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## **DRYING OF FRUITS AND VEGETABLES IN SOLAR COOKER**

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### **Abstract**

*Drying is an essential process various drying methods are employed to dry agricultural products. Each method has its own advantages and limitations. Choosing right drying system is thus important in the process of drying agricultural products. Care must be taken in choosing the drying system. Study comparing traditional drying and other drying methods for the reduction of the drying time to a significant improvement of the product quality in terms of colour texture and taste. Drying reduces possibilities of the contamination by insects and microorganism so that product is prevented.*

### **Introduction -**

India is the third largest producer a fruits and vegetables in the world. Fruits and vegetables with their rich content of minerals, vitamins, dietary fiber and antioxidants are the protective foods. Fruits are essential food items as they play a vital role in the diet humans, fresh fruits are highly perishable and bulky commodities they contain of high moisture [Mulatu Wakjira,2010] Fruits are losses Occur in transportation and losses in storage go up 40 percent annually Naik& chavan,1992] Due to these factors the cost a fruits fluctuates & tremendously from season to season.

Dehydration or drying process usually involves heating, in which water is removed from a solid or near solid substance. The terms drying is generally used for drying in sun. Drying food is open sun is being followed since ancient times. Food containing high moisture content is simply dried under open sun drying hot summer periods. The traditional method drying in the sun is very economical and cheap often yield inferior product, cleanliness attention is required to keep the product free the attack of birds. The Dried product is often of poor quality as a result of grit and dirt. The product is often unhygienic as a result of micro-organism and insects such as flies.

Dehydration is done under controlled conditions of temperature, humidity and airflow. Air is used as drying medium, temperature; moisture and velocity of air are controllable depending on the foods to be dried. It is a continuous fast process and the product is obtained with a short period. Such foods are dried to the final moisture range of 1 to 5 %. Dehydration of fruits and vegetables is one of the feasible method of surplus products for use in short fall. Hence of many families dehydrate the fruits and vegetables at home.

In solar cooker where the materials are covered under glass cover and solar radiation is concentrated on the surface. Thus the materials are not subjected to outside contamination. There is some work carried out on dehydration of fruits by direct drying, cabinet drying and solar drying, but at household level, it is not possible to buy a solar dryer especially for the purpose of dehydration. Many

of the food products requires temperature less than 80 c for drying and solar cookers are highly efficient in this range. Solar cooker are likely to be highly useful for small scale drying of fruits and some of their products.

### **Objectives -**

- 1] To estimate the drying time and rate of dehydrations of selected fruits and vegetables in solar cooker and by direct sunlight [Traditional method].
- 2] To compare the physical properties of selected fruits and vegetables in solar cooker and by direct sunlight.

### **Methodology -**

The present study was designed to observe the drying time and rate of dehydration and to investigate the physical properties of selected fruits and vegetables.

### **Methods for drying**

Weigh accurately 200gm drumstick leaves for sun, cabinet tray & solar drying process. Sun drying-weight accurately 200gm of the drumstick leaves for sun drying process. In this method the fresh drumstick leaves were washed and air dried for few minutes then put on the filter paper. Filter paper with tray placed at a place where adequate amount of sunlight.

cabinet tray drying- In cabinet tray drying method the fresh samples wash with sufficient amount of lukewarm water till it was free from dust rodents. The drumstick leaves sample spread on tray and placed into the cabinet tray drier at 60c for 4 hours. In cabinet tray method retention of nutrient values was more as compare to other drying methods .

Solar Cooker- Domestic type of solar cooker recommended by Maharashtra Energy Development Association [MEDA] will be selected for the experiment. Solar cooker is one of the most popular appliance which save time, fuel and money. Solar cooker is developed on new technology where solar energy is used to dried fruits and vegetables.

Pre-treatment –According to Mazza [1983] and Carbonell[1984] salt dip treatment affects the moisture transport and product quality of dehydrated vegetables. So brinjal slices were dipped in 5 percent NaCl solution for avoiding darkening and were dried for an hour at ambient temperature before keeping for dehydration. No pretreatment was given to other vegetables selected for the study.

