

Plant-based Functional Chemical Products, Ethanol, Heatproof Filler, and Antioxidant, obtained via Simultaneous Enzymatic Saccharification and Comminution

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Resently, we proposed the simultaneous enzymatic saccharification and comminution (SESC) as a novel method for extraction of lignocellulosic biomass, polysaccharides and lignin, that does not require toxic reagents/ organic solvents and performs under extremely mild conditions (i.e., 50 °C, pH 5.0, and 1 psi). The SESC treatment for plants gives sugar solution from polysaccharides and water-dispersed colloidal nanoparticle from lignin (see K. Shikinaka et al., *Green Chem.*, **2016**, *18*, 5962 and *J. Oleo Sci.*, **2018**, *67*, 1059). The *in situ* fermentation of sugar solution yields ethanol without contamination of toxic reagent. The lignin nanoparticle can be used as high-performance heatproof filler for polymer (see K. Shikinaka et al., *J. Mater. Chem. A*, **2018**, *6*, 837) and antioxidant for radical oxygen species and thermal free radicals (see K. Shikinaka et al., *ChemistryOpen*, **2018**, *7*, 709). This work was supported by JST ALCA Grant Number JPMJAL1601, Japan.

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