

## Accepted Manuscript

Production of phenol-rich bio-oil during catalytic fixed-bed and microwave pyrolysis of palm kernel shell

Joy Esohe Omoriyekomwan, Arash Tahmasebi, Jianglong Yu

PII: S0960-8524(16)30117-1  
DOI: <http://dx.doi.org/10.1016/j.biortech.2016.02.002>  
Reference: BITE 16052

To appear in: *Bioresource Technology*

Received Date: 11 December 2015  
Revised Date: 31 January 2016  
Accepted Date: 1 February 2016

Please cite this article as: Omoriyekomwan, J.E., Tahmasebi, A., Yu, J., Production of phenol-rich bio-oil during catalytic fixed-bed and microwave pyrolysis of palm kernel shell, *Bioresource Technology* (2016), doi: <http://dx.doi.org/10.1016/j.biortech.2016.02.002>

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.



# Production of phenol-rich bio-oil during catalytic fixed-bed and microwave pyrolysis of Palm Kernel Shell

Joy Esohe Omoriyekomwan<sup>1</sup>, Arash Tahmasebi<sup>1</sup>, Jianglong Yu<sup>1,2,\*</sup>

<sup>1</sup>Key Laboratory of Advanced Coal and Coking Technology of Liaoning Province, School of Chemical Engineering, University of Science and Technology Liaoning, Anshan 114051, China

<sup>2</sup>Chemical Engineering, University of Newcastle, Callaghan, NSW 2308, Australia

## ABSTRACT

Catalytic fixed-bed and microwave pyrolysis of Palm Kernel Shell using activated carbon (AC) and lignite char (LC) as catalysts and microwave receptors are investigated. The effects of process parameters including temperature and biomass:catalyst ratio on the yield and composition of pyrolysis products were studied. The addition of catalyst increased the bio-oil yield, but decreased the selectivity of phenol in fixed-bed. Catalytic microwave pyrolysis of PKS significantly enhanced the selectivity of phenol production. The highest concentration of phenol in bio-oil of 64.58 (phenol yield of 4.13 mg/g) and total phenolics concentration of 71.24 % (area) were obtained at 500 °C using AC. Fourier transform infrared spectroscopy (FTIR) results indicated that concentration of OH, C–H, C=O and C–O functional groups in char samples decreased after pyrolysis. Scanning electron microscopy (SEM) analysis clearly indicated the development of liquid phase in biomass particles during microwave pyrolysis, and the mechanism is also discussed.

**Keywords:** Biomass; catalytic pyrolysis; microwave irradiation; phenolic compounds.

---

\*Corresponding author. Email: jianglong.yu@newcastle.edu.au. Tel: +61 2 40333902

Download English Version:

<https://daneshyari.com/en/article/7072370>

Download Persian Version:

<https://daneshyari.com/article/7072370>

[Daneshyari.com](https://daneshyari.com)