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Title

Advanced subcritical water based technologies for extraction processes and biomass conversion.

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Abstract

Subcritical water behaves very differently not only from water at room temperature but in some aspects also from supercritical water. Actually as the temperature of water rises between 100 and 374°C and the pressure is increased high enough to maintain the liquid state, there is a marked and systematic decrease in permittivity, an increase in the diffusion rate and a decrease in the viscosity and surface tension. In consequence, moderately polar and non-polar molecules are extracted most efficiently due to a less polar medium induced by elevated temperature. So, subcritical water extraction (SWE) has proved to be a new and powerful technique for the extraction of active compounds from different biomass materials with low process cost, mild operating conditions, short process times, and environmental sustainability. Moreover, the relatively high density combined with the high dissociation constant of subcritical water, favors ionic reactions. Examples are dehydration of carbohydrates and alcohols and aldol splitting. Consequently, there has been a strong interest in using subcritical water as a solvent and reaction medium for biomass conversion. Several examples of application are provided showing the potential of subcritical water.

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