

Design and development of a coconut crust removing machine to support the Sri Lankan small and medium enterprises (SME) for the production of white coconut oil and shredded coconut

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Abstract

Coconut can be introduced as a plant having a higher value agriculturally, economically and consider as one of the main exporting items that support the Sri Lankan Gross Domestic Product (GDP). According to the 2019 Central Bank report, Sri Lanka has exported coconut production about 3085.6 million nuts and the contribution for the GDP is 0.7%. These data show that Sri Lanka is growing its income from exporting coconut-based products. The research aims to develop a machine mainly targeting the production of white coconut oil and shredded coconut, especially for biscuits and chocolate. The machine can be utilized to replace the labour involved in unsafe methods to remove the coconut crust in the process while increasing the production rate. As per the observations, even skilled people get injured because of the hand-operated peeling practice. The developing machine is capable of removing the crust on the outside of the coconut and copra in 20-30 seconds. The main benefit of the developing machine is, parallel ten coconuts can be peeled (at the end of the development) and that will increase the production rate of the process and the profit. Further, the other objectives of the research develop an affordable and ergonomically suited machine to ensure the safety of the operators, easiness of maintenance and adoption of the process, and reduction of wastage. Not only that, the expected payback period of the machine is lesser than 1.5 years. So far, the prototype is developing for one coconut and in the next step of the research, it is scheduled to extend for ten parallel coconuts and hand it over to a company for trial as a pilot project. The ultimate expectation is to contribute to the increment of local productivity of SME in the coconut industry while reducing human enrolment of high fatigue activities.

Keywords: Coconut crust removing, Ergonomics, Shredded coconut, SME, White coconut oil

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