JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

VEGETABLES PRESERVATION SYSTEM

Pranit Parde, Chaitanya Ashok Khatdev, Chaitanya Narendra Khajone, Roshan Dnyaneshwar ingle, Rushikesh Dinesh Bagade

Leader , Member

P.R.Pote(Patil) College Of Engineering And Management, Amravati

ABSTRACT

The traditional method uses by the shop owner to prevent the vegetables from spoilage is that they use water spray on the vegetables by Putting the 'TORN JUTE SACK BAGS' on the vegetables. In that the vegetables get spoilage due to Environmental temperature and Spoilage by the excessive spray of water on the vegetables. This is not profitable for shop owner our main aim in this project is to prevent the vegetables from the spoilage. We are making the vegetable stall with the help of electrical as well as electronics components. And we are trying to make it very low cost because of every shop owner can afford it.

1. INTRODUCTION

The preservation of vegetable quality is a common challenge faced by vegetable stall owners. Vegetables, being perishable items, are prone to spoilage if they are not adequately stored and maintained in optimal conditions. The traditional methods of keeping vegetables fresh, such as using ice or refrigeration, may not always be practical, especially in outdoor vegetable stalls where access to electricity or refrigeration facilities may be limited. To address this issue, we propose the development of a comprehensive cooling system that takes into account the specific requirements of vegetable preservation. Our system aims to regulate three critical factors: **humidity, moisture, and temperature**.

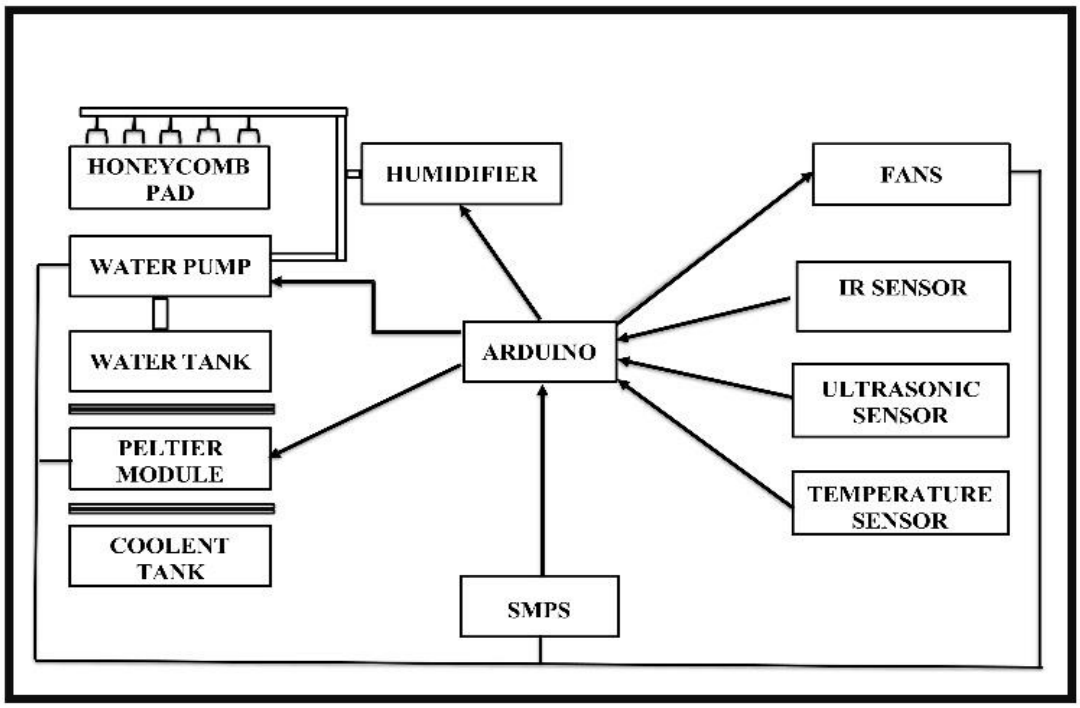
Firstly, controlling humidity levels is crucial to prevent excessive moisture build up, which can accelerate the decay of vegetables. High humidity can cause vegetables to wilt, Mold, or rot quickly. By implementing sensors and a controlled airflow system, will maintain optimal humidity levels, ensuring that vegetables remain fresh for an extended period.

