table1. 1: Soil preferences scale for type of trees. (Catherine Boeckmann May 20, 2017)

Trees and Shrubs			
Common Name	**Optimum pH Range**	**Common Name**	**Optimum pH Range**
Apple	5.0-6.5	Maple, sugar	6.0-7.5
Ash	6.0-7.5	Oak, white	5.0-6.5
Azalea	4.5-6.0	Orange	6.0-7.5
Basswood	6.0-7.5	Peach	6.0-7.0
Beautybush	6.0-7.5	Pear	6.0-7.5
Birch	5.0-6.5	Pecan	6.4-8.0
Blackberry	5.0-6.0	Pine, red	5.0-6.0
Blueberry	4.0-6.0	Pine, white	4.5-6.0
Boxwood	6.0-7.5	Plum	6.0-8.0
Cherry, sour	6.0-7.0	Raspberry, red	5.5-7.0
Chestnut	5.0-6.5	Rhododendron	4.5-6.0
Crab apple	6.0-7.5	Spruce	5.0-6.0
Dogwood	5.0-7.0	Walnut, black	6.0-8.0
Elder, box	6.0-8.0	Willow	6.0-8.0
Fir, balsam	5.0-6.0	Lilac	6.0-7.5
Fir, Douglas	6.0-7.0		
Hemlock	5.0-6.0		
Hydrangea, blue-flowered	4.0-5.0		
Hydrangea, pink-flowered	6.0-7.0		
Juniper	5.0-6.0		
Laurel, mountain	4.5-6.0		
Lemon	6.0-7.5		

Vegetables		Flowers	
Common Name	**Optimum pH Range**	**Common Name**	**Optimum pH Range**
Asparagus	6.0-8.0	Alyssum	6.0-7.5
Bean, pole	6.0-7.5	Bleeding heart	6.0-7.5
Beet	6.0-7.5	Canna	6.0-8.0
Broccoli	6.0-7.0	Carnation	6.0-7.0
Brussels sprout	6.0-7.5	Chrysanthemum	6.0-7.5
Cabbage	6.0-7.0	Clematis	5.5-7.0
Carrot	5.5-7.0	Coleus	6.0-7.0
Cauliflower	5.5-7.5	Coneflower, purple	5.0-7.5
Celery	5.8-7.0	Cosmos	5.0-8.0
Chive	6.0-7.0	Crocus	6.0-8.0
Cucumber	5.5-7.0	Daffodil	6.0-6.5
Garlic	5.5-8.0	Dahlia	6.0-7.5
Kale	6.0-7.5	Daisy, Shasta	6.0-8.0
Lettuce	6.0-7.0	Daylily	6.0-8.0
Pea, sweet	6.0-7.5	Delphinium	6.0-7.5
Pepper, sweet	5.5-7.0	Foxglove	6.0-7.5
Potato	4.8-6.5	Geranium	6.0-8.0
Pumpkin	5.5-7.5	Gladiolus	5.0-7.0
Radish	6.0-7.0	Hibiscus	6.0-8.0
Spinach	6.0-7.5	Hollyhock	6.0-8.0
Squash, crookneck	6.0-7.5	Hyacinth	6.5-7.5
Squash, Hubbard	5.5-7.0	Iris, blue flag	5.0-7.5
Tomato	5.5-7.5	Lily-of-the-valley	4.5-6.0
Aster, New England	6.0-8.0	Morning glory	6.0-7.5
Baby’s breath	6.0-7.0	Narcissus, trumpet	5.5-6.5
Bachelor’s button	6.0-7.5	Nasturtium	5.5-7.5

At table 1.1 show soil pH. The level of acidity will specify the amount of lime or sulfurthat is needed to bring it up or down to the appropriate level.

1.2 Statement of the Purpose

The purpose of this project is about the water plant for garden and pH value. Besides that, the problem statement and the objective of this project also will be mentioned. Next, there is also the scope of study related to the project.

1.3 Background

System targets measuring this pH value is to identify the state of the water in a water tank. The watermarking of water is very important for agricultural entrepreneurs in today's sophisticated era. Today farmers only plant the trees with ignoring the pH value of water to plants. They do not see the problem of pumping and treating a large amount of water to plants is also the most important factor in the agricultural sector.

In the agro technology for planting if lack of water is a problem for some gardens, then even more damaging is the over-watering of a garden. Some home owners feel the need to put down so much water on their gardens via their irrigation systems that they end up compromising their plants and their gardens. I have met home owners who water their gardens twice a day, every day, which is simply a waste of water and is hugely damaging to their plants. This system take are source water from the river, lake and other nature resource. Over-watering a garden results in a range of problems, including the increased risk of fungus and disease, the leaching of nutrients from the soil, and shallow root systems of trees. Often, if a tree falls over during the rainy season, it’s because its root system was not deep enough, a symptom that it had been over-watered by an irrigation system. Many tree species also go dormant in the winter months, and require much less water or no water at all.

1.4 Problem statement

(Spellerberg et al., 2010) The implement of the programmed case study is to introduce to a student about the concept of the pH soil is important to garden by awareness of water quality issues and still to providing the skill to monitor water quality.Development a project can monitor directly to the user phone about condition water at garden.(Bulbeck, 2019) pH water must be controlled within a range of 6.5 to 8.5 for good pH water for the garden. The problem is tree need pH control to ensure the water is not harmful to grow the plants. Thus, water ph stabilizer can control the water pH condition in the set value.(Everhart, 2019)most horticultural plants grow best in soils with a pH between 6 (slightly acid) and 7.5 (slightly alkaline). Each type of tree has its own Ph value and the ph of the tree must be in line with the basic needs of the tree.Development of Water pH stabilizer for Smart Garden is to design a water quality monitoring and detect the water pH either it is suitable or not for garden. Therefore, this project is planned to improvise from the particular issues.

1.5 Objective

The objective of this project is:

1) To develop a development of water pH stabilizer for smart garden.
2) To control the pH value using the Arduino uno microcontroller
3) Develop a system using Iot concept using the wi-fi by blynk applications.