

ABSTRAK

PENGARUH VARIASI KOMPOSISI BATUBARA ANTRASIT DAN KOTORAN SAPI TERHADAP KARAKTERISTIK BRIKET DENGAN PEREKAT TAPIOKA DAN *MOLASSES*

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Telah dilakukan penelitian pengaruh variasi komposisi batubara antrasit dan kotoran sapi terhadap karakteristik briket dengan perekat tapioka dan *molasses*. Penelitian bertujuan untuk mengetahui pengaruh variasi komposisi batubara antrasit dan kotoran sapi dengan perekat tapioka dan *molasses* terhadap karakteristik briket, meliputi uji proksimat, nilai kalor, serta struktur mikro. Sampel dibuat dalam enam komposisi (K1-K6) dan dianalisis menggunakan uji kadar air, volatile matter, kadar abu, fixed carbon, serta karakterisasi XRF, XRD, FTIR, dan SEM-EDS. Hasil penelitian terlihat bahwa hanya sampel K1, yaitu komposisi 70% antrasit, 20% kotoran sapi, dan perekat tapioka 10%, yang terpenuhi syarat SNI pada parameter kadar abu dan *fixed carbon* (77,7%). Nilai kalor tertinggi juga diperoleh pada sampel K1 sebesar 4.807,97 kkal/kg, meskipun masih berada di bawah standar SNI 01-6235-2000 (≥ 5.000 kkal/kg). Karakterisasi struktur mikro terlihat bahwa penambahan kotoran sapi meningkatkan kandungan mineral oksida (SiO_2 , CaO dan K_2O) yang berpengaruh terhadap kenaikan kadar abu dan penurunan nilai kalor. Dengan demikian, briket berbasis campuran antrasit dan kotoran sapi dapat digunakan, namun kualitas terbaik ditunjukkan oleh komposisi K1 dengan perekat tapioka karena memiliki kandungan karbon lebih tinggi, abu lebih rendah, serta struktur mikro yang lebih padat dibandingkan komposisi lainnya. Optimalisasi komposisi biomassa dan pemilihan perekat dengan kandungan mineral rendah direkomendasikan agar briket dapat memenuhi standar mutu nasional.

Kata kunci: Briket, Batubara Antrasit, Kotoran Sapi, Uji Proksimat, Nilai Kalor, XRF, XRD, FTIR, SEM-EDS.

ABSTRACT

THE EFFECT OF VARIATIONS IN THE COMPOSITION OF ANTHRACITE AND COW DUNG ON THE CHARACTERISTICS OF BRIQUETTES WITH TAPIOCA AND *MOLASSES* ADHESIVES

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A study on the effect of variations in the composition of anthracite and cow dung on the characteristics of briquettes with tapioca and *molasses* adhesives has been conducted. The research was carried out to determine the effects of varying compositions of anthracite coal and cow dung with tapioca and molasses binders on briquette characteristics, including proximate analysis, calorific value, and microstructural properties. Six briquette formulations (K1-K6) were prepared and evaluated through moisture content, volatile matter, ash content, fixed carbon tests, and characterized using XRF, XRD, FTIR, and SEM-EDS. The results showed that only sample K1 (70% anthracite, 20% cow dung, 10% tapioca) met the SNI requirements for ash content and fixed carbon (77.7%). The highest calorific value was also obtained from sample K1 at 4,807.97 kkal/kg, although it remained below the SNI 01-6235-2000 standard ($\geq 5,000$ kkal/kg). Microstructural analysis indicated that increasing cow dung content led to higher concentrations of oxide minerals (SiO_2 , CaO and K_2O), contributing to increased ash levels and reduced calorific values. Thus, briquettes produced from anthracite and cow dung can be utilized, but the best performance was exhibited by the K1 composition with tapioca binder due to its higher carbon content, lower ash percentage, and denser microstructure. Optimization of biomass composition and the use of low-mineral binders are recommended to achieve nationally standardized briquette quality.

Keywords: Briquettes, Anthracite Coal, Cow Dung, Proximate Analysis, Calorific Value, XRF, XRD, FTIR, SEM-EDS.