

DEVELOPMENT OF BIOPLASTIC FILMS WITH GOOD BARRIER PROPERTIES FOR PAPER LAMINATION

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ABSTRACT

Despite the advantages of paper in food packaging applications, such as biodegradable, recyclable, from renewable sources, flexible, good printability and low cost, this material has poor oxygen and water vapor barrier properties limiting its use in certain products (He et al., 2021). These barrier properties are important to retard lipid oxidation and the growth of mold and yeast, thus increasing the shelf life of the food product (Zainal Arifin et al., 2023).

To overcome this problem, this study focuses on the development of composite films with bioplastics with low thickness to integrate in a multilayer packaging laminated with a paper sheet, to be recycled or biodegradable (Zhao et al., 2020).

The composites were produced with bio-PP, PVOH and PLA/PBAT blend, with different particles and functional agents. The compounding was performed in a co-rotating twin-screw extruder and the samples were produced on a film extrusion line. The composite films were characterized in terms of their morphology, mechanical and barrier properties through scanning electron microscopy (SEM), tensile tests, water vapor transmission (WVT) and oxygen permeability tests.

The results demonstrated that the laminated paper/thermoplastic film can have excellent oxygen barrier properties, good structural properties with a thick paper layer and good water vapor barrier properties with enhanced oxygen barrier and mechanical properties using some of the biocomposites (for production biodegradable packaging) or one of the polymers (for the production of recyclable packaging) matrices.

Keywords: Bioplastic, Paper, Extrusion, Permeability, Food packaging

Acknowledgements: The authors are grateful for the financial support granted by the Recovery and Resilience Plan (PRR) and by the Next Generation EU European Funds to PIEP, through the Green Agenda for Business Innovation "From Fossil to Forest – Sustainable packaging and products to replace fossil plastic" (Project no.8 with the application C644920945-00000036).

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