Design And Implementation Of A Microcontroller-Based Automatication System For Making Salted Eggs

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***Abstract*— Duck eggs are an animal food that can be consumed. In community life, generally there are two ways of salting, namely the first with water, salt, and bricks. The process of mixing water and salt still uses the manual method, namely by hand. Salt is a major factor in the salting process of eggs which functions as a preservative to prevent spoilage of eggs, thereby increasing their shelf life. In order to become salted eggs in general, that is by preservation. The method used is experimental, the purpose of experimental research is to create or develop an existing research. The test results on this tool are to produce specification data or to get certainty whether a tool is functioning properly or not. So that if there is damage to the tool or equipment it cannot run properly, it can be analysed precisely and easily, and we can conclude that the difference in the results obtained from one day to the next.**

Keywords— **Salted Eggs, Arduino Uno, Node MCU, Water Heater, DC Motor**.

I. INTRODUCTION

There are two ways of salting process in people's lives, namely the first with water, salt, and bricks, and the second with a solution of water and salt [1][2][3]. For mixing water and salt, still use the manual method, namely by hand [4]. Salt is the main factor in salting eggs which serves as a preservative to prevent spoilage of eggs, thereby increasing their shelf life [5]-[8]. Preservation is a way to maintain the quality of duck eggs, keep duck eggs from being damaged and extend the shelf life of duck eggs [9][10].

With the above problems, the idea came up to automatically make a salted egg making system and add to it by making a system that can determine the salt content in water using 2 temperature sensors and a pH sensor [11][12].

II. SYSTEM MODEL

The design to be carried out in this study will be shown in Fig. 1.

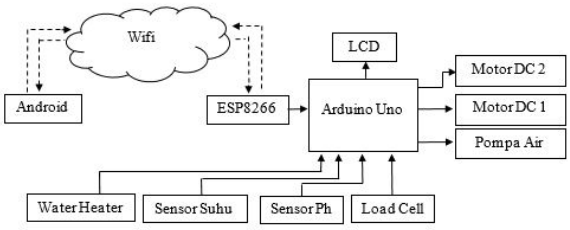

Fig. 1. The proposed system model

Figure 1 describes the system block carried out in the research consisting of the Arduino Uno microcontroller, ESP8266 module, LCD, DC Motor, Water Heater, Temperature Sensor, Ph Sensor, and Load Cell [13][14][15]. Android sends data to ESP8266, and then the data is processed by Arduino Uno. DC motor 1 serves to pour salt into a container containing eggs. The water pump functions so that water can enter the container containing the eggs. The load cell helps read the volume of water and salt-based on the number of eggs. DC motor 1 serves to stir a solution of water and salt. Water Heater to speed up the osmosis process. Temperature sensor to read the temperature of a solution of water and salt. At the same time, the pH sensor determines the level of saltiness in a solution of water and salt.

III. EXPERIMENT RESULTS

A. Hardware Implementation

In Figure 2 below shows a circuit looks from outside the LCD which functions to find out the results of the obtained data:

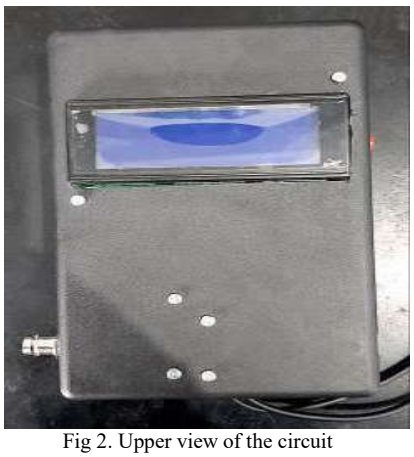

Fig 2. Upper view of the circuit

B. Experiment Measurement

Day-1

Fig. 3. Experiment on day-1

Day-2

Fig. 4. Experiment on day-2

Day-3

Fig. 5. Experiment on day-3

Day-4

Fig. 6. Experiment on day-4

Day-5

Fig. 7. Experiment on day-5

Day-6

Fig. 8. Experiment on day-6

Day-7

Fig. 9. Experiment on day-7

Day-8

Fig. 10. Experiment on day-8

TABLE 1.
MEASUREMENT IN 8 DAYS

Day	Number of Eggs	Ph Sensor	Temperature Sensor
1	7	9.6	58.2ºC
2	7	9.6	58.4 ºC
3	7	9.7	58.4 ºC
4	7	9.6	58.8 ºC
5	7	9.6	58.7 ºC
6	7	9.8	58.8 ºC
7	7	9.6	58.8 ºC
8	7	9.6	58.9 ºC

From table 1, we can conclude that the first is the difference in the results obtained from the first day to the next day. On the first day, we saw the number of eggs 7 with readings from the pH sensor 9.6, which means the level of saltiness is sufficient in making salted eggs and reading the temperature sensor data at a high water temperature of 58.2ºC can accelerate the osmosis process—likewise, the second day, the third day to the last day (the eighth day).

IV. CONCLUSION

The temperature sensor readings and the pH sensor in making salted eggs for 1-8 days show different results. Adding a Water Heater to raise the water temperature to 58 C and a DC Motor to stir the saltwater solution can speed up making salted eggs, usually 7-14 days to 4-8 days.

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