

Production of Biocomposites Using Chars Obtained by Co-Pyrolysis of Olive Pomace with Plastic Wastes

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Abstract : The disposal of waste plastics has become a major worldwide environmental problem. Pyrolysis of waste plastics is one of the routes to waste minimization and recycling that has been gaining interest. In pyrolysis, the pyrolysed material is separated into gas, liquid (both are fuel) and solid (char) products. All fractions have utilities and economical value depending upon their characteristics. The first objective of this study is to determine the co-pyrolysis product fractions of waste HDPE (high density polyethylene) and LDPE (low density polyethylene)-olive pomace (OP) and to determine the qualities of the solid product char. Chars obtained at 700 °C pyrolysis were used in biocomposite preparation as additive. As the second objective, the effects of char on biocomposite quality were investigated. Pyrolysis runs were performed at temperature 700 °C with heating rates of 5 °C/min. Biocomposites were prepared by mixing of chars with bisphenol-F type epoxy resin in various wt%. Biocomposite properties were determined by measuring electrical conductivity, surface hardness, Young's modulus and tensile strength of the composites. The best electrical conductivity results were obtained with HDPE-OP char. For HDPE-OP char and LDPE-OP char, compared to neat epoxy, the tensile strength values of the composites increased by 102% and 78%, respectively, at 10% char dose. The hardness measurements showed similar results to the tensile tests, since there is a correlation between the hardness and the tensile strength.

Keywords : biocomposite, char, olive pomace, pyrolysis

Conference Title : ICBMC 2016 : International Conference on Biobased Materials and Composites

Conference Location : Paris, France

Conference Dates : April 25-26, 2016