

Suttiporn Niamhom 2008: Development of Betel Nut Husking Machine. Doctor of Philosophy (Postharvest Technology), Major Field: Postharvest Technology, Interdisciplinary Graduate Program. Thesis Advisor: Professor Bundit Jarimopas, D.Sc. 74 pages.

The research was to a) determine physical and mechanical properties of dry betel nut and b) develop a prototype betel nut husking machine. Methodology comprised of a) determination of moisture, dimension, weight, rupture forces of dry betel nut and b) design, construct, test and evaluate a prototype betel nut husking machine. Design concept was that husking was obtained by tearing out the husk of the dry nut fruit with different dynamic friction forces existing on the opposite sides of the nut under the normal pressure. The prototype featured hopper feeding dry betel nut fruit, husking mechanism and power drive. The husking mechanism was composed of two rubber tires hinged under and adjacently parallel to the sieve which made of steel rods. In operation, betel nut fruit was fed into the space between running tire surface and the sieve surface of the husking mechanism. Because of different friction forces at the contacts between fruit surface and sieve surface, and fruit surface and tire surface, shearing occurred to crack the fruit husk at the first tire. Husk and nut were further separated by rehusking at the second tire. Results showed that a) The moisture, dimension and weight of dry betel nut fruit decreased with respect to, sun drying time. Their associated relationship could be expressed by regression models. The rupture force of dry betel nut and fruit increased with the drying time. b) the proper machine conditions were characterized by tire pressure of 138 KPa, tire speed of 440 rpm, spacing between the tire surface and the sieve surface of 15 mm, c) the proper betel nut fruit moisture content was 6.31% wb. Performance test of the prototype based on the optimum settings revealed that husking mixed size fruit could produce the full nut of 64.4%, the broken nut of 15.2%, the unhusked fruit of 20.5% at the production efficiency of 76.9%.

Student's signature

Thesis Advisor's signature

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