# Preparation and characterization of a newly water soluble lignin graft copolymer from oil palm lignocellulosic waste

## Abstract

Water soluble lignin graft copolymer (LGC) was synthesized using oil palm empty fruit bunch (OPEFB) fibre as a renewable biomass source. Initially, Kraft lignin (KL) was extracted by exploiting the OPEFB fibre Kraft pulping residue. KL was grafted with acrylic acid (AA) by using p-toluenesulfonic acid (PTS) as a catalyst in the condensation process via the bulk technique. The resulting copolymer was characterized by a Fourier transform infrared (FTIR) spectroscopy, differential scanning calorimetry (DSC), thermogravimetry-Fourier transform infrared (TG-FTIR) and carbon–hydrogen–nitrogen analyzer (CHN). The FTIR spectrum of the product showed absorption due to the presence of ester bonds as a proof of grafting. The DSC and TG-FTIR results showed significant improvements in the KL thermal properties at least 27.261% as well as a thermal degradation resistance. The elements percentages of KL compositions were changed as shown by the CHN data. SEM micrographs illustrated the grafting reaction homogenizing the KL morphological structure