International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 09 | Sep 2020 www.irjet.net p-ISSN: 2395-0072

Electronic based Solar Dryer System for Agricultural Goods

Prajkta S. Patil[1], Shraddha A. Ghadge[2], Swapnali J. Babar[3], S.S.Desai[4]

[1,2,3]BE Student, [4]Professor
[1,2,3,4]Depatment of Electronics &Telecommunication Engineering,
[3]Padmbhooshan Vasantraodada Patil Institute of technology, Budhgoan, Sangli

---

Abstract – Dehydration of fruits and vegetables is a promising food processing technology that increases shelf life of products for almost a year. It is a value addition process that can save 1/3rd losses of seasonal agro-products. Solar dryers can be used to carry food dehydration without relying on electricity. India is primarily an agriculture-dependent country. Fruits and vegetables are an essential part of human diet providing micronutrients, vitamins, enzymes, and minerals. Most fruits and vegetables have a high moisture content and water activity. This makes them vulnerable to microbial and other spoilages due to biochemical reactions, such as enzymatic activity, respiration, and senescence. Therefore, preventive measures are taken to lower water activity; drying or dehydration is one such method. Drying is a process of removal of water from the food to inhibit biochemical processes and microbial growth. Drying increases the shelf-life of the product, so that it can be available during off season. Drying can be done at high temperature, such as hot air drying or dielectric heating, at low temperature, such as freeze drying, or at ambient temperature, such as desiccant drying.

1. INTRODUCTION

Open air sun drying is conventional source to dry plants, seeds, fruits, meat, fish, wood and other agricultural or forest products as a means of preservation. To overcome the limitation of sun drying, solar drying technique came in to existence. Solar drying also utilizes solar energy which is widely available source of renewable energy but in a different setup. The objective of a dryer is to supply the product with more heat than is available under ambient condition. Warm air can hold more moisture than cold air, so the amount required depends on the temperature to which it is heated in the collector

2. RELATED WORK\LITERATURE REVIWE

This project purpose of drying is to remove moisture from the agricultural products so that it can be processed safety and stored for increased periods of time. Products are also dried before storage or during storage, by forced circulation of air, to prevent spontaneous combustion by inhibiting fermentation. Solar Powered Automatic Fruit Drying System is a small scale fruit drying machine which is useful to dry different types of fruit. To make their usage efficient, they can be dried and preserved so that fruits can be used over a long period. Preserving fruits by drying is an important operation continued from prehistoric period.

3. PROPOSED METHODOLOGY

Existing system:

Sun drying is one of the most widespread and cheap methods. Sun drying has certain limitations as it is dependent on the weather and sunshine hours. During uncertain rain and precipitation, the material are not dried properly, which cause growth and other qualitative deteriorations. This method of drying requires a large area.

Proposed solution:

Solar drying systems have been successful and economical tool for drying agricultural products. Solar drying is achieved by direct sun radiation and greenhouse effect.

3.1 BLOCK DIAGRAM

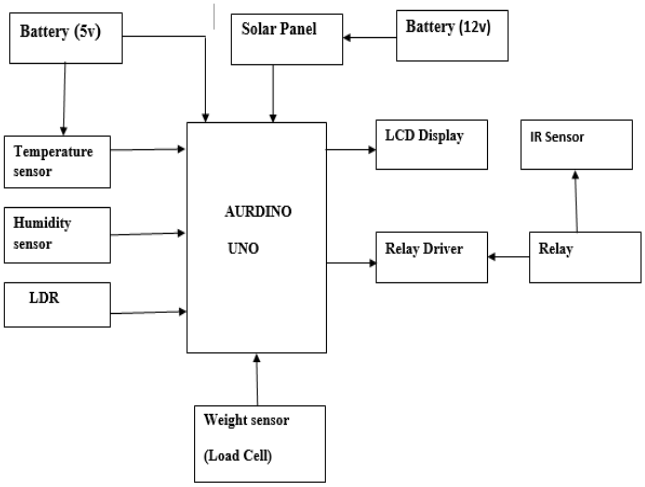

Fig 1: -Block diagram

In this projects solar panel, Battery, AURDINO UNO, LCD display, IR sensor, Temperature sensor and Humidity sensor, weight sensor, etc. A first step when considering solar drying is to compare the different drying options available. Solar drying will only be successful, when it shows tangible benefits in comparison to existing drying methods. In comparison to the traditional way of drying outside in an open field, solar dryer prevent contamination of produce by dust, insects, etc.

