

ABSTRAK

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Jurusan : Teknik Mesin
Program Studi : Diploma Tiga Teknik Mesin
Judul Laporan Akhir : Rancang Bangun Mesin Perajang Singkong Menggunakan Sistem Pisau Putar Dengan Penggerak Motor Listrik (Pengujian).

(2026: xiv + 65 Halaman, 40 Gambar, 10 Tabel + 8 Lampiran)

Proses perajangan singkong pada usaha mikro, kecil, dan menengah (UMKM) umumnya masih dilakukan secara manual sehingga kapasitas produksi rendah, ketebalan hasil rajangan kurang seragam, serta membutuhkan waktu dan tenaga kerja yang lebih besar. Kondisi tersebut menyebabkan produktivitas dan kualitas hasil produksi belum optimal sehingga diperlukan penerapan teknologi tepat guna untuk meningkatkan efisiensi proses perajangan. Penelitian ini bertujuan untuk merancang, membuat, dan menguji kinerja mesin perajang singkong menggunakan sistem pisau putar dengan penggerak motor listrik berdaya 0,5 HP. Mesin dirancang menggunakan rangka besi siku berukuran $35 \times 35 \times 2$ mm, piringan pisau berdiameter 270 mm, poros berdiameter 15 mm, serta sistem transmisi *pulley* dengan rasio 3,18:1 yang mereduksi putaran motor dari 1400 rpm menjadi 440 rpm pada poros pisau. Metode penelitian meliputi tahap perancangan, pembuatan, perakitan, dan pengujian kinerja mesin. Pengujian dilakukan sebanyak tiga kali ulangan menggunakan bahan baku singkong masing-masing 200 gram. Parameter yang diamati meliputi kapasitas produksi, ketebalan hasil rajangan, keseragaman ketebalan, persentase rajangan baik, dan kehilangan bahan selama proses perajangan. Hasil pengujian menunjukkan bahwa mesin menghasilkan kapasitas rata-rata 50,3 kg/jam atau meningkat sekitar 2,5 kali dibandingkan metode manual yang hanya mencapai 20 kg/jam. Ketebalan rata-rata hasil rajangan sebesar 0,95 mm dengan tingkat keseragaman mencapai 95%. Persentase rajangan berkualitas baik mencapai 86%, sedangkan kehilangan bahan hanya sebesar 2,5%, lebih baik dibandingkan metode manual yang menghasilkan rajangan baik sebesar 70–75% dengan kehilangan bahan sebesar 5–8%. Mesin juga dilengkapi *cover* pelindung dan sistem kelistrikan yang aman sehingga memenuhi aspek keselamatan dan kesehatan kerja (K3). Berdasarkan hasil penelitian, mesin ini layak diterapkan pada UMKM karena mampu meningkatkan produktivitas, kualitas hasil rajangan, efisiensi proses produksi, dan keamanan kerja operator.

Kata Kunci: Mesin perajang singkong, pisau putar, motor listrik, UMKM

ABSTRACT

Design and Development of a Cassava Slicing Machine Utilizing a Rotary Blade System with Electric Motor Drive (Experimental Testing)

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The cassava slicing process in most Micro, Small, and Medium Enterprises (MSMEs) is still carried out manually, resulting in low production capacity, inconsistent slice thickness, and greater labor and processing time requirements. These conditions reduce productivity and product quality, highlighting the need for appropriate technology to improve the efficiency of the slicing process. This study aimed to design, manufacture, and evaluate the performance of a cassava slicing machine using a rotary blade system driven by a 0.5 HP electric motor. The machine was constructed using a $35 \times 35 \times 2$ mm angle iron frame, a 270 mm diameter rotary blade disc, a 15 mm diameter shaft, and a pulley transmission system with a 3.18:1 ratio, reducing the motor speed from 1,400 rpm to 440 rpm at the blade shaft. The research method consisted of the design, fabrication, assembly, and performance testing stages. Performance tests were conducted in three replications using 200 g of cassava for each trial. The evaluated parameters included production capacity, slice thickness, thickness uniformity, percentage of good-quality slices, and material loss during the slicing process. The test results showed that the machine achieved an average production capacity of 50.3 kg/h, representing an approximately 2.5-fold increase compared to the manual method, which produced only 20 kg/h. The average slice thickness was 0.95 mm with a uniformity level of 95%. The percentage of good-quality slices reached 86%, while material loss was only 2.5%, outperforming the manual method, which produced 70–75% good-quality slices with material losses ranging from 5% to 8%. The machine was also equipped with a protective cover and a safe electrical system, meeting occupational health and safety requirements. Based on the test results, the developed cassava slicing machine is suitable for application in MSMEs as it improves productivity, slicing quality, production efficiency, and operator safety.

Keywords: *Cassava slicing machine, rotary blade, electric motor, MSMEs*