BIO-OIL'S FUTURE AS A CONSUMER OF MISSISSIPPI TIMBER

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Bio-oil, also known as pyrolysis oil, is produced from fast pyrolysis of cellulosic biomass. Fast pyrolysis is a process that heats bio-mass at a moderate temperature (450-550C) and high heating rates in the absence of oxygen for a short time period of less than 2 seconds. The vapors that would normally be combustible are driven off and are rapidly condensed. Water is a major component of the vapors condensed during pyrolysis such that the resulting bio-oil is actually a water emulsion, and not an oil, of chemical compounds composed of the exploded molecular fragments that previously composed the biomass feedstock. The pyrolysis process produces mainly oxygenated compounds and water that result in a high oxygen content that is highly reactive. The oxygenated reactivity of the bio-oil water emulsion causes a number of negative properties, such as high acidity, low energy value, slow ignition and polymerization over time. For these reasons, raw bio-oil must be upgraded by some means to allow utilization as a liquid fuel. The fast pyrolysis process can be performed by a number of reactor types such as Dynamotive's bubbling fluidized bed, Ensyn's moving fluidized bed, KiOR's Fluid Catalytic Cracker (FCC) pyrolytic catalysis process and MSU's auger reactor. Numerous industrial and public research institutions are developing methods of upgrading bio-oil to a drop-in fuel or heating fuel. None of these are commercially operational at this point but some industries are building infrastructure. The properties that geneticists may be developing for producing trees more suitable for cellulosic ethanol production may render the resulting biomass less suitable for production of some bio-oil fuel types. Lignin is an important component in the production of hydrocarbons by the hydroprocessing route for example. High cellulose content produces higher water content in the bio-oil and lower hydrocarbon yields.