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The Sun

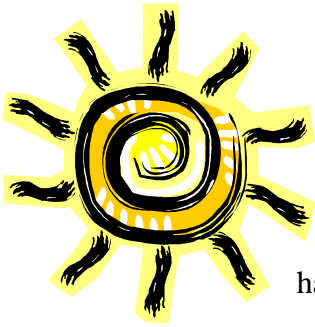
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Solar Cooking for Health

The Sun: warm and bright. Solar energy. Anyway the Sun is described the thought is translated into its function of giving heat. Not long ago, people had limited ways to protect themselves from the heat of the sun during summer days. Meanwhile, people sought out the sun's warmth during the winter. Now with the advent of electricity and gas for cooking and warming, most have forgotten the free power of the sun.

In today's society, most people do not routinely think of the cooking power of the sun. Oh, on a hot summer day one may joke about cooking an egg on the sidewalk. However, the reusable resource of the sun is often overlooked as a way to reduce energy loads on wood and electricity. Daily cooking with conventional heating such as ovens or stovetops, require long periods of heat, increasing the amount of fuel needed to cook. Solar cooking eliminates the cost of fuel to complete food preparation (or at least reduces the amount of fuel used for cooking). Solar cooking is reported to decrease fuel consumption by 38%

(<http://www.ctech.ac.za/conf/du/SOURCE/Web/Sejake/Sejake.html>).

Reports indicate that Africa, India and China are using solar cookers with great success

(<http://solarcooking.org/solarcooking-faq.htm>,

<http://www.ctech.ac.za/conf/du/SOURCE/Web/Sejake/Sejake.html>), in the United

States, Utah has worked to research solar ovens for self-sustainable living. Workload of hauling wood or coal is decreased for men, and cooking chores for women. This time is

Solar Cooking for Health

translated into community time, improving the social standing of all the members of the population.

On average, the daily solar radiation for New Mexico is at 6500, to 7,000 Whr/sq in per day (<http://www.homepower.com/solmap.htm>). Advantages can be found using solar cooking in the high altitude desert. The temperature of boiling water reduces as the altitude increases; this process slows cooking. The boiling temperature of water is only 203F degrees at 6000 ft of altitudes. The disadvantage is cooking some vegetables and dried beans. (<http://solarcooking.org/recipes/guidelines.htm.04/10/2002>,. Studies indicate that solar cooking works best from March 20 – October 1 in the northern hemisphere (<http://solarcooking.org/funnel.htm>).

The heating principles of a solar oven are to use the energy of the sun to heat up food or water. The basic design for the solar box uses simple materials of wood, cardboard, aluminum foil or reflective material, insulating materials, and glass (<http://solarcooking.org/wallovn1.htm>). The design of the box is to reflect light through a glass top (Lindo and Leios, 2002). The solar oven has a metal bottom, along with darkened pots, the heat rises. The heating should have an equal heat loss to heat gain within the solar box (<http://solarcooking.org/shades.htm>). Simple cookers can be made from Pizza or Cardboard boxes (<http://www.eecs.umich.edu/mathscience/funexperiments/agesubject/lessons/other/solar.html>; <http://solarcooking.org/plans.htm>).

Solar Cooking for Health

A greenhouse effect is produced in the closed solar box, retaining energy for heat gain.

The heat collected by the metal bottom aids the transfer of heat to the cooking food. The direct placement of the glass to face the sun increases the solar heat gain. Lastly, the reflectors on the walls, aid to bounce the light toward the cooking pots raising heating temperatures. Heat is also stored by the insulated shell of the solar cooker box.

The how to on cooking with the sun can be found on the World Wide Web in a number of sites (<http://solarcooking.org/recipes/guidelines.htm>. 04/10/2002, <http://solarcooking.org/recipes/Introduction.htm>. 4/10/2002). With some basic cooking supplies, the ability to complete a cooked meal with the sun is rewarding. When Sun shine permits, cooking with the sun can be easy, and you can easy adapt the way you currently cook to a solar oven. Conventional cooking uses increased temperature to lower cooking times, solar works just as well, only using slow cooking.



Solar Cooking for Health

Using the solar oven for meal preparation begins with facing the glass and reflectors towards the sun. This places the box in a southwestern exposure and insures adequate sun exposure throughout the box. Aluminum reflectors move the sun towards the pots sitting in the middle of the Solar Oven Box.



Face Glass of Solar Oven in a Southwestern Direction.

Research indicates that the heating works best when light is bounced no more than once before hitting the cooking vessel (<http://solarcooking.org/funnel.htm>).

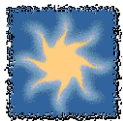


The Golden Rule of Solar Cooking is to GET THE FOOD ON EARLY,
AND DO NOT WORRY ABOUT OVERCOOKING

(<http://solarcooking.org/recipes/guidelines.htm>). Depending on the

brightness of the day, the oven temperature will vary to allow for cooking

specific foods. On Good: clear and sunny days, the sun will allow for cooking hard to cook items due to density or size of the food. Otherwise, for fair to sunny days, most other foods can be prepared; cookies, egg dishes, poultry, green vegetables.



