Accepted Manuscript

Pyrolysis behavior of rice straw under carbon dioxide for production of bio-oil

Bijoy Biswas, Rawel Singh, Jitendra Kumar, Raghuvir Singh, Piyush Gupta, Bhavya B. Krishna, Thallada Bhaskar

PII: S0960-1481(17)30355-5

DOI: 10.1016/j.renene.2017.04.048

Reference: RENE 8743

To appear in: Renewable Energy

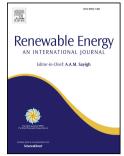
Received Date: 30 December 2016

Revised Date: 20 April 2017

Accepted Date: 23 April 2017

Please cite this article as: Biswas B, Singh R, Kumar J, Singh R, Gupta P, Krishna BB, Bhaskar T, Pyrolysis behavior of rice straw under carbon dioxide for production of bio-oil, *Renewable Energy* (2017), doi: 10.1016/j.renene.2017.04.048.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



1	
2	Pyrolysis behavior of rice straw under carbon dioxide for production of
3	bio-oil
4	
5	Bijoy Biswas ^a , Rawel Singh ^{b,c} , Jitendra Kumar ^a , Raghuvir Singh ^d , Piyush Gupta ^d ,
6	Bhavya B Krishna ^{a,b} , Thallada Bhaskar ^{a,b*}
7	
8	^a Thermo-catalytic Processes Area(TPA), Bio-Fuels Division (BFD),
9	CSIR-Indian Institute of Petroleum (IIP), Dehradun 248005, India
10	^b Academy of Scientific and Innovative Research (AcSIR),
11	New Delhi, India
12	^c Department of Chemistry, A.S. College, Samrala Road, Khanna, 141402, India
13	^d Analytical Sciences Division (ASD), CSIR-Indian Institute of Petroleum, Dehradun, India
14	*Corresponding author: Ph No: +91 135 2525820, Fax No: +91 135 2660202; e-mail:
15	tbhaskar@iip.res.in; thalladab@yahoo.com
16	
17	Abstract
18	Pyrolysis is an important thermo-chemical method for effective utilization of lignocellulosic
19	biomass. The pyrolysis of rice straw has been carried out using fixed bed reactor under CO ₂
20	
20	environment at temperatures ranging from 300 to 450° C to study the effect of CO ₂ and
21	temperature. The maximum oil yield (34.5 wt. %) was obtained at 400°C. The solid residue yield
21	temperature. The maximum on yield (34.5 wt. 70) was obtained at 400 C. The solid residue yield
22	decreased when the temperature increased from 300 to 450°C, while the gas yields increased. The
	account and temperature mercused from 500 to 100 c, while the gas from shoreased. The
22	weight shows date to the the terms within and reaction streambers had an influence on the number to the

2 d d e 23 results showed that both the temperature and reaction atmosphere had an influence on the product distribution and nature of the products. The main compounds observed in the bio-oil were phenol, 24 25 2-ethyl-Phenol, 2-methyl-Phenol, 2-methoxy-Phenol, 2-Methoxy-4-vinylphenol, 2, 6-dimethoxy-Phenol. Liquid product obtained from pyrolysis of rice straw showed high proton percentage from 26 region 1.5 to 3.0 ppm, around 31-34.5 % of protons resonate in this region indicating that the 27 liquid products have high aliphatic proton content. Bio-oil produced at 400°C indicated the higher 28 proton percentage 34.5% in this region (1.5 to 3.0 ppm), higher than the other conditions. The bio-29 30 chars were amorphous in nature. The SEM images revealed that with increase in temperature, the Download English Version:

https://daneshyari.com/en/article/6763878

Download Persian Version:

https://daneshyari.com/article/6763878

Daneshyari.com