Solar Cooking

Solar cooking

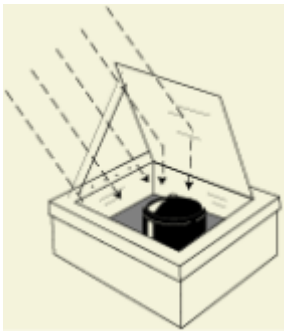


Figure 0.1 Solar oven

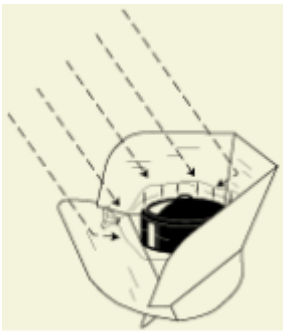


Figure 0.2 Simple solar oven

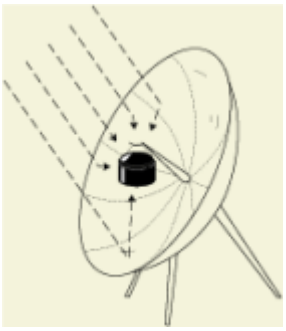


Figure 0.3 Solar cooker

Description

Solar ovens and cookers

In locations with an abundance of sunlight, solar ovens and solar cookers can be utilised to cook food, pasteurise water, dry fruit or vegetables and sterilise utensils. They must be placed out of the wind and solar ovens and cookers will not work at night.

Technology

There are different types and variations of solar cookers, but the basic principle of all solar cookers is that sunlight is converted to heat energy that is retained for cooking. This is achieved in the following ways:

Concentrating sunlight: A mirror or reflective metal is used to reflect the sunlight to a central point so that it is concentrated and the energy is stronger.

Converting light to heat: Black surfaces absorb and retain heat, which is important for keeping the cooker hot. That is why the pots or pans used are normally black.

Trapping heat: Isolating the inside of the cooker from the air outside makes an important difference. A plastic or glass cover creates a greenhouse effect, which ensures that the retained heat does not escape.

Solar oven

The box cooker consists of some type of heat-trapping enclosure, which usually takes the form of a box made of insulating material with one face of the box fitted with a transparent medium such as glass or plastic. This enables the cooker to utilise the greenhouse effect so that the incident solar radiation cooks the food inside the box. The insulating material allows cooking temperatures to reach similar levels on cold and windy days as on hot days, as well as having the added benefit of blocking any heat leakages that potentially could seep through and lower the heat of the oven. A dark cooking pot is recommended for cooking, as it absorbs the maximum amount of heat and

allows for higher cooking temperatures. Pre-heat the sun stove by placing a dark brick/tile inside to heat up the inside and retain the heat.

A good rule of thumb that indicates when the sun is high enough in the sky to allow for efficient cooking is when the length of one's shadow on the ground is shorter than one's height.

