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Abstract	:	Carbon fibre is cost prohibitive due to fossil-based raw materials and the substantial energy needed for manufacturing. Although lignin-derived oil palm biomass has been synthesised, its fundamental properties render it an unsuitable carbon fibre precursor. This study aimed to obtain lignin-derived oil palm biomass (DES-L) using choline chloride (ChCl) and lactic acid (LA) at various molar ratios (1:2–1:10) and to evaluate its fundamental properties in relation to its viability as a carbon fibre precursor at different reaction times (3–6 h) and temperatures (130–170 °C). ChCl-based DES produced high DES-L yields (74.94–98.42%) and solubilities (49.42–66.12%), with comparable phenolic hydroxyl group content (1.37–6.53 mmol/g). A higher LA molar ratio provides more active protons, facilitating the proton-catalysed breakdown of lignin-polysaccharide complexes, resulting in higher solubility and yield. The high lignin purity (81.21–89.97%) demonstrates that ChCl-based DES effectively cleaves the lignin-carbohydrate linkages, resulting in low carbohydrate content but high particulate matter (6.46–14.33%) due to cellulose degradation. The inverse correlation between volatile matter (16.25–36.53%) and ash content (0.99–3.00%) was due to the formation of volatile macromolecules from the highly branched polymer structure of lignin. The low carbon content (42.88–56.83%) diminishes the carbonaceous nature of the DES-L. Lignin has a sufficiently high average molecular weight (2221–5980 g/mol) and glass transition temperature (72.62–80.87 °C) as a carbon fibre precursor. Overall, the lignin-derived oil palm biomass obtained…see more.