

Experimental investigation of tensile properties of wood-Poly lactic acid biocomposites developed via 3D printing

Kandula Ramanaiyah*, A.V. Ratna Prasad, and Shaik Galshid Vali

Department of Mechanical Engineering, VR Siddhartha Engineering College, Vijayawada-520 007, India

*Corresponding author

ABSTRACT

Recently biomaterials are developed using 3D printing technology in medical and pharmaceutical fields. In particular, preparation of tailored medical devices such as screws, cranial fixations, and bone-plate fixation using ecofriendly materials has hastened significantly. 3D printing materialized as a workable tool to decrease production cost at faster rate of development of products. In the present study, a digital 3D samples are designed using computer aided design (CAD) software and are saved in STL (stereolithography) format. Samples were prepared using biodegradable wood –Poly lactic acid (PLA) filaments via 3 D printing. Tensile properties of samples were measured as per ASTM D 638 M standards. The samples were tested at a cross-head speed of 0.5 mm/min and the strain was measured using an extensometer. The experimental results revealed that, tensile strength of wood-PLA composite was 1.56 times that of plain PLA. The tensile modulus wood-PLA composite was 1.55 times that of plain PLA. There is a significant change in the tensile properties of PLA when reinforced with wood.

Keywords: 3 D printing, Tensile properties, Bio composite

