

# Fractionation of high lignin content biomass by supercritical water ultrafast hydrolysis

**Tijana Adamovic, Celia M Martínez, Luis Vaquerizo, María José Cocero\***

High Pressure Research Group. Chemical Engineering & Environmental Technology Dpt.  
Valladolid University. 47011 Valladolid (Spain).

\*[mjcocero@iq.uva.es](mailto:mjcocero@iq.uva.es)

Lignocellulose biomass is mainly composed of three bio-polymers: cellulose, hemicellulose and lignin. In addition to those fractions, biomass is also composed of other minor compounds as active compound, oils, starchs, etc. The bio-polymer fractions are potential feedstocks for bio-sourced commodity chemicals. However, separation steps are necessary to isolate the appropriate fraction and break it into its individual building blocks due to their differing chemical functionalities.

Pressurized water from subcritical to supercritical (SCW) is an excellent solvent for the fractionation of lignocellulosic biomass into hemicellulose oligomers and C5 sugars, cellulose oligomers and C6 sugars and lignin. Understanding the fundamentals of the processes involved is the key to achieve a selective separation<sup>1</sup>.

In this contribution, deoiled grape seed biomass with high lignin concentration (up to 40 % w/w) was fractionated to recover lignin. Moreover, 25 % of that biomass was converted of C5 and C6 sugars. Experimental results about supercritical water fractionation of deoiled grape seed by ultrafast hydrolysis will be presented.

A continuous pilot plant with a biomass treatment capacity of 10 kg/h, reactor temperature up to 400°C, pressure up to 30 MPa, and reaction time from 0.1 to 1 second is used for sugars and lignin fractionation. New insights about the construction of continuous pilot plant facilities will be discussed supported in the processes fundamentals and the experience with the pilot plant.

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## **References**

<sup>1</sup> COCERO, MJ., CABEZA, A., ABAD, N., ADAMOVIC, T., VAQUERIZO, L., MARTÍNEZ CM., PAZO-CEPEDA, MV., Understanding biomass fractionation in subcritical & supercritical water, J Supercritical Fluids. In press. <https://doi.org/10.1016/j.supflu.2017.08.012>