

Application of Soil Content Testing on the Growth Media of Water Henna Plants (*Impatiens balsamina*) with Qualitative Methods

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ABSTRACT

Resistant fertility is very important for plant growth, where soil contains nutrients needed for plant growth and development, soil can be distinguished into two types of soil properties, namely soil chemistry and soil physicality, chemically it can be seen from the value of c-organic, N, and pH, while the physical properties of the soil are related to the type of soil. The water henna plant is one of the potential plants in the Jombang area, the growth of the water henna plant can be maximized by supplying soil nutrients that are still low, one of the potentials is as an antibacterial, and as an economic sector in Jombang City, especially in the dukuh klopo area. To find out the value of the following soil nutrients by entering the previously obtained data into the application, then an application is needed that can calculate the value of soil nutrients. This soil content test application is a new software that can be used to measure soil fertility by entering data or the value of soil nutrient content so that it is in accordance with existing or predetermined standards. This study has the aim of making it easier for the public to know the content in the soil with android-based application media. This research was carried out systematically, which aims to interpret the results descriptively, where this research leads to the creation of an android-based application.

Keywords : Android-Based Applications; Soil Content Test Applications; Soil Nutrients; Water Henna Plants

INTRODUCTION

Water henna is a plant that is native to South and Southeast Asia but was introduced to America in the 19th century. This plant is an annual or biennial plant and has flowers that are white, red, purple, or pink. The shape of the flower resembles a small orchid (Komsari & Airlangga, 2021). The height of this plant can reach one meter with thick but not woody stems and jagged leaves (Sujono & Nugroho, 2019). Water girlfriend is also known as balsam flower which is an annual plant, rooted in fibers, wet trunk, round, smooth, upright, branched, yellowish green in color and usually planted in the yard as an ornamental plant or wild plant in a place that gets enough water and sunlight. (Lestari, 2016)

To find out the appropriate soil content with water henna plants, an application that can determine the water content, nutrients and nutrients of the soil is needed, so that water henna plants can thrive. The soil content test application is a new software that can be used to measure soil fertility by entering data or the value of soil nutrient content so that it is in accordance with existing or predetermined standards.

METHOD

This research was carried out systematically, which aims to interpret the results descriptively, where this research leads to the creation of an Android-based application, to calculate or measure soil fertility by entering data or soil nutrient values so that they are in accordance with existing or predetermined standards.

Data Collection Techniques

Group data collection. Data is taken through research in the laboratory conducted by the research guidance group, so as to get the results of soil content which is then entered into the application.

Research Methods

Collecting data by direct observation of all the needs needed on the object of research, both the location and the results of the software that supports this research. Test the system using Android whether the system is running well. Experiments were carried out several times to overcome errors in the system and conducted interviews to find out user responses to obtain information whether the system was feasible or had to be revised.

RESULT AND DISCUSSION

The research data produces an application that can calculate or measure soil fertility by entering data or the value of soil nutrient content so that it is in accordance with existing or predetermined standards. The application is made using kodular.io because it makes it easier to make android-based applications. In this study the system development method used is the Waterfall method, where this method is carried out from the top to the bottom sequentially as shown below:

- System Analysis Stage
This stage aims to analyze the system requirements, in this case the researcher conducts a literature study, interviews, and observations of the existing system.
- Design stage
The system design designed in this study was formed in one application, namely kodular.io by entering which one you want to enter into the application.
- Coding stage
This system is built with kodular.io which in terms of code implementation and editing uses tools in kodular itself.
- Test stage
At this stage, testing of the compatibility and functionality of the system is carried out to review whether the system is running according to the concept and plan.

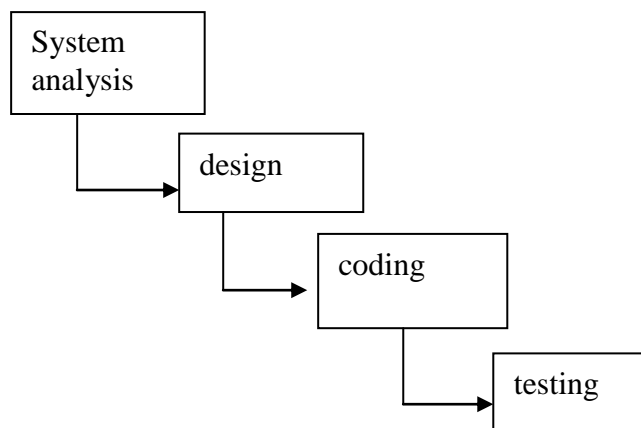


Figure 1. Waterfall Method Flow

Result

Table 1. Test Results Of Soil Chemical Properties

No	Character	Nglajur Village	Criteria	Trawasan Village	Criteria
1	Water content (%)	14,2%	-	12,8%	-
2	pH	6,32	A little sour	7,25	Neutral
3	N (%)	0,1006%	Low	0,1802%	Low
4	Phospat (ppm)	120,830 ppm	very high	112,265 ppm	Very high
5	C-organik (%)	1,517%	Low	1,532%	Low

From the results of the chemical properties test of the soil, according to the International Standard criteria, the soil in Nglajur Village, Peterongan District and Trawasan Village, Sumobito District, is classified as a soil parameter with soil chemical properties classified from low to very high.

