

# ASSEMBLING OF AN EQUIPMENT FOR HYDROTHERMOLYSIS OF BIOMASS

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The need to substitute fossil sources of energy by others renewable and non-pollutant stimulates researches on conversion of lignocellulosic biomass into fermentable sugars for production of bioethanol. The global trend of searching for ecologically correct technologies has promoted studies and industrial applications of supercritical fluids. Main biomass hydrolysis methods are acid and enzymatic, but sub/supercritical hydrolysis (hydrothermolysis) has also been proven technically feasible, with the advantages of no need of pre-treatment, shorter reaction time, lower corrosivity, lower residue generation, no use of toxic solvents and lower formation of degradation products. However, further optimization of operation conditions (temperature, pressure, time, solvent: solid proportion) and economical evaluation of the process are still needed so that it can be scaled-up to industrial level. Therefore, the objective of this work was to assemble a semi-continuous equipment for hydrothermolysis using water as solvent with possible addition of CO<sub>2</sub> as catalyzer. The system was designed to work with pressures up to 40 MPa and temperatures up to 673 K; it consists of a water pump, a CO<sub>2</sub> pump, a heating coil, a mixer and a 50 mL reactor inserted in an electric heating jacket. The biomass is fed in the reactor. Water is pre-heated in the coil, before it enters the reactor, through which it flows continuously. When there is addition of CO<sub>2</sub>, it is mixed to the water before the solvent is heated in the coil. After flowing through the reactor, the solution temperature and pressure are reduced for quenching the reaction and recovering the hydrolysate. The system was validated using cellulose as reference material, and will be further used to study biomass hydrolysis. To our knowledge, this is the first hydrothermolysis system in Brazil destined to process development for converting biomass from residues of Brazilian agricultural industry into fermentable sugars.

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