

## CONCRETE FUNNEL SOLAR COOKER: EXPERIENCES WITH MAKING AND COOKING

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**Abstract:** Hundreds of millions of people in the world depend on firewood and cow dung for their cooking energy needs. These methods are not human and environment-friendly, while on the other end the solar energy is available freely and can help to save time and health of the deprived population.

Various designs of solar cooker like box type solar cooker, funnel solar cooker and concentrating cookers like Scheffler dish are available. Prof. Celestino Ruivo from University of Algarve, Portugal has developed methodology to prepare “Concrete Funnel Solar Cooker”, which is a very sturdy, economical and easy to fabricate design of solar cooker. It can be put in open place near the house or terrace and no special care is needed to maintain it with very long life. The students of The Maharaja Sayajirao University of Baroda at Vadodara, India got inspired by this idea and took up fabrication of mould, making of the cooker and testing as their final year Bachelor project under the guidance of Dr. Jignesh Mehta with continuous guidance from Prof. Celestino Ruivo. This work describes their experiences with the project and results of testing and demonstrations with cooking.

The mould has mainly three parts; funnel piece, middle piece and bottom piece. The funnel piece has two parts, inner and outer and are assembled with a gap of 30 mm between them. They are made from hot rolled mild steel plates with 3 mm thickness and spacing tubes are spot welded on them for filling up concrete. The middle piece has two steps, upper level works as platform for cooking and the lower level allows a metal tube to pass through it to rotate the funnel about the base. Around 100 liters of concrete is needed with ratio of cement, sand and grit being 1:1:2. Glass mirrors were used as reflectors and were fixed on inner surfaces of the funnel piece as well as platform of the cooker.

The tests like water heating test as per ASAE method, oil heating and cooking demonstrations were carried out. The standard cooking power of this cooker as per ASAE method came out to be 59 W as compared to 29 W for a box type cooker design. The temperature could reach up to 161°C with oil on a sunny day. Rice making and tea making were successfully demonstrated. Thus, the concrete funnel solar cooker is a very convenient and useful design, which can help alleviate health and environment related problems related with cooking.

**Keywords:** Solar energy, cooking, environment, social upliftment, renewable energy