

## RESEARCH ARTICLE

## Biodegradability of polyethylene–starch blends prepared by extrusion and molded by injection: Evaluated by response surface methodology

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Low density polyethylene (LDPE)–starch blends were prepared by extrusion. Starch content ranged between 0 and 50% under different conditions of temperature and extrusion speed. Each blend was injected into a commercial mold of a 250 mL cup. Cups were cut into 5 cm × 5 cm coupons. Biodegradability was assessed placing the coupons in the middle of a 50 cm pile of compost. Samples were recovered, washed, dried, and weighed after 25, 50, 75, 100, and 125 days under compost. Weight loss was determined and structural modifications were evaluated by SEM. Mechanical properties as tensile strength, elongation to break, and yield point were assessed before and after compost treatment. Experimental design and characterization were performed using a central composite design (CCD) and results were modeled with surface response methodology. SEM analysis revealed fractures and pores as a consequence of microorganism degradation. Pure LDPE samples remained unchanged. Mechanical, physical, and thermal properties of LDPE–starch blends are slightly different from that of pure LDPE. Environmental exposure, measured by accelerated interperism, does not modify blend properties; consequently, they are suitable for the same industrial applications of LDPE.

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