

# PLA-BASED MULTILAYER PACKAGING FILMS

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**Abstract:** *Single-layer packaging films are sporadic on the market today, especially ones made of a single polymer. It is usually a blend of polymers or some polymer-based composite material. This is because one material does not have all the required properties for food protection, and the purpose of functionality causes the need for combining and blending materials. Today's packaging materials are multilayer structures since they provide the best quality and safety of the packed food maintenance. Multilayer packaging materials are tough to recycle because it is complicated to separate layers made from different materials, and there is no unique way to do it for all materials. For this reason, multilayer films are the leading variety of packaging waste in landfills. Due to the increased production and application of single-use plastics, the EU adopted a range of strategies and regulations to minimize plastic waste and incorporate plastic into the circular economy. The main goal is to change the product design and enable the recycling of all plastic packaging by 2030. PLA-based multilayer films were prepared in this work by combining solvent casting PLA films with electrospun PLA film. Two and three-layer structures were prepared by annealing the layers to achieve transparent films. The electrospun layer is to ensure better barrier properties compared to solvent cast film. Mechanical, thermal, morphological, and surface properties were examined together with water vapor permeability for all samples. The presence of the electrospun layer did not affect the mechanical and thermal properties compared to pure PLA films, while it has some positive effects on barrier properties. Combining polymer processing technologies without combining materials can be an excellent way to reach sustainability goals in the forthcoming years.*

**Keywords:** PLA films, packaging material, multilayer film