

Title Development of a young coconut fruit trimming machine
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Abstract

A project was initiated to design, construct, test, and evaluate a prototype young coconut trimming machine. The purpose of the design was to trim most of the outer husk so that the coconut looked attractive and could easily be cut open. The prototype was based on the lathe cutting machine mechanism and was composed of a lathe machine with a body-trimming knife, a shoulder-trimming knife, a base cutting knife, and clamping mechanisms. In operation, the body knife first pared the midsection of the fruit. Following this, the shoulder-knife trimmed the top to form a conical shape, and finally the base cutting knife sliced the bottom of the fruit to form a flat underside. In this study, the key design parameters and their optimum settings were determined. The angle between the cutting edge of the body knife and the Y -axis perpendicular to the rotating axis of the fruit (X -axis) was 76° ; the angle between the cutting edge of the shoulder-knife and the X -axis was 56° ; and the knife angle between the knife and the XY -plane was 61° . The rotating speed of the fruit – which was newly harvested – was 300 rpm. Based on these design parameters, a commercial prototype was manufactured and tested. This prototype has the capacity to trim 21 fruit/h, with the finished product on average containing 1.1% of untrimmed green area and 0.2% of fibrous area. The trimmed fruit were accepted by fruit traders and exporters.