

Variation of Nanocellulose Reinforced Recycled Paper: Effect on Tensile Strength

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Abstract

The idea of paper recycling was done due to environmental issue. However, the properties of recycled paper like tensile will decrease each time it is recycled. Addition of reinforcing filler may increase the properties of recycled paper. Thus, in this research, nanocellulose was used as reinforcing filler in recycled paper. The objectives of this research are to fabricate papers from recycled paper and to investigate the effect of different nanocellulose and pressure of compression molding in paper fabrication towards tensile strength of recycled paper. Two types of nanocellulose used were commercialized cellulose nanofiber (CNF) and cellulose nanocrystals (CNC). CNC from filter paper and empty fruit bunches (EFB) were isolated via acid hydrolysis. The recycled paper was fabricated using traditional methods (net) and further processed with compression molding. All samples with nanocellulose increase in tensile strength. The tensile strength recorded 114% improvement at 15.28 N/mm² with 5wt% of CNF.

Keywords: Recycled paper; Cellulose Nanofiber (CNF); Cellulose Nanocrystals (CNC); Tensile strength.