Title Development of a Cassava Peeling Machine for Cottage Industries

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Abstract

Timely processing of cassava tubers is important to prevent post harvest losses and ensure food quality. Several processing operations have been mechanised in the production line of cassava products. Peel removal, which used to be a major bottleneck, is receiving attention from design engineers in Nigeria, China and Brazil. Equipment for cassava peeling is now available for small, medium and large scale cassava processors. However, majority of cassava processors in Nigeria operate cottage industries. Cottage industries in developing countries are generally characterised by low capital investment, manual labour, low production capacity and hence low income. Although cottage industry offers great advantage for developing countries in terms of employment opportunities, it is the most neglected from the viewpoint of credit facilities and mechanisation. In this study a cassava peeling machine for cottage industries was developed and tested. The cassava peeler consists of a 0.75 kW electric motor, a rotary drum fitted with knives (5cm long) and a protective hood. This prototype was first demonstrated at the joint African Union-Economic Commission for Africa exhibition in Addis Ababa, Ethiopia. Its simplicity, adaptability, potentials and low cost attracted African leaders as well as captains of industries. The machine operates on the principle of shear force at relatively high angular velocity of the rotary knife edge. The rate of peeling with the machine was in the range of 45 kg/h to 80 kg/h. Lower values occurred with lower operator's skill, poor tuber orientation during the peeling process and lower tuber diameter of < 6cm. Machine capacity was also influenced by moisture content of tubers and variations in length and diameter. These values were higher than those obtained during manual peeling which varied from 20.3 kg/h to 23.3 kg/h and averages 20.3 kg/h. The proportion of peel in the cassava roots ranges from 0. 04 to 0.12 and averages about 0.15. The cost of the prototype was estimated at N 13,500 (100 US dollars) but the cost of the proposed commercial model was estimated at N 10,000 (74 US dollars). The machine operates best between a rotary speed of 1000 and 1400 rpm.