
Title: Conversion of Biomass into Biofuels with Supercritical Fluids

**Tevfik Aysu***(Guest Editor)*

Vali Mithat Bey Mah,
X1423 Ali Çalım Sok,
No:8/11 Merkez/Van,
Turkey

Tel: + 90 (432) 225 15 23

E-mail: tevfikaysu@hotmail.com, tevfikaysu@yyu.edu.tr, ta9@hw.ac.uk

Proposal

Biofuels are liquid or gaseous fuels that are produced from biomass for transportation applications. As biofuels are renewable, sustainable, carbon neutral and environmentally friendly, they have been proposed as promising alternative fuels to replace fossil fuels. There has been growing interest on biomass-based biorefineries for developing the processes and technologies for the conversion of biomass to liquid and gaseous fuels and chemicals. There have been tremendous scientific and technological developments in the area in recent years. Thermo-chemical methods of biomass conversion have some advantages over the other methods in terms of feedstock flexibility, lower processing times, complete carbon content utilisation. There are several thermo-chemical methods used to convert biomass into valuable chemicals and useful forms of energy. These methods are divided into five sub-categories: pyrolysis, gasification, liquefaction, carbonization and combustion.

Thermochemical liquefaction method is an effective method for converting biomass into bio-fuels. The liquefaction process for biomass is still in its developing stage. Liquefaction is the thermal degradation of biomass in a solvent under intermediate temperature (250-400 °C) and high pressure (4-5 MPa) conditions. The liquefaction process has certain advantages such as relatively lower temperatures and usage of a solvent which dilutes the concentration of products and consequently prevents the cross-linking and reverse reactions. Major advantage of liquefaction process is that the costly drying of biomass is not necessary before conversion. Another advantage of the liquefaction process is that the produced bio-oils are more stable and less corrosive than that of produced from pyrolysis since they contain less amount of oxygen. This feature also provides great advantage in terms of lowering the costs of the handling equipments and storage.

In recent years, among thermochemical liquefaction methods, supercritical fluids have been utilized as good solvents in the conversion of biomass due to their unique properties. A supercritical fluid can effuse through solids like a gas, and dissolve materials like a liquid. Supercritical fluids have liquid-like properties such as the lower density of the liquid and gas like properties such as lower viscosity and higher diffusivity. These unique properties make them powerful solvents for mass transfer rates of reactants to biomass molecules and easily penetrate the fibrous solids. They have the ability to dissolve compounds that are not normally soluble in either liquid solvents or gases so that the efficiency of liquefaction reactions can significantly be promoted.

In view of this, the Journal is planning to publish papers in a special issue on conversion of biomass into biofuels with supercritical fluids.
