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Ink Removal on Plastic Films Printed by Flexography

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[Fernando Bozzola](#), [Bruna Guilherme do Nascimento](#), [Joel C. Vasco](#), [Nelson Silva](#), [Fernando Lagoa](#), [Carlos Capela](#), [Lizete Heleno](#), [Marcelo Gaspar](#) & [Nelson S. Oliveira](#) 

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Abstract

Plastics are key engineering materials for our society and economy, mainly due to their multifunctionality and ease of processing. Nonetheless, their main drawback is related to the fact that when these cannot be reprocessed, they do generate waste, which leads to several environmental impacts. Therefore, considering plastics' circularity, minimizing their waste, and the resulting impacts, stresses the need for these to be recyclable. One of the main challenges that concern their recyclability is the deinking of plastic films when printed by flexography. The current technology uses non-bio-based surfactants and non-renewable surfactants, which are harmful to the environment. Therefore, the main objective of current research is to develop an environmentally sustainable process for ink removal on printed post-industrial flexible plastic films using bio-based surfactants. This process focuses on obtaining a deinked plastic that may be reprinted, avoiding this way for inappropriate disposal or reprocessing problems. The value increase of upcycling such post-industrial waste makes it possible to match the quality of the virgin plastic, which is key to carrying out an effective cost analysis of recycled plastic when compared to the new plastic films. Dedicated laboratory deinking procedures were undertaken with transparent polyethylene films printed by flexography with different conditions. Preliminary results show the dedicated experimental ink removal procedure using bio-based surfactants to be effective and environmentally sustainable.