

**EVALUATION OF JACKFRUIT SKIN BIOMASS PELLET
QUALITY BASED ON SNI 8675:2018 AND TOP-LIT UPDRAFT
BIOMASS STOVE PERFORMANCE BASED ON SNI 7926:2013**

UNDERGRADUATE THESIS

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ABSTRACT

The application of the Top-Lit Up Draft (TLUD) biomass stove is recognized as one of the promising technologies to efficiently utilize Indonesia's abundant biomass resources in a sustainable and environmentally friendly manner. West Sumatra produces jackfruit in large quantities, resulting in the abundant production of unused jackfruit skin that can serve as biomass fuel. This research was conducted to evaluate the quality of jackfruit skin biomass pellets in accordance with SNI 8675:2018, determine the emission factors of Particulate Matter 2.5 (PM_{2.5}), carbon monoxide (CO), and carbon dioxide (CO₂) during combustion in a TLUD biomass stove, and assess the stove performance based on SNI 7926:2013. The pellets were produced from jackfruit skin without the addition of binders, allowing for the direct assessment of their inherent properties. Results indicate that the jackfruit skin biomass pellets meet the reference values in SNI 8675:2018 with a calorific value of 16.88 MJ/kg (4,031 kcal/kg). However, the sulfur content exceeded the maximum reference value of 0.1%. Performance evaluation of the TLUD stove demonstrated compliance with SNI 7926:2013, yielding PM_{2.5} emission factors of 252.52 ± 32.47 mg/kg, CO emissions of 6.940 ± 1.46 g/kg, and CO₂ emissions of 173.88 ± 5.07 g/kg. In addition, the stove achieved a specific fuel consumption of 0.88 ± 0.003 kg/hour, combustion efficiency of $96 \pm 0.82\%$, and thermal efficiency of $24.31 \pm 0.32\%$. Overall, these findings highlight the potential of jackfruit skin biomass pellets as renewable energy source and demonstrate the viability of TLUD stoves for clean energy applications in Indonesia.

Keywords: Biomass pellets, calorific value, emission factor, jackfruit skin, TLUD biomass stove

