Drying characteristics of cocoa bean in a swirling fluidized bed dryer: An experimental study

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Abstract:
Drying is a process to reduce the weight for easy transportation and enhance the shelf life of product without quality losses over an extended period of time. Cocoa bean is an agricultural product that contains high moisture. The drying process of cocoa bean was conducted by two methods which are conventional method and swirling fluidized bed dryer. The conventional method is by drying under the sunlight. By using swirling fluidized bed dryer, it can shorten the time where heater is used to supply heat in this experiment. This fluidized bed dryer functions by the addition of design of air distributor used in the experiment. The distributor installed to improve mixing inside the bed. Therefore, in order to minimize the cost of using high capacity blower as well as to reduce energy, viable design of air distributor which can contribute to low pressure drop and improved particulate mixing in fluidized bed is essential. A fluidized bed column of 108 mm in diameter with one slotted distributor with inclination angles of 45º is used in the experiment. We find the results by using 1kg sample for conventional method are 11 days drying time, 58.55% weight loss reduction, and 0.4145 moisture ratio. Meanwhile for swirling fluidized bed dryer the time required was 2 days, 59.16% weight loss reduction, and 0.4083 moisture ratio. Based on the results obtained, the drying by using swirling fluidized bed dryer is more efficient compare to conventional method.

Keywords: Integrated; Transcript; Optimization Technique; Query Optimization

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