Secondly, controlling moisture levels is crucial for preserving the texture and appearance of vegetables. Excess moisture can lead to a loss of crispness, making vegetables unappealing to customers. Our cooling system will incorporate appropriate drainage mechanisms and moisture control mechanisms to prevent vegetables from becoming excessively soggy or damp.

Thirdly, maintaining an optimal temperature is essential to slow down the process of vegetable spoilage. Different types of vegetables have varying temperature requirements, and our system will be equipped with adjustable temperature settings to accommodate different produce. By utilizing cooling tubes and the Peltier model, our cooling system will provide efficient and consistent temperature regulation, ensuring that vegetables stay fresh for a longer period.

Furthermore, our cooling system will be designed to be energy-efficient and cost-effective, keeping in mind the operational constraints faced by vegetable stall owners. It will be compact, portable, and easy to install, making it suitable for use in various types of vegetable stalls. The implementation of our cooling system has the potential to significantly benefit vegetable stall owners and the general public. Vegetable vendors will experience reduced financial losses due to decreased spoilage and improved shelf life of their produce. Customers will have access to fresher and higher-quality vegetables, thereby promoting healthier eating habits and reducing food waste.

2. BLOCK DIAGRAM



3. BASIC COMPONENTS

3.1 HONEYCOMB MESH LAYER

First layer is of honeycomb pad and honeycomb pad is mainly used in the cooler for the cooling purpose. On the honeycomb pad simply, the water is inlet and the honeycomb pad get cooled as similar we are also going to use the honeycomb pad for the colling purpose in our project. Simply, the honeycomb pad is fitted in the aluminium frame and the honeycomb pad can be easily change if there is damage of honeycomb pad. The water is inlet on the honeycomb pad by the help of the pipe and motor. The honeycomb pad has ability to remain in cool nature for long time in high temperature. The aluminium frame which is using in our project is easily can open or close to change the honeycomb.

Fig. 3.1 Honeycomb Mesh Layer on Aluminium Frame Body

3.2 FAN COOLED LAYER

On the second layer the fans are used. Fans are fitted on the aluminium frame and the DC fans are used which are uses in the computer CPU and other electronics devices. The main function of DC fans is to provide the air to honeycomb pad and to the external area. The DC fans are simply works on the 12V DC power source and we are using 6 fans in our

project. The DC fans are located at the middle layer of aluminium frame. The aluminium body is in the rectangular shape which is fitted with the help of screw. It is easy to assemble and it is also easy to maintenance.

Fig. 3.2 Fan Cooled Layer

3.3 WATER TANK LAYER

Simply, the water for spray on the honeycomb pad is take from tank, in that tank we are placing the motor which can pass water to the honeycomb pad. The Peltier module is also in the water tank to maintain the temperature cold.

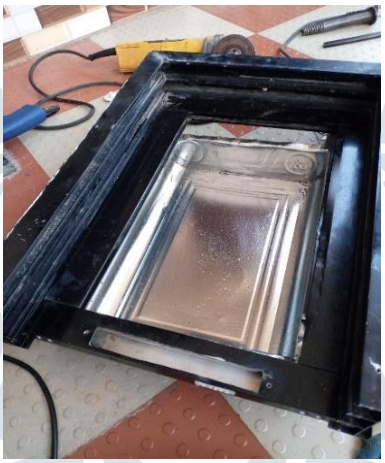


Fig. 3.3 Water Tank Layer

4. ELECTRICAL COMPONENTS

4.1 DC FAN

We are using the DC brushless fans which can work on the DC power source. We are using six fans in our project simply; the power is given to the fans by the help of SMPS.