During the drying process there is lot of losses takes place like nutritional, physical and chemical composition of leaves. Satwase et al-studies that when fenugreek leaves were dried by using solar dryer these was a loss of colour pigments. Fenugreek leaves pretreated with 0.1% sodium bicarbonate gave better results in chlorophyll and carotene retention. So to minimize drying losses various pretreatment are used.

### **Result and Discussion-**

Sun drying leads to considerable reduction of drying time by up to 50% and a significant improvement in product quality in term of colour, texture flavor and nutrient retention. For vegetables, the dehydration process affects to varying degrees, the quality attributes of colour, texture and nutrient retention, such variations in quality attributes may be due to vegetable type and type of treatment, solar drier load, thickness of the vegetable pieces and the drying method. Quality characteristics were



also affected by moisture content and water activity, temperature, relative humidity, and rate of dehydration.

The graph was plotted between moisture content Vs time. Time was in hours and the moisture content was in Percentage.

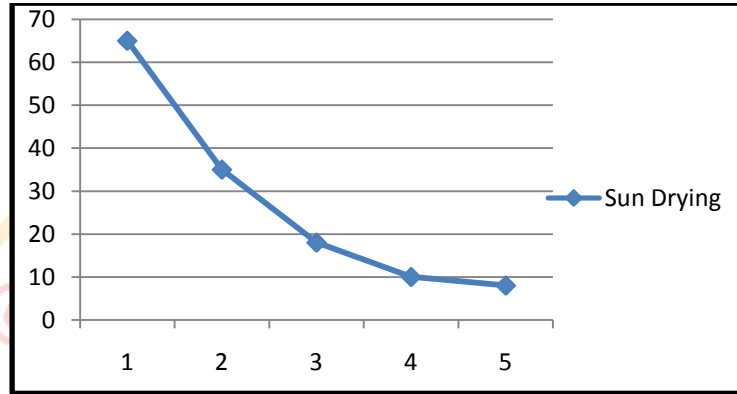


Fig. 1 For sun drying sample plotted between moisture content Vs time.

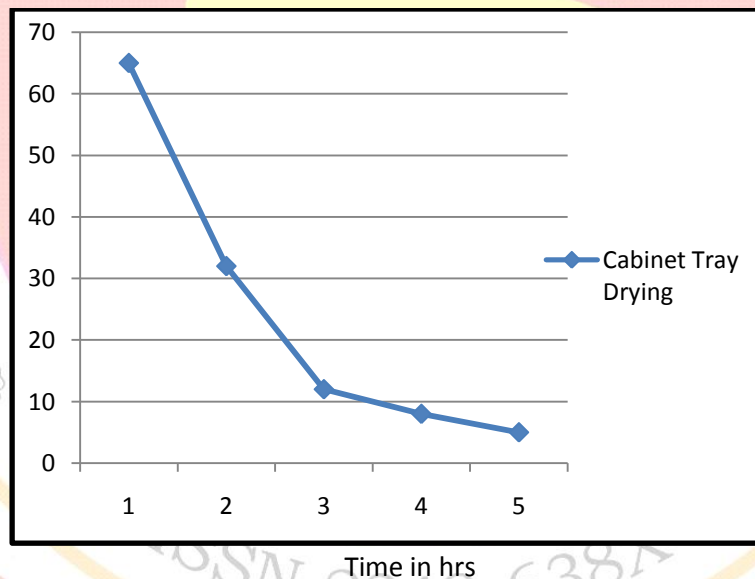


Fig.2 For Cabinet tray Drying sample plotted between moisture content Vs time

**Conclusion-**

The study revealed that the solar cabinet tray drying method was observed suitable for dehydration of drumstick leaves. The drumstick leaves drying at 60c to minimize the drying losses. Cabinet dried sample were better than open drying. The rehydration ratio calculated at 55 c, 65 c,75 c temperature for 60,45, 30 minutes respectively.

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