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# DEGRADATION BEHAVIOUR OF PLA-BASED POLYESTERURETHANES UNDER ABIOTIC AND BIOTIC ENVIRONMENTS

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## ABSTRACT

Study was conducted on the degradation of polyurethanes based on Poly(lactic acid)/Poly(ethylene glycol), containing three differing concentrations of di-isocyanate compound, under three conditions (hydrolytic, thermal and composting). In the hydrolysis study, the effect of temperature and time were studied by techniques including weighting and GPC. Thermal decomposition was examined by thermogravimetry and mass spectroscopy. Composting was performed under standardized conditions and the amount of CO<sub>2</sub> was measured. It was found that hydrolysis of the material started almost immediately after exposure to a water environment at both investigated temperatures (37°C and 55°C), whereas weight loss exhibited a certain delay. Thermal decomposition of the studied materials started below 230°C and lactide was identified as the main product. A biodegradation experiment showed that all the investigated samples successfully (>80%) mineralized within 90 days under composting conditions.

**Keywords:** polylactide, polyurethanes, hydrolysis, thermal decomposition, biodegradation

## INTRODUCTION

Poly(lactic acid) (PLA) is a biodegradable thermoplastic polymer that possesses good mechanical and processing properties, which can be obtained from 100% natural sources as

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