

ABSTRAK

Nama Mahasiswa : Faisal Faturrahman
NPM : 062330200325
Jurusan : Teknik Mesin
Program Studi : Diploma Tiga Teknik Mesin
Judul Laporan Akhir : Rancang Bangun Mesin *Mixer* Minyak Jelantah
Menjadi Sabun Cair dengan Kapasitas 10 Liter
(Proses Pembuatan)

(2026: xiii + 50 Halaman, 12 Gambar, 8 Tabel + 17 Lampiran)

Minyak jelantah merupakan limbah rumah tangga yang berpotensi mencemari lingkungan apabila tidak diolah dengan baik. Pembuangan minyak jelantah secara langsung ke saluran air atau tanah dapat menyebabkan pencemaran lingkungan serta mengganggu kualitas ekosistem. Salah satu upaya pemanfaatan limbah tersebut adalah mengolahnya menjadi sabun cair yang memiliki nilai ekonomi lebih tinggi. Penelitian ini bertujuan merancang dan membuat mesin mixer minyak jelantah menjadi sabun cair berkapasitas 10 liter yang mampu menghasilkan pencampuran secara efektif dan homogen. Metode yang digunakan meliputi tahap perancangan, perhitungan teknis, pembuatan komponen, perakitan, dan pengujian alat. Perancangan mesin dilakukan menggunakan perangkat lunak CAD sehingga setiap komponen dapat dibuat sesuai ukuran dan spesifikasi yang telah ditentukan. Mesin terdiri atas rangka, tangki berbahan stainless steel, poros, impeller, kopling, sistem penjepit, dimmer sebagai pengatur kecepatan, dan motor listrik 120 Watt sebagai penggerak utama. Material stainless steel dipilih pada bagian tangki dan impeller karena memiliki ketahanan terhadap korosi serta sesuai untuk proses pencampuran bahan kimia. Hasil perhitungan menunjukkan kebutuhan daya sebesar 0,100 HP dan diameter minimum poros 4,26 mm, sehingga spesifikasi yang digunakan dinilai aman dan mampu menahan beban kerja selama proses pengadukan. Hasil pengujian menunjukkan mesin dapat beroperasi dengan baik, menghasilkan pencampuran yang homogen, serta seluruh komponen bekerja secara terpadu tanpa mengalami kendala selama proses pengujian. Dengan demikian, mesin mixer yang dirancang diharapkan dapat menjadi alternatif alat pengolahan minyak jelantah menjadi sabun cair secara efektif, efisien, dan ekonomis, meningkatkan nilai tambah limbah, mendukung kegiatan usaha skala rumah tangga maupun UMKM, serta berkontribusi dalam upaya pengurangan pencemaran lingkungan dan penerapan konsep ekonomi sirkula.

Kata kunci: minyak jelantah, mesin *mixer*, sabun cair, perancangan mesin, teknologi tepat guna.

ABSTRACT

***Design and Construction of a Mixing Machine for Used Cooking Oil into
Liquid Soap with a Capacity of 10 Liters
(Making Process)***

(2026: xiii + 50 pp. + 12 Figures + 8 Tables + 17 Attachments)

Faisal Faturrahman
NPM. 062330200325

DIPLOMA–III MECHANICAL ENGINEERING STUDY PROGRAM
MECHANICAL ENGINEERING DEPARTMENT
STATE POLYTECHNIC OF SRIWIJAYA

Used cooking oil is a household waste product that has the potential to pollute the environment if not properly managed. Disposing of used cooking oil directly into drainage systems or onto the ground can cause environmental pollution and degrade ecosystem quality. One approach to utilizing this waste is to process it into liquid soap, which has a higher economic value. This study aims to design and fabricate a 10-liter capacity mixer machine for processing used cooking oil into liquid soap, capable of producing effective and homogeneous mixing. The research method consisted of the design, technical calculation, component fabrication, assembly, and performance testing stages. The machine was designed using Computer-Aided Design (CAD) software to ensure that each component was manufactured according to the specified dimensions and technical requirements. The machine consists of a frame, a stainless steel mixing tank, a shaft, an impeller, a coupling, a clamping system, a dimmer for speed control, and a 120-Watt electric motor as the main driving unit. Stainless steel was selected for the mixing tank and impeller due to its corrosion resistance and suitability for mixing chemical materials. The calculation results indicate that the required power is 0.100 HP and the minimum shaft diameter is 4.26 mm, demonstrating that the selected specifications are safe and capable of withstanding the operational load during the mixing process. Performance testing showed that the machine operated properly, produced homogeneous mixing, and that all components functioned in an integrated manner without any issues during testing. Therefore, the designed mixer machine is expected to serve as an effective, efficient, and economical alternative for processing used cooking oil into liquid soap, increasing the added value of waste, supporting household-scale and small and medium-sized enterprises (SMEs), and contributing to environmental pollution reduction as well as the implementation of the circular economy concept.

Keywords: waste cooking oil, mixer machine, liquid soap, machine design, appropriate technology.