

Automatic Food Dryer System

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Abstract— Automatic food dryer system project is mainly based on the agriculture field. Our country is a agriculture based country 80% people in India engaged with agriculture field. So our project makes the some help in agriculture field. The natural drying process has many drawbacks like a requiring more time, more capital cost and more space is required. In this paper we describes automatic food dryer system in which dried food in one chamber which is made up of metal which is fully microcontroller based. The fresh food or fruit is placed inside the chamber. The air is blown inside the chamber to maintain the humidity. Microprocessor are used to control overall process of drying chamber like the control function of heating, blowing the air, giving time indication and maintain constant temperature throughout the chamber. By using sensor and microcontroller we give full control on the drying process. Automatic food drying system is also useful for the small scale farmer.

Keywords- Dryer, Microcontroller, Sensors, Exhaust fan, Display.

I. INTRODUCTION

As the population in the world increasing, there is a demand of more food in the world. It also require the transportation of foods from food production areas to the demand areas,. For this transportation purpose, we need preserve the food, during transportation. When transportation period is more than the life of food preservation is important. Healthy and fresh food can be gives people to enjoy dry fruits as a snack. Dehydration is important things also used to lower cost of packing; storing and transportation as it reduce weight and volume of the finial product. When the product is dehydrates the food is preserved for the long times. The problem in a natural drying it required more time for drying and it done by manually without any automatic control. A strict and accurate monitoring of every process is thus required to ensure the quality of food for long time. The process required less man power ensure the good quality, leading growth in the former. In conventional method of drying the area required for the drying is more, fruits are not desired uniformly, drying is not possible in the humid environment and required long time can be considered risky due to environmental condition.

II. METHODOLOGY

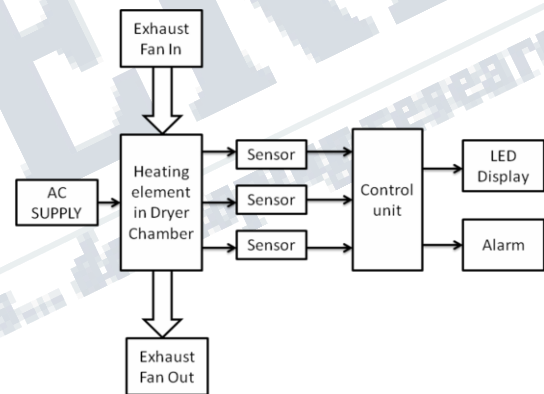


Fig. [1] Block Diagram

The microcontroller is used and programmed to control and manage the overall process of the unit. Different fruits and vegetables will have different temperatures to dry. The thermostats are used to set required temperature. Sensors are used to read the temperature in the cabinet connected to microcontroller through ADC. A display is use to see the process continuously for the temperature value and time to dry the particular fruit. The Rh- value (humidity) measuring sensor is used to know the moisture in the particular fruits. The program is made in such a way that it compares Rh-value of grapes. AC supply is given to the drying chamber.The process of drying a wet object involves the transfer of heat causes evaporation of moisture in the fruit. Maximum 80 % of moisture can be removed by using the external drying parameter. To calculate heat required to dry the given fruit for storage purpose is

calculated by equation:

$$W1 (100 \cdot M1) = W2(100 \cdot M2)$$

Where W1 is the weight in kg of fresh fruit. M1 is the initial moisture in the fresh fruit. W2 is the weight in kg of dried fruit. M2 is the final moisture in the dried fruit.

III. OPERATION

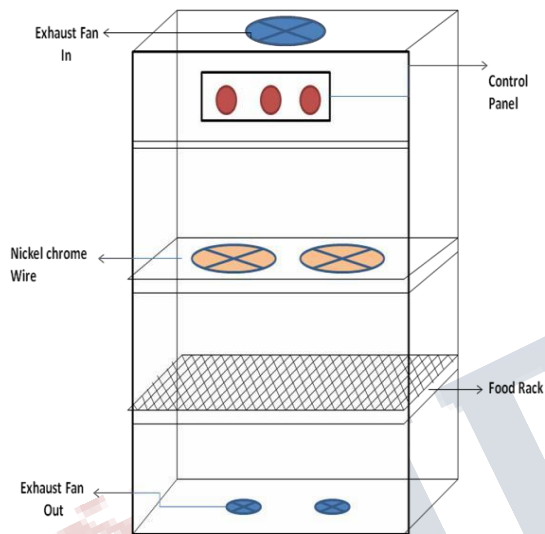


Fig.[2] General view of drying chamber.

