FACULTY OF ENGINEERING

DEPARTMENT OF CHEMICAL AND PROCESS ENGINEERING

FINAL YEAR PROJECT REPORT

DEVELOPMENT OF AN ARDUINO CONTROLLED REFRACTANCE WINDOW DRYER

SUB-SYSTEM: THE ARDUINO SYSTEM

BY

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Abstract

Refractance Window Drying (RWD) is one fourth-generation drying technology that can be employed to dry heat-sensitive products such as juices and purees. The dried products retain their product color, aroma, antioxidant compounds, and nutritional properties. The Temperature and relative humidity of the air above the food product are difficult to be controlled manually. This project, therefore, employs the use of Arduino and different sensors to monitor and control the Temperature and relative humidity of the air above the food product in a Refractance Window Dryer. DHT22 sensor is used to measure the temperature and Relative humidity of the air above the food product, an Arduino compatible soil moisture sensor is used to measure the moisture content of the food product. An LCD is used to display the readings of the temperature, moisture content, and relative humidity. The dc fans are used to extract moist air from the system. Based on the value of the relative humidity of the air above the food product, the moisture sensor sends a signal to the controller to turn on the dc fans so that the moist air is extracted from the machine. The program code was written using an Arduino Integrated Development Environment and uploaded into the system via a USB drive. The code uploaded into the system was able to run successfully

Keywords: Arduino, Sensor, Extractor fan, LCD, program code

Declaration

I **KIBET GODWIN** declare to the best of my knowledge that the work presented here is out of my research and effort except where due references are made. It has not been partially or wholly submitted for any academic award to any institution of higher learning whatsoever.

SIGNATURE………………………………

DATE…………………………….

Approval

This is to certify that this research project has been carried out under my supervision and that it is ready for submission to the Department of Chemical and Process Engineering.

Supervisor Name: MR. SSENYIMBA SHAFFIC

Signature…………………………………………

Acknowledgment

My sincere thanks go to the Almighty God for the strength, health, wisdom, grace, and protection He has given to me all through.

I am very grateful to my beloved family whose dream and prayer has always been to see me reach this far and succeed in my studies.

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Finally, I thank all my group members, Jakony Jeremy, Machari Peter, Kyagera Musa, and Mwanyi Ian who have always advised me at all times, especially when writing this report.

May the ALMIGHTY GOD Bless you abundantly

Dedication

This report is dedicated to my beloved Parents Mr. John Mongin and Mrs. Chebet Sophy and my brothers and sister together with Chebet Emmanuel in appreciation for their selfless care and parental support provided to me since childhood and for the mentorship of hard work and determination delivered to me, which attributes I have cherished with firmness and which have transformed me to this level.

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LIST OF ABBREVIATIONS

RWD - Refractance Window Dryer

CPU -Central Processing Unit

ARM - Advanced Risc Machines

RAM -Random Access Memory

GPU - Graphical Processing Unit

USB -Universal Serial Bus

LCD -Liquid Crystal Display

TCP -Transmission Control Protocol

IP - Internet Protocol

PV - Present Value

NPV - Net Present Value