3.2 FLOW CHART

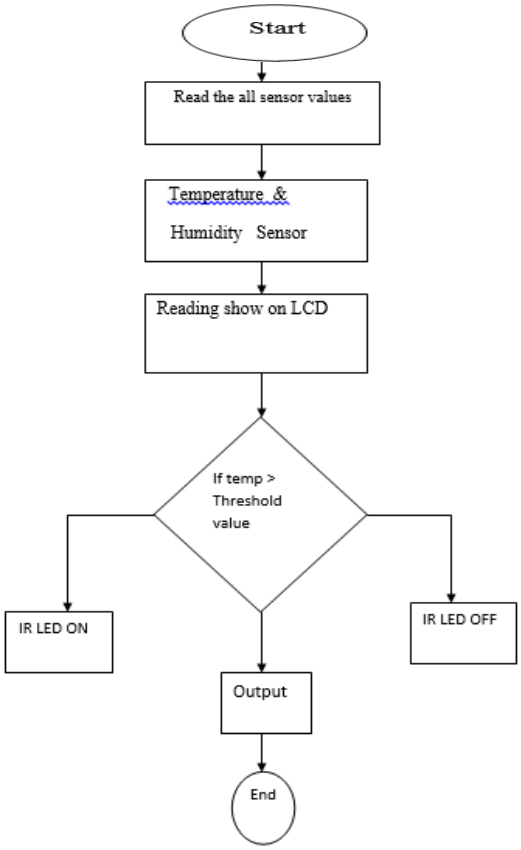

Fig 2: -Flow chart

4. SIGNIFICANCE AND SCOPE

It takes time for dry the product in rainy season. To overcome the drawback we can use IR heater. The disadvantages of temperature can be removed by increasing the number of fans. The quality and color of the dried product depend upon the techniques used for drying process. In the future the size of the unit can be increased to dry more amount of fruits. We can use vacuum to control humidity in the air. Larger system could be designed utilizing solar, thermal, photovoltaic panels combined with wind energy.

5. RESULT:

We have performed the experiment by interfacing sensor, display and relay with the arduino. The use of Load cell to measure the weight of the product. The temperature sensor continuously sense the temperature of the surrounding and temperature is displayed on LCD display. With the help of commands on arduino, IR sensor works.

Advantages of solar dryer:

The various advantages associated with the use of solar dryer:

- Solar dryer can save fuel and electricity and drying time in solar dryer is reduced in comparison to open drying method.
- Fruits and vegetables dried in solar dryer are better in quality and hygienic than dried in open.
- Products are protected against flies, rain and dust: product can be left in the dryer overnight during rain, since dryers are waterproof.
- It reduce Losses and better market price to the products.
- The use of solar dryer involves no fire risks.

All these solar dryers are very much beneficial for farmers of India and hence the economical analysis of these dryers is also important.

6. CONCLUSION

Solar drying unit gives better performance in terms of drying rate compared to conventional method. The quality of dry fruit is better as compared to conventional method. As solar panel is used for it does not cause pollution. Also the maintenance cost is less. As solar and wind energy is necessarily intermittent, advances in thermal and electrical energy storage is needed to make use of renewable energy visible in drying.

7. REFERENCES

1. R. K. Sahdev, Open sun and greenhouse drying of agricultural and food products: A Review, International Journal of Engineering Research & Technology, 3, 2014.
2. O. Prakash, Anil Kumar, Solar greenhouse drying: A review, Renewable and sustainable energy review, 29, 2014.
3. M. Liu, S. Wang, K. Li, Study of the solar energy drying device and its application in traditional Chinese medicine in drying, International journal of clinical medicine, 6, 2015..
4. S. Nayak, A. Kumar, J. Mishra, G.N. Tiwari, Drying and testing of mint (Mentha piperita) by a hybrid photovoltaic-thermal (PVT)- Based greenhouse dryer, Drying technology, 29, 2011.
5. S. Janjai, A greenhouse type solar dryer for small-scale dried food industries: Development and dissemination, International journal of energy and environment, 3, 2012.