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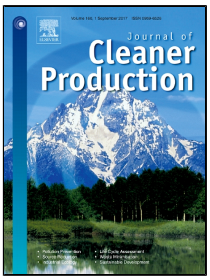

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UV and thermal stability of soft PVC plasticized with cardanol derivatives

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Abstract

This work is aimed to the study of the thermal and UV stability of Poly Vinyl Chloride (PVC) plasticized by cardanol derivatives. To this purpose, soft PVC obtained by cardanol derivatives, as well as by commercial plasticizers, were subjected to different sources of degradation, i.e. thermal treatments and UV weathering, and characterized by means of the tensile tests. Analysis of variance (ANOVA) was used to highlight the statistical significance of the type of plasticizer and treatment of soft PVC on the mechanic properties. In particular, estimation of the retention index of different plasticizers to different sources of degradation allowed highlighting the better performances of PLACARD compared to the other commercial plasticizers. In absence on any relevant loss of plasticizer during thermal treatment or UV weathering, the change in mechanical properties was attributed to change in the chemical structure of PVC homopolymer, which was studied by FTIR analysis. It was shown that the better retention of property of soft PVC plasticized by PLACARD is due to a lower amount of thermal or UV activated degradation. Therefore, the results highlight that PLACARD plasticizer can also act as an efficient thermal and UV stabilizer, which could increase soft PVC durability and recyclability, and contribute to a reduction of the amount of thermal and UV stabilizers, with additional relevant effects on the toxicological and environmental impact of soft PVC.