

# Development of biodegradable films with antioxidant properties based on polyesters containing $\alpha$ -tocopherol and olive leaf extract for food packaging applications

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## Abstract

Biodegradable films with antioxidant properties based on Ecoflex<sup>®</sup> and Ecoflex<sup>®</sup>-polylactic acid (PLA) containing  $\alpha$ -tocopherol and olive leaf extract were developed by blown film extrusion.

There was a good recovery of tocopherol from Ecoflex films (98–112%). Oleuropein and oleuroside were the main antioxidants detected in the studied olive leaf extract. A reduction of oleuropein content (21–33%) and an increase of oleuroside (14–31%) were observed in Ecoflex and Ecoflex/PLA films. All the films showed antioxidant capacity *in vitro*. The films containing tocopherol exhibited higher antioxidant activity than the films containing olive leaf extract.

The incorporation of both antioxidants gave a coloured taint to the films. The films containing olive leaf extract showed the highest colour changes ( $\Delta E$ ). Films containing 2.8% of antioxidants showed increased elongation at break (EB), however at higher antioxidant concentrations reductions of tensile strength and EB were observed. These results confirmed the feasibility to produce antioxidant films with Ecoflex and Ecoflex/PLA blend. However, the concentration of antioxidant that can be added to the films is constrained by the changes induced on the physical properties. The weak interaction between the antioxidants and the polymer matrix would provide a material suitable for food products with a short shelf life.