

PERANCANGAN PROTOTIPE MESIN SEMPROT HAMA PERTANIAN DENGAN BAHAN BAKU LIMBAH KOMPRESOR KULKAS 1/8 PK

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ABSTRAK

Penelitian ini bertujuan untuk mengembangkan prototipe alat semprot hama pertanian berbasis limbah kompresor mesin pendingin dengan kapasitas 1/8 PK, mengetahui tingkat kelayakan produk berdasarkan penilaian para ahli, serta mengetahui tingkat kepraktisan alat berdasarkan hasil uji coba pada kelompok kecil dan kelompok besar ke petani. Metode yang digunakan dalam penelitian ini adalah *Research and Development* (R&D) dengan model pengembangan 4D yang meliputi tahap *Define, Design, Develop, dan Disseminate*. Produk yang dihasilkan berupa alat semprot hama pertanian yang portabel yang memanfaatkan limbah kompresor kulkas sebagai sumber tekanan utama, dilengkapi dengan tangki pestisida, aki motor, inverter, selang, stik dan *nozzel*, dan rangka penyangga sehingga mudah digunakan di lahan pertanian. Pengumpulan data dilakukan melalui validasi oleh ahli desain produk, ahli manufaktur, serta uji kepraktisan yang melibatkan petani dalam kelompok kecil dan kelompok besar. Hasil penelitian menunjukkan bahwa prototipe alat semprot hama pertanian memperoleh tingkat kelayakan sebesar 98,57% berdasarkan penilaian ahli desain produk dan 92,30% berdasarkan penilaian ahli manufaktur, sehingga termasuk dalam kategori sangat layak. Sementara itu, hasil uji kepraktisan menunjukkan persentase rata-rata 83,06% pada kelompok kecil dan 84,73% pada kelompok besar, yang termasuk dalam kategori sangat praktis. Berdasarkan hasil tersebut, prototipe alat semprot hama pertanian dengan memanfaatkan limbah kompresor kulkas 1/8 PK dinyatakan sangat layak dan sangat praktis untuk digunakan dalam proses penyemprotan, efisiensi waktu kerja, serta mendukung pemanfaatan limbah mesin pendingin secara lebih bernilai guna.

Kata Kunci : alat semprot pertanian, limbah mesin pendingin, kompresor bekas, teknologi tepat guna.

DESIGN OF A PROTOTYPE AGRICULTURAL PEST SPRAYER USING WASTE PARTS FROM A 1/8 PK REFRIGERATOR COMPRESSOR

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ABSTRACT

This study aims to develop a prototype of an agricultural pest sprayer based on waste from a 1/8 PK refrigeration compressor; to determine the product's feasibility based on expert evaluations, and to assess the device's practicality based on the results of pilot tests conducted with small and large groups of farmers. The method used in this study was Research and Development (R&D) using the 4D development model, which includes the Define, Design, Develop, and Disseminate stages. The resulting product is a portable agricultural pest sprayer that utilizes waste air from a refrigerator compressor as its primary pressure source. It is equipped with a pesticide tank, a motorcycle battery, an inverter, a hose, a spray wand, a nozzle, and a support frame, making it easy to use in agricultural fields. Data collection was conducted through validation by product design experts and manufacturing experts, as well as practicality tests involving farmers in both small and large groups. The research results showed that the prototype of the agricultural pest sprayer achieved a feasibility rating of 98.57% based on the assessment by product design experts and 92.30% based on the assessment by manufacturing experts, thus falling into the "highly feasible" category. Meanwhile, the practicality test results showed an average percentage of 83.06% for the small group and 84.73% for the large group, which fall into the "highly practical" category. Based on these results, the prototype of an agricultural pest sprayer utilizing waste from a 1/8 PK refrigerator compressor is deemed highly feasible and very practical for use in the spraying process, improving work efficiency, and supporting the more valuable utilization of waste from refrigeration units.

Keywords: agricultural sprayers, air conditioner waste, used compressors, appropriate technology.