Drying of Cocoa Beans Using Solar Tunnel Dryer with Photovoltaic Module in Manokwari

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Abstract

A research about cocoa beans drying used solar tunnel dryer with photovoltaic module driven have conducted in Manokwari. Solar tunnel dryer used in this research adapted from type Hohenheim with photovoltaic module and integrated air heat collector has been installed at the Department of Agricultural Technology, Papua State University Manokwari to dried cocoa beans. The objectives of this research were to design solar tunnel dryer and evaluate its performance in dried cocoa beans. The result obtained was a new construction of solar tunnel dryer for cocoa beans with dimensions 6 m of length and 0,9 m of wide. The dryer completed with photovoltaic module to drive the blowers of hot drying air. Performance test of the dryer showed that drying of 10 kg of cocoa beans with initial moisture content about 70% wet basis needed 13 hours of drying time to achieved final moisture content about 7,17% wet basis. The drying time achieved was faster compared than traditional solar drying that needed 20 hours of drying time. The maximum temperature achieved in drying chamber was 60 °C.

[Keywords : Drying, Solar tunnel dryer, photovoltaic module, Cocoa beans]