

Techno Economy of Bio-briquette from Durian Peel Based Bio-briquette Using Cassava Peel Flour Adhesive

Mohammad Basuri^{1,a}, Rismawti Rasyid^{2,b}, Nurdjannah Nurdjannah^{3,b}, La Ifa^{4,b,*}

^aMaster of Chemical Engineering Postgraduate Program, Universitas Muslim Indonesia, Jalan Urip Sumoharjo Km 05 Makassar, South Sulawesi 90231, Indonesia

^bDepartment of Chemical Engineering, Faculty of Industrial Technology, Universitas Muslim Indonesia, Jalan Urip Sumoharjo Km 05 Makassar, South Sulawesi 90231, Indonesia

*la.ifa@umi.ac.id

Durian peel waste which is difficult to decompose and not utilized properly has the potential to become a biological waste which causes environmental pollution. This research utilizes this waste to become bio-briquette as solid fuel such as bio-briquette using cassava peel flour adhesive. The implementation of this research consisted of 2 aspects, namely the manufacture of bio-briquette and testing of bio-briquette (technological aspects) and economic analysis (economic aspects). The aim of this study was to study the effect of the concentration of cassava peel flour adhesive and to study the effect of compressive strength on the characteristics of the resulting durian peel bio-briquette charcoal. Durian peel waste was first made into biochar by pyrolysis. Biochar was made into a slurry by mixing adhesive (with a concentration of 10, 15, and 20% of the total mixture. Then the mixture was put into a hydraulic press and pressed into a bio-briquette product. Bio-briquette products have potential applications in bioenergy production. The results showed that the best bio-briquette is bio-briquette at a compressive strength of 4 tons with an adhesive content of 20% by weight of biochar (Sample A3B4). The best bio-briquette characteristics include 31,39% volatile matter, 50,29% fixed carbon, 7,32% ash, 11% water, sulfur 0,116%, calorific value 5.856 cal/gr, relative density 0,65 g/cm³ and combustion rate 0,1035 gr/min. The results of the economic analysis show that the production of this bio-briquette has a Return on Investment (ROI) percentage of 32%, Pay Out Time (POT) of 2,3 years and Break Event Point (BEP) of 51%.

Keywords: durian peel waste, cassava peel flour, biochar, bio-briquette, techno-economy.