SPECIFICATIONS

- 12 Volts DC Power,
- 0.15 Amp current.

Fig. 4.1 DC Fan

4.2 ARDUINO UNO

The board has 14 Digital pins, 6 Analog Pins and programmable with the Arduino IDE (Integrated Development Environment). Arduino is an open - source prototyping tool that uses simple hardware and software. Here it gives input and output signals based on the sensors connected to it via a type B USB cable. We are using Arduino in this for automatically sense and function well.

SPECIFICATIONS

- Microcontroller Microchip AT mega 328 P,
- Operating Voltage = 5 Volts,
- Input Voltage = 7 to 20 Volts,
- Digital I/P Pins = 14.

Fig. 4.2 Arduino Uno

4.3 IR SENSOR

Basically, the IR sensor emits infrared radiation to sense the particular phase environment. It consists of IR transmitter LED (white colour) they transmit the IR light and the black light is IR receiver which receive IR light rays. IR sensor consist of three pins. VCC, OUTPUT, & GND. IR receiver receive this ray then the output pin gets high. The distance between sensor and object should be less than 5cm. If the distance is greater than 5cm then output pin will be lows. We are using IR sensor in our project for detecting the vegetable is present or not for that particular purpose we are connecting IR sensor with the help of the Arduino.

SPECIFICATION

- Input voltage to VCC = 5 Volts,
- Blue portion is sensitivity adjustment of potentiometer. (Which is use for controlling the range of IR sensor.)

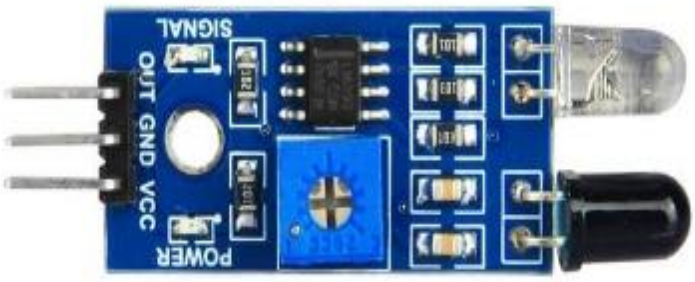


Fig. 4.3 IR Sensor

4.4 PELTIER MODULE

Basically, the Peltier module works on the principle of the Peltier Effect. This effect brings up a temperature difference by transferring heat between two junctions. The principal application of the Peltier module is cooling, but this module can also be used for heating or maintaining a temperature. We are using the Peltier module in our project for purpose of cooling of water.

SPECIFICATION

- Input Voltage = 12 Volts,
- Current = 6 Amp,

- Maximum temperature = 138°C.

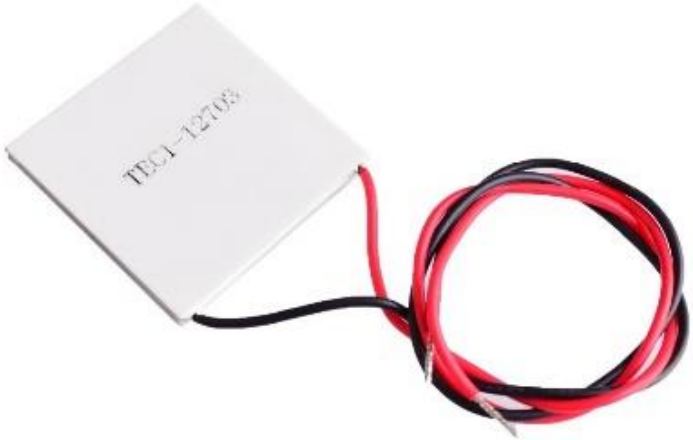


FIG. 4.4 Peltier Module

4.5 DC WATER PUMP

Basically, the DC water pump works on the DC power supply, it can also works on the Solar. The DC water pump works on the principle of Faraday's law of induction when current carrying current placed in the magnetic field the rotational force applies on that conductor. There is the impeller is fitted on the shaft of the motor. The body of the water pump is of plastic. There are two holes on the motor, one is for inlet of water and another one is for outlet of water.

