

The Packed Bed Drying Characteristics of Cocoa Beans

Alejanndro Bravo Charcap^a and David R. McGaw^{b,Ψ}

^aDepartment of Chemical Engineering, The National University of the Center of Peru, Mariscal Castilla, Peru

^bDepartment of Chemical Engineering, The University of the West Indies, St Augustine Trinidad and Tobago, West Indies

^Ψ Corresponding Author

Abstract: Experiments were carded out on the drying of cocoa beans in a packed bed, in order to determine their drying characteristics, The air temperature used in the experiments 135°F, was the maximum possible consistent with the desired biochemical changes. Superficial bed air velocities, V , were varied in the range 8 to 18ft/minute, and bed depths, h , in the range 2 to 10 inches. The following relationship was derived from the results, this being an equation for the time required to dry cocoa beans to 6.4% moisture, dry basis, θ_T , interms of the initial moisture content, X_o , dry basis and the variables quoted: $\theta_T = \{(X_o - 0.3) / \exp (-2.8482 + 0.0277V - 0.1154h)\} + 22$. An optimisation calculation was carried out, on the basis of this equation, which showed that the running costs reduced progressively with reducing air velocity. The optimum bed depth was ten inches.

Keywords: Drying characteristics, cocoa beans, packed bed