



## THE SYNERGISTIC PROPERTIES OF PLASTICIZED LINEAR/ BRANCHED PLA BLENDS

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Poor deformation characteristics and low melt strength of Poly (lactic acid) (PLA) pose considerable scientific challenges and limit its large-scale applications. This project proposes the possible approaches to improve the PLA's properties to satisfy end use applications such as packaging. In this study, Poly (ethylene glycol) (PEG) as a plasticizer has been added into linear PLA (L-PLA) / branched PLA (B-PLA) blend, (L,B-PLA) in various concentrations (0, 5, 10, 15 and 20 wt%). A range of characterization techniques including molecular weight, transition temperature, crystallization behaviour, impact resistance and rheological behaviour were studied. Initially, the synergetic features in terms of molecular weight, impact resistance and melt viscosity than the log additivity rule prediction were unexpectedly observed in L,B-PLA at the ratio of linear PLA : branched PLA (50 : 50 wt%). In relation to plasticizer content, the addition of PEG enhanced the crystallization behaviour but decreased the glass transition temperature and molecular weight of L,B-PLA. The 25 % improvement in impact strength of L,B-PLA/PEG blends could be observed with the addition of PEG at particular content (up to 10 wt%). It was also observed that both the dynamic viscosity and dynamic moduli decreased with increasing PEG concentration.