



SOLAR DRYING OF CHILLI PEPPER

DRYING OF RED PEPPER BY USING SOLAR
TENT DRYER



BEN A. MENSAH
FOOD RESEARCH INSTITUTE
P. O. BOX M.20
ACCRA.

1990



1. INTRODUCTION

Drying, or dehydration, is a simple, and low-cost means to preserve food that might otherwise spoil. Drying removes water and thus prevents fermentation or the growth of moulds. It also slows down the chemical changes that take place naturally in foods, as when fruits ripens. Surplus foods, like grain, fruits and vegetables preserved by drying ~~can~~^{can} be stored for future use.

The method of drying foods has been practised for thousands of years, by placing the foods on mats in the sun. This simple method, however, allows the food to be contaminated by dust, airborne moulds and fungi, insects, rodents and other animals. Furthermore, open air drying is often not possible in humid climates.

Solar food dryers represent a major improvement upon this ancient method of dehydrating foods. Although solar dryers involve an initial expenses, they produce better looking, better tasting and more nutritious foods. This enhances both their food value and their marketability. They are also faster, safer, and more efficient than the traditional sun drying methods. An enclosed cabinet or tent style solar dryer can produce high quality dried foodstuffs in humid climates as well as arid climates. It can also reduce the problem of contamination. Drying is completed more quickly, so there is less chance of spoilage.

Fruits maintain a higher vitamin C content. Furthermore, because many solar dryers have no additional fuel cost, this method of preserving food also conserves non-renewable sources of energy and pollution free.

THE DRYING PROCESS

Drying products makes them more stable and in the case of foods, allows them to be stored safely for longer periods of time. Safe storage requires protection from the growth of moulds and other fungi, the most difficult of the spoilage mechanisms to detect and control. The types of loss generally caused by fungi are:

1. Development of mustiness or other undesirable odours or flavours.
2. Discolouration, which reduces value of foods for many purposes.
3. Chemical changes that render food undesirable or unfit for processing and consumption.
4. Production of toxic products, some of which can be harmful if consumed.
5. Total spoilage and heating, which sometimes may continue to the point of spontaneous combustion.

Solar dryers use the energy of the sun to heat the air that flows over the food in the dryer. The air is heated, its relative humidity decreases and it is able to hold more moisture. Warm, dry air flowing through the dryer carries away the moisture that evaporates from the surfaces of the food.

THE DRYING MECHANISM

In drying processes several factors play an important role, moisture content, surface and size of the drying product, humidity and temperature of the air, and convection flows (circulation of air by heating). Important criteria for drying efficiency are convection flows and temperature.

THE SOLAR TENT DRYER

The solar tent dryer essentially consists of a ridge tent-like framework covered with clear plastic sheet on the ends and the side facing the sun and black plastic sheet on the side in the shade, and on the ground within the tent. The drying rack is positioned centrally or near the plastic sheet - with a central passage along the full length of the tent.

The plastic sheet at one end is arranged so as to allow access to the rack as required, but otherwise is fastened shut. The bottom edge of the plastic sheet is rolled around a pole which when raised or lowered forms a method of controlling the air flow through and the temperature within the tent. Holes at the apex of both ends of the tent permit the venting of the exhaust air. The advantages of the tent dryers are its simplicity both of construction and operation and its low cost. The main disadvantage is its susceptibility to damage in windy conditions.

RED PEPPERS

Peppers come from the fruits of the capsicum or chillie plant (*Capsicum frutescens* and *capsicum annuum*). They are also known as paprika, chilli, pimento, cayenne or red pepper. Red pepper is used as a garnish and pungent flavouring. The hot, pungent taste of red pepper is due to capsaicin.

Capsaicin

DRYING RED PEPPER

The harvested pepper which is evenly ripened is destalked and blanched. The pepper is then kept in baskets or other similar containers for some minutes to allow maximum water to drain from the produce. The pepper is then loaded on trays in the dryer in about two layer thickness. The produce is stirred from time to time to recondition it. When the pepper is dried it is then allowed to stay for some time at room temperature and then bagged in sealed polythene.

CONCLUSION

A solar dehydrator for fruits and vegetables works satisfactorily at the usual ambient temperature of between 29⁰- 32⁰C around Accra, Ghana.