Good days are identified as clear and sunny. The Solar Oven temperature will vary from 275° – 300° F (<http://solarcooking.org/solarcooking-faq.htm>) .



Fair days are identified as hazy or partly cloudy. The Solar Oven temperature will vary from 200° – 225° F. If the clouds will cover the sun for over 20 minutes it is best to remove the food or use retained heat cooking to prevent spoilage.

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Bad solar days are completely cloudy. The Solar Oven will not cook.

Solar cookers can be used Winter or Summer depending on solar availability.

Caution: Always wear sunglasses when using the solar cooker, the focused sunlight can damage eyes (<http://www.exoticblades.com/tamara/sol.cook/tips.html>).



Darkening canning jars, with regular canning lids and rings tightened, will help speed cooking. Wrapping blackened pots with a Reynolds Oven Bag will also increase temperature for cooking.



Use dark covered pots or pans with tight fitting lids.

Cast iron takes time to heat up, so do not use on a marginal day.

You can Pre-heat oven by adding several bricks or stones before you begin cooking.

To increase reflection, add a foil covered cardboard as a screen around $\frac{3}{4}$ of the glass.

Cook Breads in large cans, painted black.

Cook crust first then add ingredients



Cook Corn on the Cob with the husk on



and the silk removed.

Use potholders when



removing items

Solar Cooking for Health



Cooking meals can vary by the amount of sun available for the day.

Clear, Sunny days offer the best days to cook foods with high volume and/or thickness.



Easy to Cook: The Solar Oven will vary from 200° to 300° F

If started early, the food will be done on a fair day by the dinner meal.

Rice, whole grains cereals, most egg dishes



, chops,



ribs,



fish and most poultry,

puddings, cookies,



brownies,

fruits



,



green vegetables,



shredded vegetables.



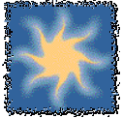
Certain vegetables will not cook well using solar cooking; use care in cooking

cauliflower,



broccoli and cabbage.

Solar Cooking for Health



Medium Difficulty to Cook: The Solar Oven temperature will vary from 225° to 300° F. The sunnier the day the greater the heat gain.



If started early, ready by noon on a good day or by evening on a fair day.



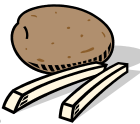
Cornbread, gingerbread, medium-sized roasts



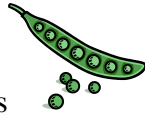
quick breads , yeast rolls, buns,



root vegetables such as potatoes

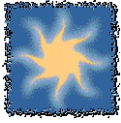


, turnips,



some beans such as lentils , black-eyes peas, black beans.

Solar Cooking for Health




Difficult to Cook: The Solar Oven will need to range from 275° to 300° F

If started early, the food will be ready for late lunch or dinner on a good day.

Whole turkey , large roasts ,

stews and soup  and bean pots,

most yeast breads  and cakes,

pre-soaked pinto beans,  field peas,

small navy beans, soybeans, kidney beans, red beans,

dried peas,  winter vegetables.

Solar Cooking for Health

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Solar Cooking for Health

Basic Recipes for a Sunny Day

Baked Chicken: 3 lbs = Cook for 1 hour 15 minutes.

Baking: Breads and Biscuits: Cook in blackened oiled can for 1-1½ hours;

Cookies cook for 1 hour.

Beans: Soak overnight, cook in closed jar with water. Cook for 3+ hours.

Beef roast: 2 ½ lbs = Cook for 1 hour and 20 minutes.

Boiled eggs: Cook in 1 hour. With or without water.

Cereals and Grains: *Rice, wheat, barley, oats, millet, etc.* Soak for faster cooking.

Mix 2 parts water to 1 part grain. . Cook 1½ to 2 hours.

Meats: *Chicken, beef, and fish*

Cook chicken for 1½ hours cut or 2½ hours for whole; Cook beef for 1½ hours cut to 2½ – 3 hours for roasts; Cook fish for 1 -1½ hours.

Rice: Place 2 ½ cups of water and 1 cup of rice in a pot. Cook for 2 hours.

Nachos: Corn chips and Velveeta cheese on a plate. Cook for 10 minutes.

Vegetables: *Potatoes, carrots, squash, beets, asparagus, etc.*

Cut into slices or logs for uniform cooking. Cook for 1½ hours.

Water pasteurization: Temperature reached in 50 minutes.

Goal is to raise heat to 160 F degrees for 6 minutes.

Prepackaged Foods: Place in Cooking bag. Cooking time varies with food type and package.

(<http://solarcooking.org/funnel.htm>)

Solar Cooking for Health