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# Plasticization of poly(lactic acid) through blending with oligomers of lactic acid: effect of the physical aging on properties

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## Abstract

Two oligomers of lactic acid (OLAs), carboxyl (OLA-COOH) or hydroxyl (OLA-OH) end capped, were employed to modulate physical and mechanical properties of poly(lactic acid), PLA. Blends up to 25 wt% by weight of OLAs were prepared by melt mixing. Mechanical, thermal and transport properties of the materials were tested as a function of OLA functional moieties and blend composition. Moreover, the effect of physical aging on structure and properties of blends was studied by storing the samples in controlled temperature and humidity conditions, up to 8 weeks.

OLAs significantly affect mechanical properties of PLA; blends showed an interesting ductility even after aging, suggesting their use as flexible films. Moreover, gas transport and total migration properties of blends are suitable for packaging applications.

Keywords: Polymer blends, biodegradable polymers, physical aging, plasticization

## Introduction

Poly (lactic acid) (PLA) is a linear aliphatic thermoplastic polyester derived from renewable resources. It is one of the most studied biodegradable polymers, with potential applications in various fields, such as packaging, medicine and agriculture [1]. The interest on lactic acid

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