Effects of the processing on properties of biochars from rice husk and rice straw pyrolyzed from 500-1800°C
Pranuda Jivaganont*, Phontip Tammawat, Kritkaew Somton, Pimpa Limthongkul
National Metal and Materials Technology Center, Klong Luang, Pathumthani 12120, Thailand
*E-mail: pranudj@mtec.or.th

Abstract: With increasing in energy demand and the concern of by-product waste management, the conversion of biomass wastes into biochars has been considered value-added. As variability in biochars properties originated from its location as well as the processing, the initial properties check was required prior to further in-depth investigation. This study evaluated the processing of biochars from rice husk and rice straw from rice fields in Nakorn Ratchasrima, Thailand. The physical properties of the as-received state and the processed state of the precursors were compared before the pyrolysis and the characterizations. Both rice husk and rice straw were pyrolyzed at the temperatures ranged from 500°C to 1800°C, where biochars were expected to possess amorphous structure. The raw precursors were treated with NaOH and HCl prior to the pyrolysis in order to obtain biochars with higher purity. Biochars with and without the treatment were compared their properties. Various carbon structures and phases were observed via Scanning Electron Microscopy (SEM) and X-ray diffractometry (XRD). Transmission Electron Microscopy (TEM) had revealed the existence of graphitic structure within amorphous matrix at the pyrolysis temperature of 1360°C.

Keywords: Biochars; Biomass; Rice husk; Rice straw