SOLAR FOOD PROCESSING

AN EFFECTIVE WAY TO COMBAT HUNGER AND POVERTY USING SUSTAINABLE AND RENEWABLE SOLAR ENERGY TO DRY FOOD AS PART OF THE FOOD PROCESSING

AUTHORS

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01. INTRODUCTION

In a developing country like India, agriculture plays a major role in the economy. In agriculture, the major problems are post-harvest loss and storage loss. Most of the food is being wasted when there is more supply and less demand for a particular crop. Traditional methods like open sun drying were used in the past for preservation and to increase the shelf life of a crop. Open sun drying has disadvantages like food contamination, unpredictable weather changes, etc.

02. OBJECTIVES

- Reduce post-harvest loss of food
- Increase income obtained to the farmers
- Preserve the food for long time
- Use IOT to increase efficiency
- To use sustainable solar energy

03. RESULTS/FINDINGS

CROP	INITIAL MOISTURE CONTENT	FINAL MOISTURE CONTENT	OPEN SUN DRYING TIME	PROTOTYPE TIME
Tomato	90 %	9 %	74 hrs	29 hrs
Red Chillies	63.8 %	8.01 %	3 weeks	48 hrs
Cabbage	91.2 %	8.63 %	48 hrs	7 hrs

Before Drying Tomatoes

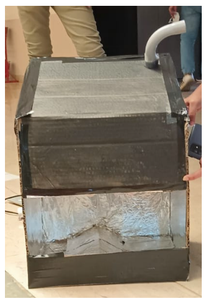
After Drying Tomatoes

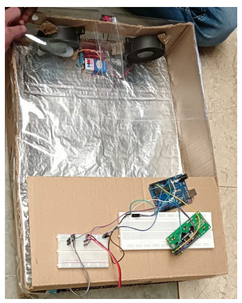
Before Drying Red Chillies

After Drying Red Chillies

04. DESIGN

We used Arduino uno as microcontroller and dht11 sensors to measure temperature and humidity inside the drying chamber and solar collector. Aluminium metal plate absorber is present inside the collector to heat the air inside collector when sun rays fall on it, there is a polycarbonate sheet on top of collector so that the heat gets trapped inside. Fans help in forced convention of heated air into drying chamber thus drying the food by removing the moisture in it. There is an LCD display that displays temperature and humidity inside the solar dryer.





05. CONCLUSION

Solar energy can be effectively used for preserving the food through solar drying. Although companies like Aachi, Eastern and Priya are using solar drying, our prototype gives better results by drying the food faster due to forced air convention and IOT implementation. The food dried using solar dryer has more demand thus increasing income of farmers.

06. FURTHER WORKS

- UV lights and 24 hrs working
- ethylene sensors
- Image processing techniques
- Arduino Mega