

ABSTRACT

High feed costs are one of the main challenges faced by small- and medium-scale poultry farmers. One approach to reducing production costs is to produce feed independently through the grinding and mixing of raw materials. This study aimed to design a portable poultry feed grinding and mixing machine that integrates disc mill and mixer functions into a single unit, as well as to analyze its production capacity, energy consumption, grinding fineness, feed homogeneity, portability, and economic value.

The research employed the Engineering Design Research (EDR) method, consisting of needs analysis, literature review, design specification determination, conceptual design, design calculations, technical drawing using SolidWorks, and design analysis and evaluation. The results showed that the machine successfully integrated disc mill and mixer functions using a single drive motor. The machine has dimensions of $30 \times 30 \times 40$ cm, a weight of 8.025 kg, a container volume of 28.26 liters, an effective working volume of 19.78 liters, and an effective material capacity of 10.88 kg. The production capacity reached a minimum of 10 kg/hour with an average processing time of 102 seconds.

The machine uses a 200.2-watt electric motor with an energy consumption of 0,72 -16,67 kWh. The grinding process achieved a fineness level of $\geq 70\%$ passing through a 60-mesh sieve, while feed homogeneity reached $\geq 70\%$. The estimated design cost of the machine was IDR 935,000. Therefore, the designed machine is compact, lightweight, energy-efficient, and economical, making it potentially suitable for supporting independent poultry feed processing in small- and medium-scale farms.

Keywords: Machine Design, Disc Mill, Mixer, Poultry Feed, Portable