

Dr David Thomas - Abstract

Title: Muconic acid as a versatile bio-based monomer for plastics

Plastics have revolutionized our lives in every aspect, yet only 2 % of the yearly production of 300 Megatons are renewable. Bio-based plastics have gone from a novelty to a serious player in the chemical industry, spanning from new materials such as furandicarboxylic acid to drop-in replacements. Muconic acid is a highly versatile platform chemical that can be used to make many plastic monomers, from adipic acid through to caprolactam and hexamethylenediamine for use in nylon materials.

Our research has looked into the synthesis of muconic acid from sugar acids, particularly from pectin derived from citrus peels. The bio-technically prepared mucic acid is converted using rhenium-based catalysts to muconic acid in high yield. Subsequent purification gives a monomer that can be further exploited, or used as a unique bio-based monomer itself. VTT's patented routes allow for a significant gain in the advancement of bio-based plastics.