

Enhancing cocoa bean quality through improved post-harvest drying in Trinidad and Tobago

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Abstract

Trinidad and Tobago is a fine flavor cocoa (*Theobroma cacao* L.) producing country making the high-end chocolate industry and premium market prices accessible. To retain a competitive edge in this market, maintaining a high-quality product is essential. Post-harvest drying of cocoa beans is one of the critical steps affecting the moisture content, acidity, and sensory quality metrics. Among several methods used for post-harvest drying, the open-air sun-drying methods remains the most widely used globally, as well as locally via the use of traditional cocoa houses. The unpredictability of the weather conditions and lack of control of the drying conditions lead to post-harvest drying losses, inconsistent quality, and loss of farmer income. This study aims to develop a suitable drying regime for cocoa in Trinidad that can improve and maintain the quality of dried beans, having gained an understanding of the effect of drying rates on quality under various drying conditions. Greenhouse drying has been identified as a method to mitigate the negative impacts of the ambient weather. In this work, the effects of a new greenhouse dryer design with and without upward throughflow forced convection on the drying dynamics and cocoa quality are investigated. These results are also benchmarked against open-air drying. The greenhouse and forced convection drying techniques were found to increase the drying rate and affect the pH profiles of the beans. This shows that these techniques can be used to control the drying conditions and improve the quality and value of cocoa beans.