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MECHANICAL BEHAVIOUR OF POLYMER BLENDS BASED ON POSTCONSUMER LDPE AND PET IN PRESENCE OF NEW COMPATIBILIZERS BASED ON EBAGMA TERPOLYMER

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High consumption of plastics inevitably leads to the production of large amounts of plastic waste especially because a substantial part of produced plastics is used for packaging. Therefore, suppression of the environment pollution by the plastic waste is a task of great and increasing importance. Poly(ethylene terephthalate) (PET) and polyolefins (LDPE, HDPE, PP, etc.) are the thermoplastics most found in urban waste streams because of their use in the field of packaging (bottles, films, containers, etc.). Because of the enormous growth of these materials, the need of providing for their post-consumer recycling- reducing the conventional waste management methods- has become a very important challenge towards the problem of environmental protection and to make plastics manufacturing technology sustainable. It would be highly convenient, in economical terms, to blend both polymers. The obstacle is that these two polymers are incompatible, resulting in a gross phase separation and lack of adhesion between the two polymers responsible for poor mechanical performances, brittle behaviour, and low barrier properties. Compatibility of immiscible blends may be improved through the addition of third component with a segment capable of specific interaction, and/or chemical reaction with the blend constituent.

The objective of this work was to investigate the way to recycle LDPE/PET blends based on waste through the use of modified Ethylene-Butyl Acrylate-Glycidyl Methacrylate (EBAGMA) Terpolymer as compatiblizer. The modification carried out by premelting EBAGMA with LDPE in equal proportion (50/50%, w/w) named as MB1. Morphology and mechanical properties were investigated by Scanning Electron Microscopy (SEM) and tensile test and impact measurements, respectively. The results obtained were discussed according to the non modified systems. LDPE/PET/MB1 ternary blends showed better morphology and a substantial improvement in both elongation at break and impact strength and decrease in the Young’s modulus in comparison to non modified blends.