

### Degradation of kraft lignin using supercritical water and perhydrolase derived from esterase

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Kraft lignin is the major form of the lignin produced in the paper industry. The kraft lignin was degraded using supercritical water (SCW) and perhydrolase derived from *Pseudomonas fluorescens* esterase (PFE) to useful aromatic compounds. Both are very eco-friendly methods because they don't use an organic media. Using directed evolution method, mutant PFE F162L produced more than double the peracetic acid than the wild-type PFE during the same time course. The reaction time is reduced from 72 hr to 24 hr using enhanced enzyme. For efficient lignin degradation, the experiment was carried out under various time lengths with maximum temperature and pressure condition (420 °C and 50 MPa). As a result, 20 min was found to be the optimal time length with fixed temperature and pressure. Through the process of supercritical water and perhydrolase, degraded kraft lignin products at specific time points were obtained. By comparing the degraded kraft lignin products to p-coumaric acid (MW = 150, one of the lignin monomers), it was confirmed that the degraded lignin products were monomers, dimers and trimers. Further investigation is required for analyzing the chemical structure of small molecules.