SPECIFICATION

- Input voltage = 12 Volts,
- Input current = 2 Amp.

FIG. 4.5 DC Water Pump

4.6 WATER HUMIDIFIER

Water humidifier is device which spray water when needed. The water humidifier is fitted in the water tank and it spray small particle of water like smoke.

SPECIFICATION

- Input voltage = 12 Volts,
- Input current = 9 Amp.

FIG. 4.6 Water Humidifier

4.7 ULTRASONIC SENSOR

The ultrasonic sensor is an electronic device which measure distance by sending out sound wave and collecting returning echo. It can measure item up to 4.5 meter away. Making it a versatile tool for measuring both short and long distance accurately. We are using the Ultrasonic sensor in our project for the purpose of the identify if there is available of vegetable or not. If there is no availability of vegetable then that system will be turned off and another system will work properly. On the other hand, if there is availability of vegetable then the system will work automatically.

SPECIFICATION

- Input Voltage = 5 Volts,
- Measuring angle =15 Degree,
- Input current = 15 mA.

Fig. 4.7 Ultrasonic Sensor

4.8 BATTERY

The use of battery in the project for giving the power supply to all components. We are also installing the SMPS for the charging purpose to the battery.

SPECIFICATION

- Output Voltage = 12 Volts.

Fig. 4.8 Battery

4.9 SMPS

Basically, the full form of the SMPS is SWITCH MODE POWER SUPPLY. In the SMPS simply the input 230 Volts is given and at output side we can collect the required voltage like 5 Volts, 12 Volts, & 24 Volts. In the SMPS, It use the Thyristor to switch the power supply.

SPECIFICATION

- Input voltage = 230 Volts,
- Output voltage = 5 Volts, 12 Volts, & 24 Volts.

Fig. 4.9 SMPS

5 ADVANTAGES

- Reduced food waste.
- Extend self-life of vegetable.
- Benefits to both shop owner and also to the customer.
- Maintain the Humidity, Moisture, & Temperature.
- Preserving freshness and quality.
- Improve product quality.
- Environmentally friendly.

6 CONCLUSION

This smart cooling system presents a variable solution for minimizing vegetable spoilage in outdoor stalls. Its Arduino-controlled, sensor - driven approach ensures targeted cooling, improved shelf life, and reduced losses for vendors. This system presents way for a more sustainable and efficient vegetable retail industry, while promoting access to fresh product for consumers.

FUTURE SCOPE

- Vegetable prevention System provides much needed employment avenues to many individuals in the vegetables processing and allied fields.
- With the spurt in growth of vegetables preservation industries, the demand for the trained personnel has substantially increased.
- With the recent liberalization policy and lifting of trade restrictions, there is a vast potential of exports of the processed vegetables.
- Multinational food giants are finding India as a promising market. In case, Indian products can meet the international standards of quality as well as compete successfully, we can earn valuable foreign exchange.

BIBLIOGRAPHY

- Fruits and Vegetables Preservation (Principle and Practices), Revised and Enlarged Third Edition, By R. P. Srivastava Sanjeev Kumar.
- Quality Control in Fruits and Vegetables Processing, FAO Food and Nutrition Paper 39, Food and Agriculture Organisation of the United Nations, Rome.
- Specific Gravity as a Guide to the Content of Dry Matter and of Starch in Potato Tubers, In 'The Potato', 3rd Ed. Longman Scientific and Technical, Essex, England.
- Home - Scale Processing and Preservation of Fruits and Vegetables, Central Food Technological Research Institute, Mysore.
- Basic Food Microbiology, The AVI Publishing Company, Inc., Westport, Connecticut.