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A REVIEW OF THE TYPES OF SOLAR COOKERS

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Abstract: *Solar cooking, being one of the key applications of solar energy is proven to have the potential of replacing conventional cooking technologies. In rural areas where wood or cow dung is the main source of energy for cooking, solar energy must replace them to reduce health hazards and deforestation. This paper presents a comprehensive review of the available literature on solar cookers. The review includes a thorough explanation of the various types of solar cookers.*

Keywords: *solar cooker, type, box solar cooker.*

Types of solar cookers

Box solar cooker

As shown in Fig. 1, there are two types of solar box cookers: rectangular and cylindrical. For 0.5, 1 and 1.5 kg of fresh water, the performance parameters of each cooker were determined. The cylindrical model outperformed the rectangular model in terms of thermal efficiency. When the amount of water was increased from 0.5 to 1.5 kg, the thermal efficiency increased from 12.7 % to 36.98 % for the cylindrical model and from 9.85 % to 28.25 % for the rectangular model [1]

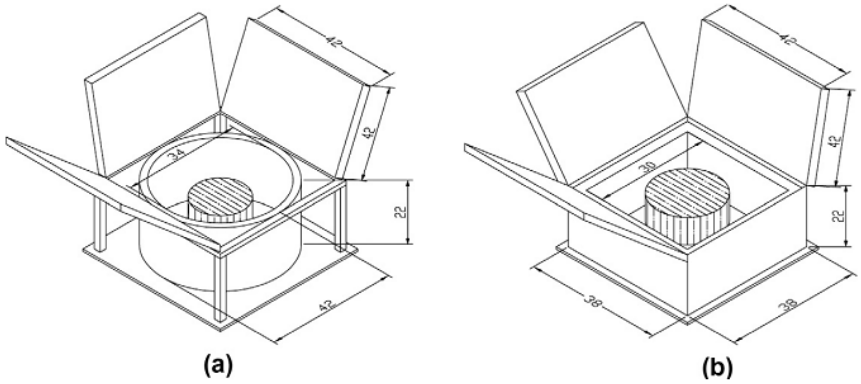

Fig. 1. Schematic diagram of (a) cylindrical and (b) rectangular box-type of solar cookers

Several solar cooker designs are being researched in order to improve their performance. Various booster mirror combinations were analyzed, as shown in Fig. 2, to arrive at a final design aimed at providing a cooker that can be mounted on a south-facing window. According to the findings, the proposed new cooker can provide higher temperatures throughout the day and throughout the year. They also mentioned that the cooker can be used to prepare two meals a day and keep food warm in the late evening. Some studies concentrated on the glazing factor in solar box cookers [2].

