Slow co-pyrolysis jerami padi dan limbah plastik untuk menghasilkan bio-oil = Slow co-pyrolysis of rice straw and plastic waste for bio-oil production

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Abstrak

Untuk meningkatkan bio-oil baik dari segi kualitas dan kuantitas, co-pyrolysis jerami padi dengan plastik HDPE dan PP, yang mengandung kadar hidrogen tinggi, dapat menjadi salah satu solusi. Prosedur slow co-pyrolysis dilakukan pada reaktor batch dengan laju pemanasan 5 /menit hingga suhu 500 dan laju aliran nitrogen yang digunakan adalah 750 mL/menit. Produk cair selanjutnya dianalisis dengan menggunakan GC-MS.

Hasil penelitian menunjukkan bahwa semakin besar rasio berat plastik/biomassa menghasilkan yield char yang rendah serta yield oil dan yield gas yang cenderung meningkat dengan hasil bio-oil maksimum diperoleh melalui co-pyrolysis PP/jerami padi dengan rasio berat 25:75, yakni 12,88%. Besarnya rasio berat plastik/biomassa juga mempengaruhi penurunan senyawa aldehid dan fenol pada kandungan bio-oil. Adapun lama waktu penahanan menunjukkan adanya reaksi cross-linking sehingga meningkatkan yield waxy solid.

.....To improve the quality and quantity of bio-oil derived from rice straw pyrolysis, the idea of incorporating plastics (HDPE and PP) containing higher hydrogen contents can be considered. Slow co-pyrolysis performed in a batch reactor with a heating rate of 5 /min up to a temperature of 500 with nitrogen flow rate 750mL/min. Liquid products were than analyzed by GC/MS.

The results showed that the greater the weight ratio of plastic/biomass produces low char yield with oil and gas yield are likely to increase. The maximum yield of bio-oil obtained (12,88%) through co-pyrolysis of PP/rice straw with a weight ratio of 25;75. Upon increasing weight ratio of plastic/biomass, the decline of aldehyde and phenol compunds in bio-oil were observed. The increasing holding time thus further promotes cross-linking reaction thereby increasing the amount of waxy solid obtained.