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Design and Fabrication of Maize on cob Tray Dryer

D.M.T.A.L. Dissanayaka, S.M. Marasinghe, P.K.M. Rajapaksha, R.M.E.C Sandeepa, T.K.K.S. Pathmasiri and K.T.K.M. De Silva

University of Ruhuna

Abstract

Maize (corn) is an important staple crop in Sri Lanka, and preserving it for storage and further processing is crucial for food security and income generation for small-scale farmers. Maize is grown in many regions of the country and is harvested twice a year. But nowadays, farmers cultivate maize several times yearly with water and fertilizers. Sri Lanka produces about 250,000 metric tonnes of maize and has a national requirement of 600,000 MT. Drying maize-on-cob is one of the most important steps in preserving the crop, as it removes excess moisture, which can cause mould growth and spoilage. However, traditional drying methods, such as natural air-drying and sun-drying on rooftops or other elevated surfaces, can take several days to a week and highly depend on weather conditions. In this project, we design and fabricate a maize-on-cob tray dryer, a type of drying equipment that can dry maize quickly and efficiently by reducing moisture content through proper air circulation. The dryer is designed to be simple, inexpensive and easy to use for small-scale farmers. With an extensive review of existing drying techniques, the design specifications were finalized for design, and conceptual strategies were generated. The best method with all the compatibilities among the functions was selected using a morphological chart according to the weighted object matrix. Then, the CAD models were designed. After validating all the designs, the fabrications were started, and testing was conducted to verify the functionality of the results. Fabricated dryer reduces moisture content from 32% to 12% of 750g of maize within 15 minutes. The total cost of production of the dryer was LKR 500000.

Keywords: Design, Dryer, Fabrication, Moisture, Maize

***Corresponding Author**: *kalpani@mee.ruh.ac.lk*