Practical recommendations for cooking in a solar cooker

Using a new solar cooker: the black paint smells strongly when used for the first time. We recommend to heat the cooker twice before cooking food.

Temperature:
The temperature in a solar cooker can reach 150ºC but it is possible to cook from 80ºC onwards already. To reach the maximum temperature the sky has to be clear, the windows of the cooker clean and from time to time it is necessary to adjust the position of the cooker and of the reflector to the position of the sun.
A reorientation every 30 min optimises the temperature but in general a medium position towards the south is sufficient.
Therefore, the best time to prepare food in the solar cooker is between 9 am und 4 pm.
If there are clouds or if one wants to eat after sundown, the cover should be closed when the temperature has dropped below 80ºC. The food stays hot for 2 –3 hours.
It is possible to preserve the heat much longer if black tiles are placed under the pots or if a layer of sand is put in the aluminium tub of the cooker, but the sand has to be covered with a plate in aluminium or iron painted black.

Cooking time:
Length of time depends on the temperature and the food.
If the cooker is very hot it takes about double the time of conventional cooking.
A temperature of 80ºC is enough to simmer food carefully. It takes longer to cook but the vitamins are less destroyed.

Pots:
It is possible to use pots made of iron, aluminium or pottery. With metallic pots the heat is conducted faster but the most important is the black exterior of the pot.
Pots must be covered with black lids as well.
If you want to use a light coloured pot, it can be painted black with non-toxic black dispersion or with colour for blackboards.
It is preferable to use 2 small pots instead of a large one.

What to do during cooking:
Once the pots have been placed into the solar cooker one can do other things. It is not necessary to be there during cooking. The food can neither burn nor boil over. It is therefore not necessary to stir the food while it cooks.
To maintain the interior temperature the cooker window or the lids of the pots should not be opened.

Unsuitable food for preparation in a solar cooker:
Almost all food can be prepared in a solar cooker except pasta such as spaghettis or macaronis that have to be cooked in boiling water, as well as any grilled and fried food that requires a higher temperature.

Food preservation:
Dry food such as rice, flour or beans can be put in a well closed paper bag and placed in the cooker exposed to the sun; after that insects cannot develop any longer.

Drying fruits and vegetables:
The cooker can also be used to dry food. Cut fruit such as bananas, mangoes etc. or cut vegetables like tomatoes, peppers, green beans etc. and put it on one or two grates placed in the cooker in such a way that the air can circulate properly on all sides. The window has to stay a little opened by placing two sticks for the humidity to escape.

Sterilising drinking water:
It is possible to sterilise water in a solar cooker in a pot or a black container. A temperature of 80ºC for 20 min is enough to kill the microbes in drinking water.
Maintenance of the Solar Oven
To allow the sun rays to penetrate the windows, the glass must be very clean. Wipe inside and outside with a damp cloth.
After cooking the oven should be protected from rain. If it gets wet all the same, it can dry in the sun by opening the window a little. Should there be evaporated water between the two glass panels, a couple of frame screws can be taken out to open the frame.
If the black colour is defective, it has to be repainted.

Additional recommendations
Results with almost any food cooked with moderate heat in a solar cooker are excellent. Unless otherwise indicated, pots ought to be covered with a lid!

Rice: Put the usual quantity rice and water in a pot – normally one part rice and two parts water. The quantity can be adjusted for drier or moister rice.

Eggs: Cook eggs in their shell, without water, approx. 30 min.

Meat: Do not add water. If meat is cooked longer it becomes more tender.

Beans(dried): To save time soak the beans over night in water. Add the usual quantity of water. Depending on the kind and condition of the beans cook them for 3-5 hours. For larger quantities cooking time may amount to two days.

Fresh vegetables: Do not add water. Most vegetables cook within 1 - 1½ hours. If they are cooked longer, they lose colour, but the taste remains. Most root vegetables need approx. 3 hours.

Corn on the cob: These cook well in a pot without water, with a lid that closes well. Approx. ½ hour.

Whole potatoes: Wash them, brush with a little oil and put them in a black pot. Cooking time normally 2-3 hours.

Bread and cakes: Best in the middle of the day, between 10 am and 2 pm. Cakes must not be covered.

Pudding, custard: 1 egg, 1 cup milk, 2 or 3 tablespoons sugar, ¼ tablespoon salt, ½ small spoon vanilla. Mix everything well and sprinkle with a little nutmeg. Cover with a lid and cook for approx. 1 - 1½ hours. Let cool down before serving.

Miscellaneous:
Some people preheat the oven before they place the food but usually there is not much difference.

Moisture from cooking can condense inside the oven. Wipe with a clean cloth.

Clouded or rainy: The sun must shine at least half of the day. Do not open the oven often in order to save the heat.

How to pasteurise water:
It is well known that water heated up to 100 ºC. becomes drinking water. It is less known that water can be pasteurised at 65 ºC. – all pathogenic agents in water are killed, including Giardia, Entamoeba, E. Coli, Sigella, Trichinoses, Salmonella, Cholera and Tuberculosis-bacteria, Rotavirus and Hepatitis A.

Therefore, solar ovens can save life if the water is dangerous and no wood or gas available.
The World Health Organization assumes that 80% of illnesses spread through contaminated water. On a sunny day you can pasteurise 4 litre water in approx. 4 hours.

The water remains safe for an unlimited time, provided it is sealed after pasteurising. Keep pasteurised water covered until you use it. Do not touch it with fingers or dirty objects!

**Temperature in Solar Ovens:**

For thousands of years people cooked with fire, and contrary to solar ovens, everything had to be checked and stirred, so that it wouldn’t burn or stick to the pot.

Food can be cooked with 80-90ºC and keeps its taste, moisture and nutritional value.

Pathogen germs, viruses and parasites are killed at 65 ºC. (pasteurising). Food cooked with 80-90ºC is free from pathogen germs, provided it has been completely done. Soon after the food was placed in the solar oven, the temperature rises quickly above 49ºC. The pot is then too hot to touch and growth of all germs is stopped.

As usual, if food has been cooled down for several hours, it can get bad. If the food has been cooled down for 4 hours or longer, it must be cooked again in order to kill all pathogen elements.

If the temperature of the air inside the oven is measured with a thermometer, you get only an approximate idea of the food temperature. After an hour or longer, temperatures inside the pots are normally higher than those of the air around the pots. The lid of the pot is usually the hottest spot.

Temperatures in the solar oven:

- 100 ºC water is cooking
- 82 ºC food is cooking
- 71 ºC pasteurising food
- 85 ºC pasteurising water
- 49 ºC most germs cannot grow anymore
- 22 ºC room temperature