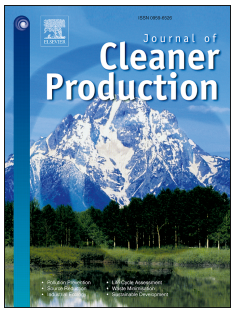
Accepted Manuscript



Characterisation of Residual Char From Biomass Gasification: Effect of the Gasifier Operating Conditions

Juan J. Hernández, Magín Lapuerta, Esperanza Monedero

PII: S0959-6526(16)30592-3

DOI: 10.1016/j.jclepro.2016.05.120

Reference: JCLP 7302

To appear in: *Journal of Cleaner Production*

Received Date: 13 April 2015

Revised Date: 21 April 2016

Accepted Date: 23 May 2016

Please cite this article as: Hernández JJ, Lapuerta M, Monedero E, Characterisation of Residual Char From Biomass Gasification: Effect of the Gasifier Operating Conditions, *Journal of Cleaner Production* (2016), doi: 10.1016/j.jclepro.2016.05.120.

CHARACTERISATION OF RESIDUAL CHAR FROM BIOMASS GASIFICATION: EFFECT OF THE GASIFIER OPERATING CONDITIONS

Juan J. Hernández[a(*)], Magín Lapuerta[a], Esperanza Monedero[b]

[a]Universidad de Castilla-La Mancha
Escuela Técnica Superior de Ingenieros Industriales
Avda. Camilo José Cela, S/N
13071 Ciudad Real (Spain)

[b]Universidad de Castilla-La Mancha
Instituto de Investigación en Energías Renovables
Calle de la invetigación, S/N
02006 Albacete (Spain)

[(*)] Author for correspondence: JuanJose.Hernandez@uclm.es

ABSTRACT

Char, together with tars, are the main wastes derived from biomass gasification. The removal of tars and the valorisation of char are necessary to avoid technical problems and to increase the overall efficiency of the gasification plant, respectively (both aspects encouraging the commercial implementation of biomass gasification systems). However, char properties may not be suitable for an easy valorisation. This work analyses the effect of the main gasifier operating conditions (relative biomass/air ratio, temperature and steam content of the gasifying agent) on the properties of char produced from gasification of dealcoholised marc of grape. Those properties allow both, to analyse the phenomena taking place during the conversion process and to assess potential applications (valorisation) of this waste. Gasification was carried out in a small-scale drop-tube pilot plant. Char characterisation includes structural, thermo-chemical and compositional analysis. Results show that an increase of the relative biomass/air ratio leads to a higher char production as well as to an increase in the extent