Table 2. Soil Texture Analysis Results

Proportion (%) of soil texture	Nglajur village	Trawasan village
Sand	54,433 %	33,743%
Dust	41,009%	44,170%
Clay	3,703%	19,110%

From the results of the analysis of the physical properties of the soil, according to the soil texture class in Nglajur Village, Peterongan District, the soil has a sandy loam texture and Trawasan Village, Sumobito Village, has a clay-textured texture.

Table 3. Soil Fertility Criteria (Sulaeman & Eviati, 2009)

Soil parameter	Nilai					
	very low	low	currently	High	very high	
c- organic %	<1	1-2	2,1-3	3,1-5	>5	
N %	<0,1	0,1-0,2	0,21-0,5	0,51-0,75	>0.75	
P ₂ O ₅ bray (ppm P)	<4	5-7	8-10	11-15	>15	
P ₂ O ₅ olsen (ppm P)	<5	5-10	11-15	16-20	>20	
pH	Very sour	sour	Rather sour	Neutral	rather alkali	Alkalis
	<4,5	4,5-5,5	5,6-6,5	6,6-7,5	7,5-8,5	>8,5

Table 4. Proportion of fractions by soil texture class

Soil texture class	Proportion (%) of soil fraction		
	sand	silt	clay
1. (Sandy)	>85	<15	<10
2. (Loam sandy)	70-80	<30	<15
3. (Sandy loam)	40-87,5	<50	<20
4. (Loam)	22,5-52,5	30-50	10-30
5. (Sandy-clay loam)	45-80	<30	20-37,5
6. (sandy-silt loam)	<20	40-70	27,5-40
7. (Clay loam)	20-45	15-52,5	27,5-40
8. (Silty loam)	<47,5	50-87,5	<27,5
9. (Silt)	<20	>80	<12,5
10. (Sandy-clay)	45-62,5	<20	37,5-57,5
11. (Silty-clay)	<20	40-60	40-60
12.(Clay)	<45	<40	>40

Application Creation Steps

- Login the kodular.io application online

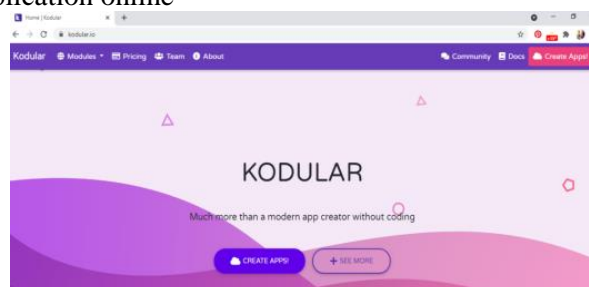


Figure 2. Application Kodular.io

- Create a display that will be used in the application



Figure 3. Application Kodular.io

Kodular is one of the open source IDE applications or tools such as the Kodular Investor App which has widget features that are the most common IDE tools. This kodular site can not only create android applications, but can also upload the results of making these applications into the kodular store and can create their own extensions to make widgets that don't exist from default. Before there was a code name change, this site was called makeroid (Mushthofa et al, 2021). Currently this kodular site continues to develop in making application tools to make it easier for developers to make android applications without coding (type programs) for making android applications only relying on drag and drop and compiling program block puzzles so that the application program can run well (Lestari, 2018).

- After it looks like we want, then we go to the coding stage

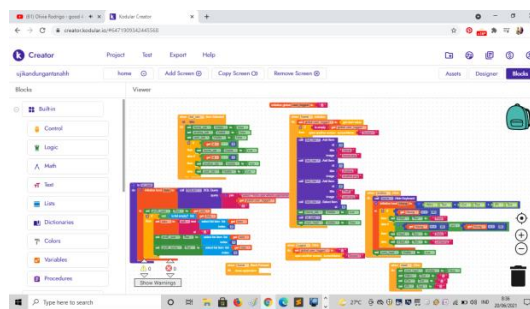


Figure 4. Coding in Application kodular.io

coding is an activity to write down a systematic thought in the form of a certain syntax according to the programming language used which can be converted into a form of program that can be run by a computer. (Wantoro & Sukirman, 2014)

- Home screen on the Soil Content Test Application

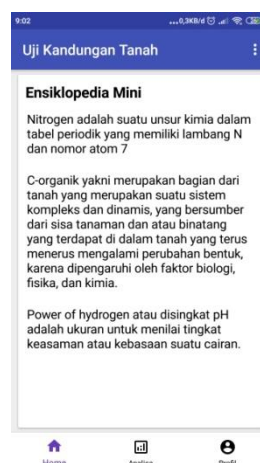


Figure 5. Home site

In this section there is a mini encyclopedia that serves to provide information related to scientific terms in the application.

