

Wijitra Hongsiri 2006: The Study of Cassava Tubers Cutting by Rotating Blades. Master of Engineering (Agricultural Engineering), Major Field: Agricultural Engineering, Department of Agricultural Engineering. Thesis Advisor: Assistant Professor Bharata Kunjara, M.Eng. 234 pages. ISBN 974-16-2837-4

The study of cassava tuber cutting by rotating blades consisted of 3 research topics namely, a study for determination of dust content in cassava chip production process in factories, a study of cassava tuber cutting by rotating blades in longitudinal and transverse axes and a study of cassava chip sun drying. Dust contents found from cassava tuber cutting by conventional disk chopping machine to chip sun drying on concrete floor to get less than 14% moisture content (w.b.) in 3 days were in the range of 10.16-11.91% (by mass) which was mainly due to the disk chopping machine. Results of the study of fresh cassava tubers cutting by rotating blades in longitudinal axis at the rotating speeds of 290-517 rpm showed that torques and rotational speeds exhibited simple linear relationship ( $R^2$  in the range of 0.89-0.99) which torque decreased as rotational speed increased. When cutting large and small tubers, torques were maximum and minimum in the range of 4.8-11.4 Nm and 2.5-5.1 Nm. Also, when cutting large and small tubers, cutting losses were minimum and maximum in the range of 0.54-0.57% and 1.00-1.16%. Fractures in the transverse and longitudinal sections were predominantly found in the chips when cutting large tubers. Results of the study of fresh cassava tubers cutting by rotating blades in transverse axis at three blades spacings, 1.5, 1.8 and 2.0 cm respectively, and at the rotating speeds of 413-651 rpm showed that torques and rotational speeds exhibited simple linear relationship ( $R^2$  in the range of 0.87-0.99) which torque decreased as rotational speed increased. When cutting large and small tubers, torques were maximum and minimum in the range of 15.33-16.47 Nm and 4.93-6.51 Nm. Also, when cutting large and small tubers, chips having correct size were maximum and minimum in the range of 85.52-89.55% and 79.92-87.92%. Chips having correct size increased as blades spacings increased. Small fragments of cassava chips and cutting loss were maximum in the range of 3.19-4.89% and 0.85-1.63% when cutting large tubers and were minimum in the range of 2.09-3.82% and 0.63-1.09% when cutting small tubers. Small fragments of cassava chips and cutting loss decreased as blades spacings increased. Results of the thin layer drying of cassava chips obtained after cutting by rotating blades in longitudinal and transverse axes using solar energy on concrete floor showed that the cassava chips initial moisture content of 125-135% (d.b.) decreased to 11.50-21.81% (d.b.) within 3 days. The blades spacings and tuber sizes were significant factors affecting the drying of the cassava chips. The final moisture contents of the cassava chips originated from the cutting by the three blades spacings and from the different tuber sizes were statistically different. However, there was no interaction between blades spacings and tuber sizes. Optimum blades spacing for transverse cutting was 1.8 cm. The Henderson and Pabis model ( $MR = ae^{-kt}$ ) was found to be the most suitable model for expressing changes in moisture ratio of the cassava chips in each day during thin layer sun drying for 3 days. The experimental moisture ratios and the predicted values were agreed very closely ( $R^2$  in the range of 0.9990-0.9998).

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