

**RANCANG BANGUN MESIN PERONTOK
BUNGA JANTAN KELAPA SAWIT (*Elaeis
guineensis* Jacq.)**



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ABSTRAK

Kegiatan perontokan bunga jantan kelapa sawit merupakan tahapan penting dalam proses *assisted pollination* untuk meningkatkan produksi tandan buah segar. Namun, proses perontokan yang masih dilakukan secara manual membutuhkan tenaga besar, waktu yang lama, serta menghasilkan efisiensi kerja yang rendah. Kondisi ini menunjukkan perlunya inovasi alat yang mampu mempercepat proses perontokan secara efektif dan aman. Penelitian ini bertujuan untuk merancang, membuat, dan menguji mesin perontok bunga jantan kelapa sawit berbasis Motor listrik DC 24 V dengan sistem transmisi puli dan *v-belt*. Pengujian dilakukan terhadap kapasitas kerja, rendemen, kerusakan hasil, frekuensi putar, serta tingkat kebisingan sebagai indikator kinerja mesin. Hasil pengujian menunjukkan bahwa mesin memiliki kapasitas kerja 0,97 kg/jam pada perlakuan 1, 0,83 kg/jam perlakuan 2, 0,79 kg/jam perlakuan 3, rendemen 87,9% perlakuan 1, 88,6% perlakuan 2, 84,1% perlakuan 3, dan kerusakan hasil 0,5% perlakuan 1, 0,67% perlakuan 2, 0,73% perlakuan 3. Frekuensi putar mesin mencapai 795,29 rpm tanpa beban dan 657,15 rpm dengan beban, sedangkan tingkat kebisingan sebesar 72,6 dB berada di bawah ambang batas aman. Analisis ekonomi menunjukkan biaya pokok produksi sebesar Rp 2.571/kg dan BEP 306,2 kg/tahun. Berdasarkan hasil tersebut, mesin perontok ini dinilai efektif, efisien, aman, dan layak secara teknis maupun ekonomis untuk mendukung kegiatan penyerbukan buatan pada perkebunan kelapa sawit.

Kata Kunci: assisted pollination, analisis ekonomi, bunga jantan, kelapa sawit, mesin perontok.

DESIGN AND CONSTRUCTION OF A MACHINE FOR THRESHING MALE FLOWERS OF OIL PALM (*Elaeis guineensis* Jacq.)

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ABSTRACT

The threshing of oil palm male flowers is a crucial step in the assisted pollination process to increase fresh fruit bunch production. However, the threshing process, which is still carried out manually, requires a lot of energy, takes a long time, and results in low work efficiency. This condition indicates the need for innovative tools that can accelerate the threshing process effectively and safely. This study aims to design, build, and test an oil palm male flower threshing machine based on a 24 V DC electric motor with a pulley and v-belt transmission system. Tests were carried out on work capacity, yield, product damage, rotational frequency, and noise levels as indicators of machine performance. The test results showed that the machine had a working capacity of 0.97 kg/hour in treatment 1, 0.83 kg/hour in treatment 2, 0.79 kg/hour in treatment 3, a yield of 87.9% in treatment 1, 88.6% in treatment 2, 84.1% in treatment 3, and yield damage of 0.5% in treatment 1, 0.67% in treatment 2, 0.73% in treatment 3. The machine rotation frequency reached 795.29 rpm without load and 657.15 rpm with load, while the noise level of 72.6 dB was below the safe threshold. Economic analysis showed that the basic production cost was Rp 2,571/kg and BEP 306.2 kg/year. Based on these results, this thresher machine was considered effective, efficient, safe, and technically and economically feasible to support artificial pollination activities in oil palm plantations.

Keywords: assisted pollination, economics analysis, male flowers, oil palm, thresher.