- Soil analysis to fill in the data that has been obtained there is a reset button to return the value to its original form

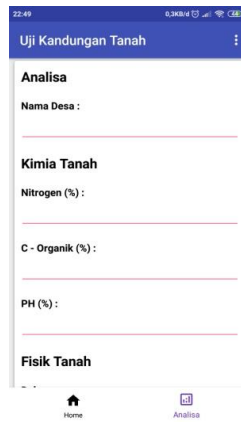


Figure 6. Soil Chemical Analysis Section

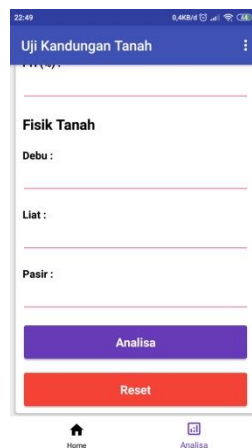


Figure 7. Soil Physic Analysis Section

- The results of the value of the soil content test application



Figure 8. The final result of the application data value

In this study, it shows the final result of the calculation of the data that has been received previously, by entering the data into the data analysis page on the application, to displaying the results of soil chemistry and soil physics.

Discussion

The following are descriptions, explanations, basic understanding and terms, as well as reviews obtained from various published sources or references.

- **Smartphone**

Smartphone is a mobile phone that has the ability to use and function like a computer. Smartphone is a phone that works using all operating system software that provides standard and basic relationships for application developers. Smartphone is also a phone that provides advanced features such as e-mail (electronic mail), internet and the ability to read electronic books (e-books) or there is a VGA in other words, a smartphone is a small computer that has the capability of a telephone. Smartphones are internet enabled phones that usually provide personal digital assistant (PDA) functions, such as agenda books, address books, address books, calculators, and notes. (Gary & Thomas, 2007).

- **Android**

According to Hermawan (2011), Android is a Mobile OS (Operating System) that grows in the midst of other OSES that are developing today. Other OS such as Windows Mobile, i-Phone OS, Symbian, and many more. However, the existing OS runs by prioritizing core applications that are built in-house without seeing the considerable potential of third-party applications. Therefore, there are limitations of third-party applications to obtain native mobile data, communication between processes and limitations of distribution of third-party applications for their platforms.

CONCLUSION

Based on the results of this study resulting in an "Application of Soil Content Test on Water Boyfriend Growth Media" several conclusions can be drawn, including the following:

- According to the data obtained by the researcher, that this application can determine the nutrient content of the soil by entering the data that has been obtained from the laboratory.
- This application can calculate data on the value of soil nutrient content for research purposes etc. More about test

REFERENCES

- Gary B. S., & Thomas J. C. (2007). *Discovering Computers : Fundamentals, 3th ed.* Jakarta : Salemba Infotek.
- Hermawan, S. S. (2011). *Mudah Membuat Aplikasi Android.* Yogyakarta: Andi Offset.
- Komsari, A., & Airlangga, P. (2021). Website-Based Design of Scholarship Information Distribution System for UNWAHA Students. *NEWTON: Networking and Information Technology*, 1(1), 41-45.
- Lestari, D. A. (2018). *Perkenalan kodular.io* <https://kodular.dwitari.my.id/2018/12/perkenalan-kodular.html>
- Lestari, N. M. A. (2016). Isolasi dan Uji Aktivitas Antibakteri Fungi Endofit dari Daun Pacar Air (*Impatiens balsamina*) Terhadap *Staphylococcus aureus* dan *Escherichia coli*. [Thesis]. <http://repository.wima.ac.id/id/eprint/9743/>
- Mushthofa, A., Zulfikar, Z., & Hariono, T. (2021). Sistem Informasi Manajemen Digital Printing. *Exact Papers in Compilation (EPiC)*, 3(2), 313-318.
- Sujono, S., & Nugroho, D. A. (2019). Sistem Informasi Lowongan Pekerjaan Berbasis Web. *Exact Papers in Compilation (EPiC)*, 1(2), 87-94.
- Sulaeman, & Eviati. (2009). *Analisis Kimia Tanah, Tanaman, Air dan Pupuk.* Bogor : Balai Penelitian Tanah
- Wantoro & Sukirman. (2014) An Attempt To Create An Automatic Scoring Tool Of Short Text Answer In Bahasa Indonesia. [Thesis]. <http://eprints.ums.ac.id/88867/3/BAB%20I.pdf>