EXPERIMENTAL INVESTIGATION OF THE PERFORMANCE OF THE SOLAR TUNNEL DRYER FOR DRYING BANANAS

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ABSTRACT

The multi-purpose solar tunnel dryer was used to dry bananas under the hot and humid weather condition of Thailand in order to investigate its performance. The dryer composes of a plastic foil-covered flat plate collector and a drying tunnel. The dryer is arranged to supply hot air directly to the drying tunnel using three fans powered by a 53 Watt solar cell module. The products to be dried are spread in one layer on a plastic net in the drying tunnel to receive energy from both hot air supplied by the collector and incident solar radiation. This dryer can be used to dry up to 300 kg of ripe bananas for each drying batch. In investigating the performance of the dryer, seven drying tests were conducted at the Royal Chitralada Projects in Bangkok during March - May, 1995. The temperature of drying air from the collector varied between 40 - 65 °C during drying and the bananas could be dried within 3 - 5 days compared to 5 - 7 days needed for natural sun drying. In addition, the bananas being dried in the solar tunnel dryer were completely protected from rain, insects and dust, and the dried bananas were of high quility in terms of flavour, colour and texture. As the fans are powered by the solar module, the dryer could be used in rural areas where there is no supply of electricity from grid. The pay-back period of the dryer is estimated to be about 3 years when the dryer is locally produced.

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