



# Sustainable green pretreatment approach to biomass-to-energy conversion using natural hydro-low-transition-temperature mixtures



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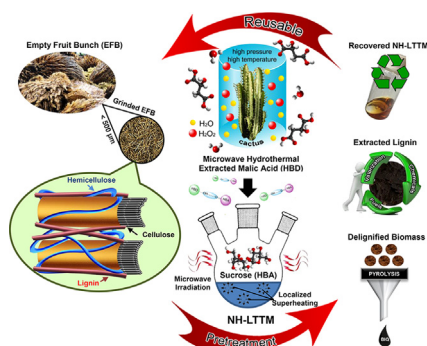
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## GRAPHICAL ABSTRACT



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## ABSTRACT

Natural hydro-low-transition-temperature mixtures (NH-LTTMs) tend to be the most favorable next-generation green solvents for biomass pretreatment, as they are cheap and environmental friendly. The amount of water bound into the NH-LTTMs greatly affected their thermal stability, whereby the highest thermal stability was observed with the water content of 7.6 wt%. It is worth noting that, the highest molar transition energy of NH-LTTMs (47.57 kcal mol<sup>-1</sup>), which indicated the highest solubility, was optimized with the molar ratio of hydrogen bond donor (HBD)-hydrogen bond acceptor (HBA)-water (2:4:3) at a temperature of 60 °C. Hydrogen bonding networks of the NH-LTTMs, which led to the dissolution of biomass, were confirmed by the alteration in the peaks of the involved bonds and resonance signal to lower field through FTIR and <sup>1</sup>H NMR spectra, respectively. The components evidenced in high-resolution mass spectra of extracted lignin showed its high potential to be valorized into useful fuels and chemicals.

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