



The Hardness and Mechanical Strength Characteristic of Pre-carbonized Solid Biofuel Effected by Additional Hemicellulose

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Abstract. Biomass is an organic alternative resource, which can be used directly or converted into solid, liquid and gas stages. Solid biofuels have advantages in terms of the variety of raw material types, such as woody biomass, agricultural biomass, and food waste. Moreover, the solid biofuels is a substitution of traditional solid fossil fuels in household and power generating sectors, which prevent the increasing amount of carbon dioxide in the earth's atmosphere. The present work studies the effect of additional hemicellulose, glucomannan from Konjac tuber, on hardness and mechanical strength characteristics of Japanese cedar base pre-carbonized solid biofuels (Biocoke). These characteristics are the considerable factors related to solid biofuels transportation and application. Test samples are produced by way of laboratory scale compression machine under the controlled condition of 12 mm size mold, 463 K operating temperature, 21 MPa loading pressure, and 0.1 kg/kg-wet of Japanese cedar. The dried glucomannan powder 0, 2, 5, 8, 10, and 15 wt. %, was mixed with Japanese cedar powder as raw materials of this study. The results of Vickers hardness test via Mitutoyo hardness testing machine (Series HM-100), maximum compressive strength via SHIMADZU (UH-F2000KNA) compression machine and appearance density of biocoke from various conditions show in this present work.

Keywords: Solid Biofuels, Biocoke, Vickers Hardness, Maximum Compressive Strength