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# An Indirect Passive Solar Dryer for Crop Drying

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**Abstract**

A solar drying system designed on the principles of convective heat flow, constructed from local materials and was employed in drying yam (*Dioscorea alata*). The Indirect passive solar dryer consists of a drying chamber at the top of which was a chimney. The chimney is to improve air flow. The solar collector was constructed using a single layer of 4 mm thick glass of transmittance value of 0.63. Other parts include an absorber made of galvanised sheet painted black to absorb the heat energy. Granite stones painted black were also placed on the galvanised metal sheet for heat storage. The drying chamber consists of two drying trays. Air passing through the collector heated up and dried the crop in the drying chamber. The collector was placed at an inclined angle that tallies with the latitude of Ilorin, Nigeria is 8.260 to receive more insolation. Three tests were carried out to evaluate the performance of the solar dryer. The first was a no-load test to know the maximum temperatures attained. The maximum temperatures for the drying chamber, ambient and collector were 56°C, 41°C and 71°C respectively. The second test was to determine the drying rate of yam inside the dryer. Some samples of yam chips, each weighing 1560 g and having an average size of 1 cm thick, were dried both inside the dryer and outside the dryer within its surrounding. The yam tuber was peeled, washed, sliced to about 1 cm and blanched before drying. The initial moisture content of the yam was 70.3 % (wet basis) and its final moisture content was 9 % (wet basis).The result was compared to natural sun drying. It was observed that the drying time was reduced from 52 hours for sun drying to 45 hours for solar drying. The total cost of the construction was Naira 6,105 ($50)

**Keywords:** Collector, drying, moisture content., passive, solar, yam

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