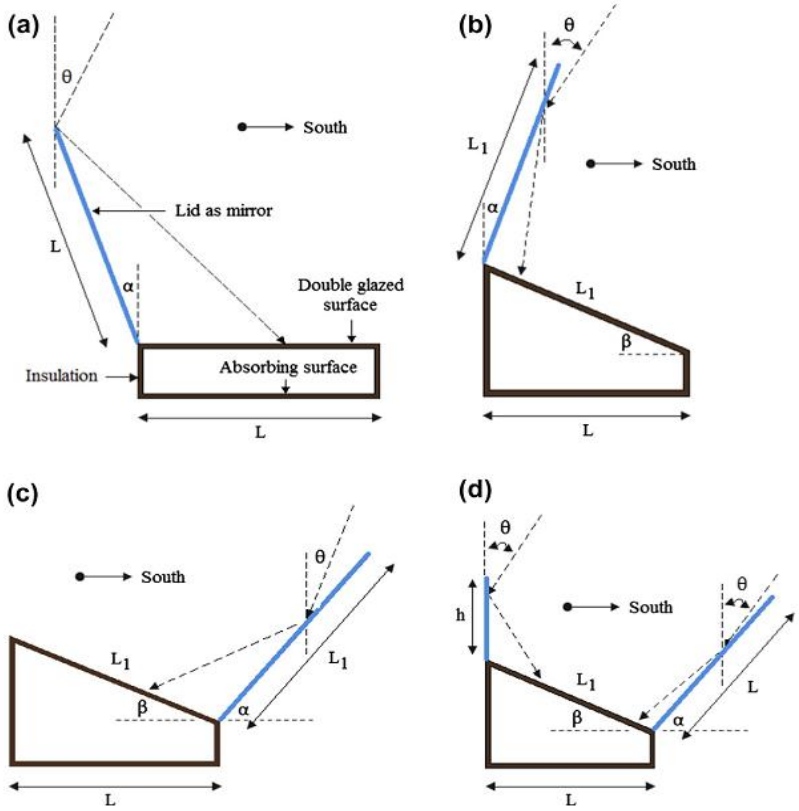

Fig. 2. (a) Conventional box-type solar cooker with south facing mirror; (b) solar box cooker with south tilted collecting surface and south facing mirror; (c) cooker with south tilted collecting surface and north facing mirror; and (d) cooker with south tilted collecting surface, north facing mirror and a fixed south facing vertical mirror

Parabolic solar cooker

A non-tracking building integrated solar cooker (Fig. 3) was designed by [3] for a family of four persons. The system consists of CPC fixed on the south wall of the house with rear opening in the kitchen. The maximum plate temperature reached 166 ˚C and 165 ˚C with no-load conditions for cooker with its reflector in hot and cold seasons respectively. For without reflector arrangement the highest plate temperature was 127.7 ◦C in cold season. The system was found very useful as it doesn't require going out in the sunshine for cooking.

Fig. 3. Building integrated solar cooker [3]

Concentrating solar cooker [4, 5] r cooks' food directly by absorbing the heat from the sun light without any interference of any material between the sun light and the cooking pot. It relies on the principle of solar optics in which it concentrates direct solar radiation on the bottom of the cooking pot to heat it and achieve extremely high temperatures. Concentrating cooker is formed of a parabolic reflector, cooking pot which is placed on the focus point of the cooker [6] and a stand as a support with turning mechanism to keep the reflector facing the sun. Fig. 4 shows a schematic drawing of the parabolic solar cooker. The two major kinds of concentrating cookers are: cookers concentrating light from above and cookers concentrating light from below.

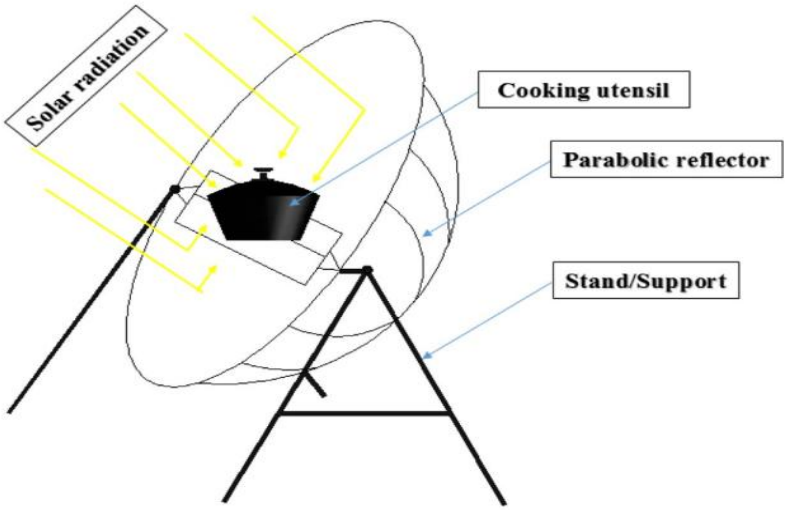

Fig. 4. Solar concentrating cooker

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THE CURRENT STATE OF IoT SYSTEMS IN CROP PRODUCTION

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***Abstract:** Analyzed the main trends in the development of Internet of Things technologies and Decision Support Systems (DSS) in agriculture for further implementation in science and crop production.*

***Keywords:** IoT technology, DSS, agriculture, climate change, crop production*

The main tasks identified for IoT in modern agriculture can be attributed to the problem of implementing climate-optimized agriculture and are usually reduced to solving specific tasks- maintaining a microclimate to create ideal plant growth conditions, improving irrigation and fertilizer practices, monitoring and prevention infections and increased safety of production [1]. The safety of agricultural production can be achieved by using infrared cameras, unmanned aerial vehicles/systems for remote monitoring, optical monitors, infrared and thermal sensors for detecting pests [2].

The classical architecture of measurement networks in the field of agriculture, forestry and ecology based on the Internet of Things technology consists of four basic levels [3]

1. Sensors distributed over the research object, that collect information from the environment

2. Internet of Things gateways and systems-collection from hub devices that collect data directly from sensors and transmit it directly to the Internet.