MWLc of both woods, MWLc has higher amount of phenyl glycoside and gamma ester linkages the CEL. This is presumably due to the fact that all cellulolytic enzymes contains β-glycosidases and esterases. Loblolly pine has higher amounts of total LCC linkages, especially the benzyl ether linkage than sweet gum. Chips of loblolly pine and sweet gum were also pretreated with green liquor, a pretreatment process developed in our laboratory for woody plants. CEL was isolated from the pretreated pulps. While phenyl glycoside and gamma ester linkage are cleaved during the pretreatment, the benzyl ether linkages are preserved to some extent in both woods. Again, loblolly pine has higher amount of benzyl ether linkage than sweet gum. Correlations between LCC linkages and enzymatic hydrolysis will also be presented.

OP219

Influence of the pyrolysis temperature on the end-products obtained during the carbonization of *Eucalyptus* wood

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Charcoal Production and consumption from planted forests of Eucalyptus for manufacture of steel in Brazil has increased significantly in recent years. The charcoal quality is related to different factors such as the raw material nature and its carbonization process parameters. Carbonization process parameters considering the heating rate, final pyrolysis temperature and also pyrolyiss pressure used in the process.The final temperature of carbonization interferes significantly in the carbonization products and sub products, as well as in quality of charcoal. With the increased production of charcoal from planted forests of Eucalyptus the studies of the effect of temperature in the carbonization products are important. Thus, this study aimed to asses the influence of final temperature of carbonization on the end-products yields.Standardized samples were removed from four trees of Eucalyptus sp. The carbonization was conducted in experimental electric furnace adapted with water-cooled condenser and collection flask volatile condensable materials. The peak pyrolysis temperatures were equal to 500, 600, 700 and 800 °C. The gravimetric yields of charcoal, pyroligneous liquor and non-condensable gases were determined.The pyroligneous liquor yield, ie tar yield and non-condensable gases yield showed a significant difference only at higher temperatures of 700 °C and 800 °C. The charcoal yield varies between 27% and 34%, tending to decrease with increasing temperature. The average pyroligneous liquor yield is 45% and a non-condensable gas is 24.5%, both with variable behavior in relation to the carbonization temperature. The yields are consistent with those reported in the literature. Temperature of 500 ° C showed the optiumum result in trem of charcoal yield, but more investigation on charcoal quality at different pyrolysis temperatures are needed to define the best process parameters to bedefined for charcoal requirement in steelmaking.

Keywords: Gravimetric Yield, Pyroligneous liquor, Non Condensable, Charcoal.

OP220

Hydrodeoxygenation of Bio-oil in the Presence of Pd/C in Supercritical Ethanol

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Liquid pyrolytic products (bio-oil) produced by fast pyrolysis technology from yellow poplar wood was subjected to hydrodeoxygenation reaction to overcome disadvantages such as high water content and low heating value. Hydrodeoxygenation (HDO) of bio-oil was performed in supercritical ethanol under hydrogen atmosphere by using Pd/C catalyst at different temperatures (250-370°C), reaction time (40-120 min) and catalyst loading (0-6 wt%). After completion of the reaction, gas, char and liquid were obtained. In case of liquid phase two immiscible separations occurred (upper layer: light oil and lower layer: heavy oil).

The distribution of these products was heavily influenced by temperature, reaction time and catalyst loading. The upgraded oils were less acidic and contained less water than the raw bio-oil. Water content of the light oils and heavy oils at different conditions was 48.5 - 62.4 wt% and 0.4 - 1.9 wt%, respectively. The higher heating values of heavy oil were estimated to be between 28.7 MJ/kg and 37.4 MJ/kg, which were about twice the value of raw bio-oil. Elemental analysis of the liquid products showed that the heavy oil had lower O/C ratio which ranged from 0.17 to 0.36 than original bio-oil (0.71). The H/C ratio of heavy oil decreased from 1.50 (250°C) to 1.32 (370°C) with increasing of temperature and slightly increased from 1.26 (40 min) to 1.42 (90 min) for longer reaction time.

The highest yield of heavy oil was approximately 48.4 wt% (wet basis of starting bio-oil weight), with the reaction conditions of 250°C, 60 min of reaction time and 4 wt% of catalyst. But in this condition, the degree of deoxygenation was estimated to relatively low, which should be the reason for low calorific value (28.7 MJ/kg).

Keywords: Bio-oil; yellow poplar; upgrading; hydrodeoxygenetion; Pd/C catalyst oil

OP221

Microwave-treatment of frozen Wood Packaging Material

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Wood Packaging Materials (WPM) are known as preferential vectors of exotic forest pests and pathogens, which are nowadays major threats to the biodiversity and productivity of forest ecosystems.

As a preventing tool against biological invasions, ISPM15 (FAO, 2009) regulates the phytosanitary treatments that must be applied to WPM.

Two treatments are at present approved in ISPM15: Methyl Bromide fumigation and Heat Treatment. However, since the former is being phased out, the latter will be soon the only remaining method for WPM producers, which is an uncomfortable situation.

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