

## Development of a Passive Solar Tomato Dryer with Movable Heat Storage System

**Authors :** Jacob T. Liberty, Wilfred I. Okonkwo

**Abstract :** The present study designed and constructed a post-harvest passive solar tomato dryer of dimension 176 x 152 x 54cm for drying tomato. Quality of the dried crop was evaluated and compared with the fresh ones. The solar dryer consist of solar collector (air heater), 110 x 61 x 10 x 10cm, the drying chamber, 102 x 54cm, removal heat storage unit, 40 x 35 x 13cm and drying trays, 43 x 42cm. The physicochemical properties of this crop were evaluated before and after drying. Physicochemical properties evaluated includes moisture, protein, fat, fibre, ash, carbohydrate and vitamin C, contents. The fresh, open and solar dried samples were analysed for their proximate composition using the recommended method of AOAC. Also, statistical analysis of the data was conducted using analysis of variance (ANOVA) using completely Randomize Design (CRD) and means were separated by Duncan's New Multiple Range test (DNMRT). Proximate analysis showed that solar dried tomato had significantly ( $P < 0.05$ ) higher protein, fibre, ash, carbohydrate and vitamin C except for the fat content that was significantly ( $P < 0.05$ ) higher for all the open sun dried samples than the solar dried and fresh product. The nutrient which is highly affected by sun drying is vitamin C. Result indicates that moisture loss in solar dried tomato was faster and lower than the open dried samples and as such makes the solar dried products of lesser tendency to mould and bacterial growth. Also, the open sun dried samples had to be carried into the sheltered place each time it rained. The solar dried produce is of high quality. Further processing of the dried crops will involve packaging for commercial purposes. This will also help in making these agricultural product available in a relatively cheap price in off season and also avert micronutrient deficiencies in diet especially among the low-income groups in Nigeria.

**Keywords :** tomato, passive solar dryer, physicochemical properties, removal heat storage

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