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“Agricultural development within the rural-urban continuum”

An Automated Peeling Machine for Large Scale Industries

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Abstract

Cassava and other tuber crops form the major staple in sub-Saharan Africa and are very useful in agro and agro-allied industries. One major problem in the processing of cassava is peeling, which is occasioned by variation in tuber sizes, peel thickness and shape. Farmers often plant many tuber crops and may find it difficult to buy different peeling machines for each crop. In this study a multipurpose peeling machine was designed, fabricated and made ready for commercial production. The machine impacts rotary motion on the tubers and through shear and/or abrasion effect the required peeling of the tubers. Its major advantages include simplicity in design, utilisation and maintenance and relatively cheap procurement cost. The machine was fabricated from local materials which consist of a tuber inlet, trimming device, tuber metering device, peeling tool, 7Hp Engine, outlet and protective hood. Tubers were presented in three categories of both length and diameter. Length of 20 – 25 cm and diameter of 8 – 10 cm produced an efficiency of 79.5 % and a capacity of 95 Kg/hr respectively at a brush speed of 1200 rpm and auger speed of 150 rpm. The functional efficiency (Peeling efficiency) was highest in cocoyam but lowest in cassava. However minimum efficiency of 75.5 % was recorded with cassava peeling and a maximum peeling efficiency of 95.2 % was obtained with cocoyam. Other parameters affecting the performance of the machine include, auger speed, brush speed and moisture content of tubers. The speed of the metering device influenced the peeling process significantly at constant or variable speeds of the auger and brush. The speed of the metering device determines the residence time of the auger in the peeling chamber. Tuber damage and peeling efficiency were also influenced by the speed of the metering device. The machine is recommended for immediate commercialisation and utilisation for large scale entrepreneurs.

Keywords: Automated, cassava peeling machine, large scale industries