

Seminari di dottorato

Scienze per l'Ambiente e la Salute & Scienze Chimiche

21 Gennaio 2026, ore 14.30 - 15.30

Università degli Studi di Ferrara
Dipartimento di Scienze Chimiche,
Farmaceutiche ed Agrarie
Via Luigi Borsari, 46 -Ferrara
Nuovi Istituti Biologici - **Aula Levi**

Introduction

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*Processing-Driven Toughening and Degradability of
PLA-PU-DMA Blends: A Comparative Study between
Extrusion and Kinetic Mixing for Automotive
Applications*

Abstract

Polylactic acid (PLA) is an appealing biopolymer for interior and semi-structural automotive parts, yet its adoption remains limited by low impact resistance and slow degradation. To address these limitations, a ternary PLA-polyurethane (PU)-dimethyl acrylate (DMA) blend (60–30–10 wt%) was produced and processed using either twin-screw extrusion or kinetic mixing to evaluate the effects of processing on morphology and performance. The material prepared by kinetic mixing showed a substantial increase in toughness, achieving an Izod notched impact strength of 27 kJ/m²—more than double that of the extruded counterpart—demonstrating a strong synergistic effect between PU and DMA when finely dispersed. Thermal, structural, and mechanical analyses confirmed the formation of a more



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