

## AGRICULTURE WASTE, A GREAT OPPORTUNITY TO PRODUCE ENERGY AND HIGH VALUE PRODUCTS: EXPERIENCE IN COLOMBIA

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Colombia has high potential from various sources such as fast growing plantations, municipal waste, and sludge from wastewater treatment plants, forest residues and agricultural harvesting. Those sources are considered biofuels of the second generation, which can contribute significantly to the replacement of the currently used fossil energy carriers for transportation fuel production and they can be precursors of new products with high-added value. In this work we show different experiences carrying out in Colombia related to thermochemical process to produce Bio-oil, Bio-char and Syngas. We show the results of our experience in slow and fast pyrolysis consisting of thermal decomposition of the lignocellulosic material in an inert atmosphere or with oxygen shortage (less than stoichiometric), at temperatures between 500 °C - 600 °C, with particle sizes between 0.5mm - 2mm, with the aim of producing a liquid fuel with a high oxygen content, called bio-oil, a solid residue "bio-carbon" or char and non-condensable gases with low calorific value (rich in CO, CO<sub>2</sub> CH<sub>4</sub>, H<sub>2</sub>) which they can be re-circulated in the reactor to supply heating power. Depending on the operating conditions of the reactor, pyrolysis can be classified as: slow pyrolysis and fast pyrolysis (see Figure 1).

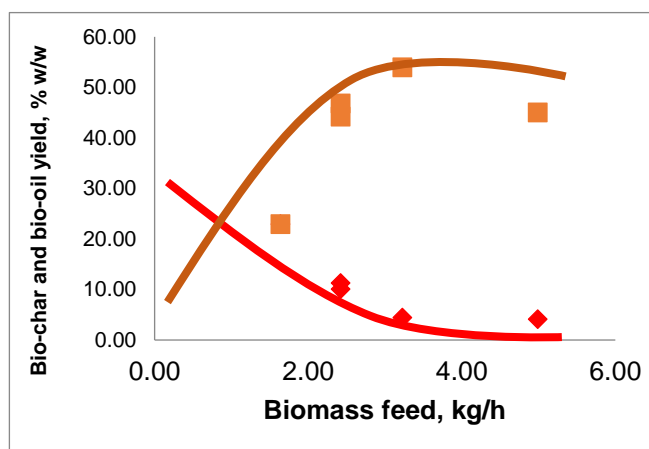


Figure 1 – Bio-oil (diamond) decrease as biomass feed increase; contrary, Bio-char (square) increase as biomass increase.

The development of biofuels derived from thermochemical processes from biomass has grown in recent years as a promising alternative in mild and long term to supply partially rising energy consumption. Thermochemical conversion processes use mostly agro-industrial wastes as main source of raw materials, so they do not threaten food security, not required complex pre-treatments and reaction times are short; which are striking advantages over biological transformation processes for the same proposes.