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Development and performance testing of a passive vegetable dryer with movable heat storage system

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The present study designed and constructed a post-harvest passive solar tomato dryer of dimension 176 x 152 x 54 cm 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 10 cm, the drying chamber, 102 x 54 cm, removal heat storage unit, 40 x 35 x 13 cm and drying trays, 43 x 42 cm. 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 produce available in a relatively cheap prices in off season and also avert micronutrient deficiencies in diet especially among the low income groups in Nigeria.

Biography

J T Liberty is a new PhD Student at McGill University, Canada. He has completed his Master's degree from the University of Nigeria, Nsukka and Bachelor's degree from the University of Maiduguri. His area of specialization is food processing and storage engineering. He is presently a Lecturer at the Federal University Dutsinma. He has published more than 25 papers in reputed journals.

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