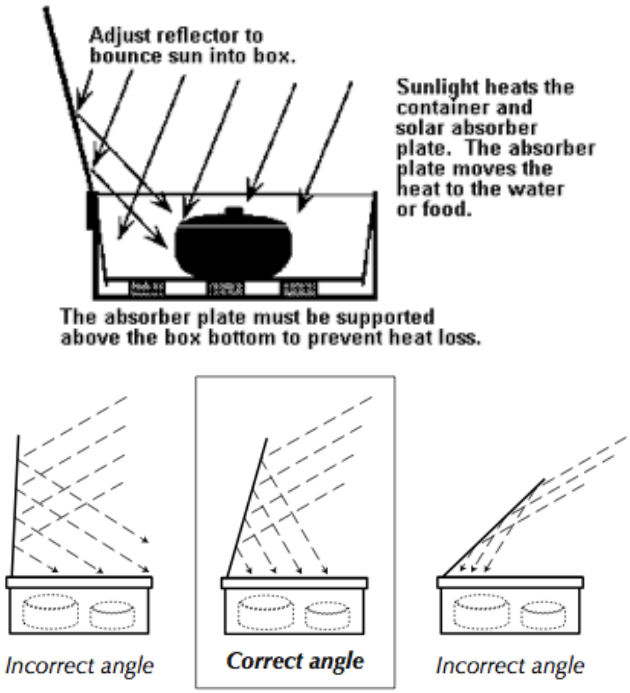


Figure 0.4 Operation of solar oven

Figure 0.5 Examples of solar ovens

Solar cooker

A solar cooker is characterised by a large reflective surface that focuses the solar energy on a pot to produce a relatively high temperature. The surface must track the sun on a continuous basis.

This is a very effective device for using direct sunlight for cooking. All the sunlight reaching the 'disk' is reflected to the focal point.

The outer focus of the solar cooker is about 500 Watts.
The solar cooker must be aligned with the sun every 20 to 30 minutes.
The larger the disc, the higher the watt output that is achieved.

Figure 0.6 Solar cooker

Contact: crosby@sunfire.co.za; sunstove@iafrica.com

Advantages of solar cookers and ovens:

They can cook most types of food that can be prepared on an open fire or electric stove, including stews, mieliepap and bread.
They need little attention while cooking, leaving the cook free to attend to other matters.
The risk of anyone, especially children, being burned, is eliminated almost entirely.
No hazardous gases are released.
They reach temperatures of 115^{o}C merely by facing the sun.
They can cook with indirect sunlight if the sun shines at least 30 minutes in an hour.
They use less water for stews and casseroles.

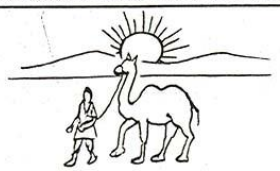
Disadvantages:

The solar oven and cooker cannot be used on cloudy days and at night.
Cooking times with solar ovens are considerably longer compared to conventional cooking.

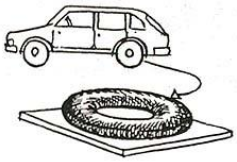
Tire cooker

The Tire Cooker

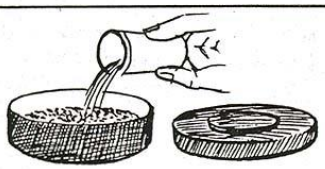
This solar cooker has been designed by Suresh Vaidyarajan - an architect, who has found a simple solution for a tough problem. For the last one year he has been cooking his food in this solar cooker. This is the simplest solar cooker that I have ever seen.



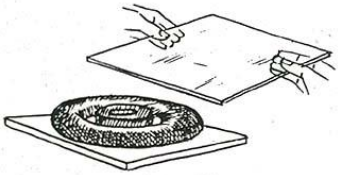
1. There is a tremendous shortage of wood, kerosene and fuel for cooking. But can we not use the tremendous heat of the sun to cook food ?



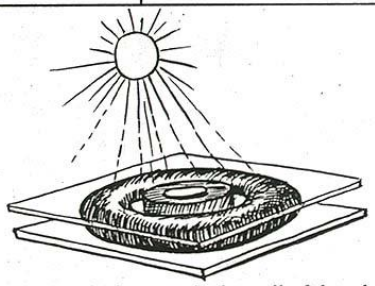
2. Take an old car tube. If the tube is punctured get it patched. Inflate the tube and keep it on a wooden board.



3. Take an aluminium cooking vessel with a lid. Paint it black from the outside. Put all the ingredients for cooking ***Khichdi*** - rice, daal, salt, water etc. in the cooking pot.



4. Place the cooking vessel inside the tube. Cover the tube with a piece of plain glass. Within three hours the ***Khichdi*** will get cooked.



5. What happens ? The space in the well of the tube is like a closed cavity. Air can neither go out nor come in. The rays of the sun enter the glass and get trapped. Slowly, the temperature of the cooking vessel rises and the ***Khichdi*** gets cooked.

Figure 0.7 Tire cooker