

ABSTRACT

Investigations into the Solar Drying of Coconut as an Alternative Method of
Producing Copra in Trinidad and Tobago.

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Investigations have been made on the moisture content reduction, energy saving and efficiencies produced by an electric dryer and a solar dryer using coconut as the drying material. The following results were obtained as a result of these investigations.

When loaded with 13.6kg of wet coconut meat an energy saving of 32% was obtained in the electric dryer by using recirculation with intermittent venting instead of continuous venting (McDoom et al., 1999. Appendix 3). Also in this, dryer efficiencies of 7.8% and 13.8% were obtained in the continuous and intermittent venting modes, respectively.

The solar dryer loaded with 45.5kg of wet coconut produced an energy saving of 15% and a 28% saving in drying time upon recirculation with intermittent venting of the hot air in the dryer (McDoom et al., 2000. Appendix 4). The associated drying efficiencies in the continuous and intermittent venting modes were 4.6% and 5.4%, respectively.

The solar dryer when loaded with 227.3kg of wet coconut meat produced energy savings of 21% for the upper trays and 5% saving overall (ie. taking into account the three trays of the solar dryer) with efficiencies of 22.4% and 24.7% under conditions similar to those stated above.

The typical drying time was 6 days for a drying run at sunshine energy values averaging 111.8MJ per day on the entire area of the solar collectors. The datalogger program integration error was reduced from 2.6% to 0.13% per day by rewriting it with appropriate adjustments to the input values.

The use of solar photovoltaic panels, operating at 9% efficiency under field conditions in Trinidad, for providing electricity to the blowers proved to be successful in terms of durability and reliability over the 4-year period of testing.

Solar drying of coconut is feasible on the estates. The recirculation technique (both solar and electric recirculation drying) can save between 5% to 31% of the energy use. Photovoltaic power is reliable and maintenance free. However it still remains somewhat costly to purchase. This source of power although used in these investigations for the sake of gaining experience in its use is not expected to be used on the estates.

KEYWORDS

Electric dryer, solar dryer, coconut, energy saving, drying efficiencies.