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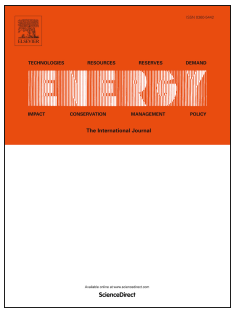

Pyrolysis of cashew nutshells: Characterization of products and energy balance

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ABSTRACT

Cashew cultivation leads to the generation of large amounts of nutshells. In order to determine whether pyrolysis could be a suitable method for the valorization of this agricultural residue, cashew nutshells (CNS) from Burkina Faso were pyrolyzed in the temperature range between 400 and 600 ºC in a laboratory-scale fixed bed reactor. The solid, liquid and gaseous fractions were quantified and characterized, with special focus on the solid product. Recovery of the cashew nutshell liquid (CNSL) was accomplished during pyrolysis separately from the pyrolysis liquid. Results suggest that, except for the aqueous fraction, all the products obtained from pyrolysis are suitable for fuel purposes, and that part of the CNSL can be recovered below 200 ºC during the heating process. A preliminary energy balance of the process shows that burning the gases can provide the energy necessary for the process at a pyrolysis temperature of 500 ºC.

Keywords: Cashew nutshell; Pyrolysis; Carbonization; Charcoal; CNSL.

1. Introduction

The cashew (*Anacardium occidentale*) is a bushy, evergreen tree cultivated in tropical zones all over the world. A pseudo-fruit (cashew apple) can be obtained from cashew cultivation and used in the food industry; however, the principal and most valuable product from the cashew is its edible nut. Cashew nuts are enclosed in a shell with an internal honeycomb structure which contains a phenolic liquid (cashew nutshell liquid, CNSL) that is a severe skin irritant, but also a valuable product for various industrial applications [1] that are attracting increasing interest.