

REDUCING THE ENVIRONMENTAL IMPACTS OF YELLOW NOODLE PRODUCTION AT UD TANI MULIA

Final Project

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**DEPARTMENT OF INDUSTRIAL ENGINEERING
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UNIVERSITAS ANDALAS

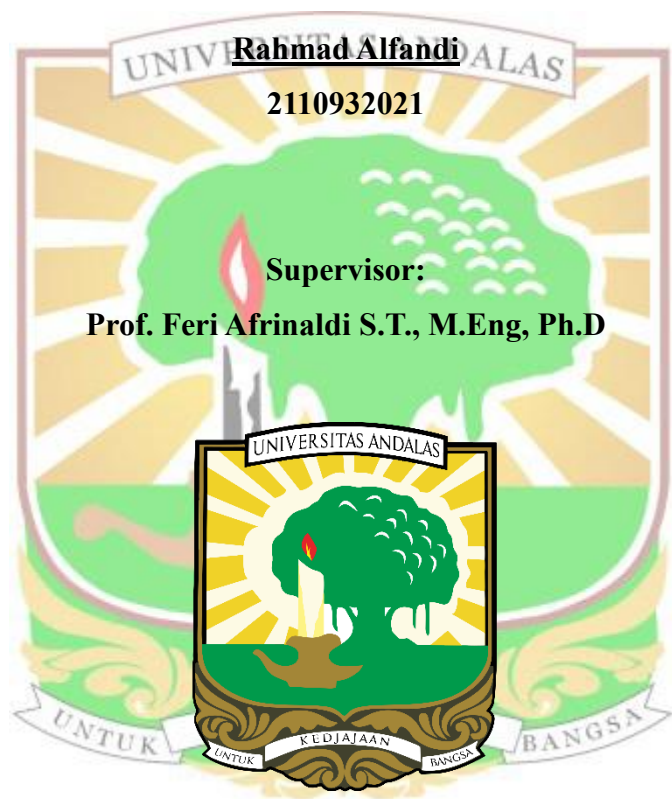
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in Industrial Engineering, Faculty of Engineering, Universitas Andalas*



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ABSTRACT

Environmental issues such as global warming and air pollution have become global challenges requiring serious attention, including in Indonesia. The manufacturing sector, including the yellow noodle industry, significantly contributes to greenhouse gas emissions (CO₂-e). With yellow noodle consumption in Indonesia reaching 110 million kg by 2023, it is crucial to evaluate the environmental impacts generated during the production process. This study analyzes the environmental impacts of yellow noodle production at UD Tani Mulia using the Life Cycle Assessment (LCA) approach in accordance with ISO 14040 standards.

The study adopts the “Gate to Gate” method, covering stages from raw material transportation to the final product ready for distribution, with 100 kg of yellow noodles as the functional unit. Primary data were obtained through direct observations and interviews, while secondary data included information on energy consumption and emissions. Analysis was conducted using OpenLCA software with the CML-IA method to identify production stages contributing the most to environmental impacts.

The results show significant impacts across several categories: Abiotic Depletion (1025.52 MJ), Global Warming (158.88 kg CO₂-eq), Water Use (239.91 L), Solid Waste (45.21 kg), and Photochemical Oxidation (0.0567 kg C₂H₄-eq). The steaming process, currently using waste lubricating oil, is identified as the primary hotspot. In terms of fuel alternatives, LPG is the most environmentally friendly with the lowest emissions (79,369.98 kg CO₂-e) but the highest cost (IDR 204,916,503.98/year). Biodiesel offers a balanced option with moderate emissions (95,929.78 kg CO₂-e) and lower cost (IDR 99,363,885.73/year), while used oil is the cheapest (IDR 40,000,000/year) but has high emissions (113,509.20 kg CO₂-e). Briquettes are the least favorable, with high emissions (113,509.20 kg CO₂-e) and the highest cost (IDR 215,402,000/year). From a productivity perspective, switching to LPG increases productivity by 12.06%, and get payback period investment in 1,22 month.

Keywords: Life Cycle Assessment, yellow noodles, Emission, OpenLCA, ISO 14040

