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## Development of polybutyrate (PBAT) based biodegradable film with wheat flour as a filler material

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Plastic has become an important part of every aspect of modern life. But excessive and unwise use of plastic results in the deterioration of the environment and has harmful effects on human health. To solve this problem, there is a need to search for an alternative, such as biodegradable plastic. Polybutylene adipate terephthalate or polybutyrate (PBAT) is a biodegradable random copolymer with good features for packaging applications. However, its high cost limits its current usage at the commercial level. To reduce the cost, fillers and other additives can be used. In this study, a starch-based biodegradable composite (for food wrapping and shopping bags) was successfully prepared by incorporating wheat flour (WF) into the PBAT matrix. WF and PBAT were mixed to form a uniform sheet at different composition ratios (10%, 20%, 30%, and 40% of WF) using the extrusion method. Mechanical properties such as tensile strength, elongation at break, and tear resistance were examined using a universal testing machine. Comprehensive characterization was done including FT-IR, SEM, and particle size distribution. Test for overall migration was done according to SLS 1718:2021 for aqueous and fatty food. According to the results obtained, the mechanical properties of the sheets we developed, decreased with increasing filler content, but three composites had sufficient values to be used as food wrapping material. No heavy metals were detected from the analysis by ICP-MS. Migration test data proved that 20% WF composite was ideal for aqueous food wrapping purposes and 30% WF composite can be used for other packaging purposes.

**Keywords:** Biodegradable polymer, filler, PBAT, starch-based, extruder

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