The AC supply is given to the drying chamber. In the drying chamber exhaust fan is fitted on top. For the heating purpose nichrome coil is used. The drying chamber is made by the 3 rack. When supply is given then according to the temperature needed to the fruit coil is heated. This hot air is circulated by the exhaust fan. For the controlling of the temp of the drying chamber thermostat, driver circuit, microcontroller is used. As soon as operation is completed the alarm is give sound

IV. CIRCUIT CONSTRUCTION & WORKING

The 5 volt power supply given to the microcontrolling unit with microcontroller ATmega328/P by using the driver circuit. Once unit is turn on, reference temperature is set to get good quality of dried fruit. The date time and duration process is controlled by the microcontroller. The temperature is continuously sensed by the temperature sensor LM35, which dose not require external calibration at room temperature during temperature range (50°C to 300°C). Three sensors are mounted to

different place of cabinet with ATmega328/p microcontroller. Based on the comparison of the three references temperature value and the average of three sensor value fans will be run to glow in the air in the chamber. The hot air created in the chamber, passes over the trays where it comes in contact with surface of dried fruit carries the moisture. So the humid air, carried out through the moisture exhaust.

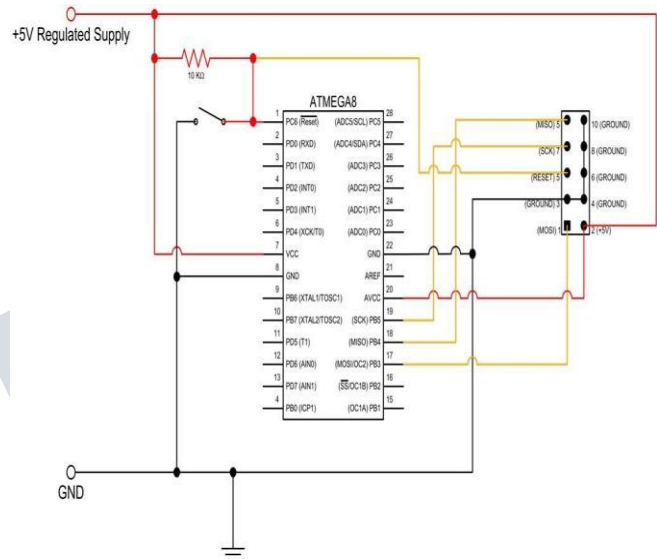


Fig.[3] Microcontroller circuit diagram.

The driver circuit is used to regulate the current flowing through the circuit. The actual diagram of driver circuit is shown in below figure.

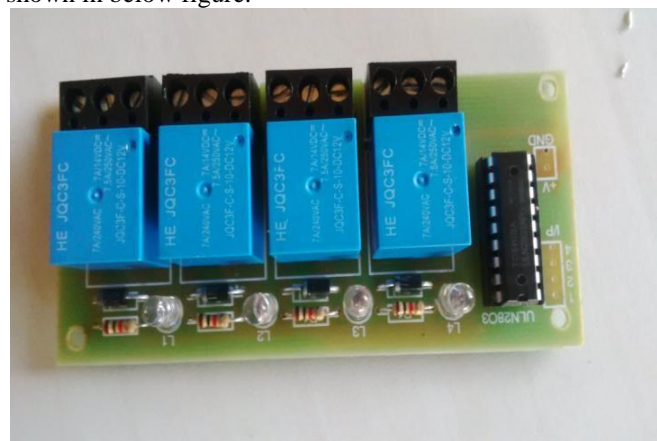


Fig.[4] Driver Circuit.

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V. CONCLUSION

The systems require low space, minimum installation time and less time to dry as compared to the conventional method of drying. Unit can be available in varied capacities. Dust and dirt are dose not contact with food thereby ensuring good quality of the dried product. The system can be made more economical by making provision for drying variety of fruits in a single unit. It is very economical for farmer. Instead of AC supply also gives solar supply to this drying system. This can be used for seafish.

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