

Exploring the Structural and Functional Properties of Novel Biodegradable Polymers for Sustainable Packaging Applications

Miss. Rafat Sabir Chafekar

Department of Chemistry

M. M. Jagtap College of Arts, Science and Commerce, Mahad-Raigad, Maharashtra, India

Abstract: *This study focuses on the synthesis, characterization, and application of novel biodegradable polymers derived from renewable resources for potential use in sustainable packaging materials. A series of polymeric materials were synthesised via the polymerization of bio-based monomers obtained from agricultural by products. The thermal, mechanical, and barrier properties of the synthesised polymers were systematically investigated. Moreover, gas permeability measurements indicated excellent barrier properties against oxygen and moisture, crucial for extending the shelf life of packaged goods. Preliminary studies on the cytotoxicity of these materials revealed promising biocompatibility, suggesting potential applications in biomedical fields. In conclusion, the synthesised biodegradable polymers exhibit favourable structural, mechanical, and barrier properties, making them promising candidates for sustainable packaging materials. Further research will focus on optimising their properties and exploring wider applications in various industries, aligning with the growing demand for environmentally friendly materials. This abstract illustrates how a research paper in materials chemistry might be summarised, highlighting the synthesis, characterization, properties, and potential applications of novel biodegradable polymers for sustainable packaging*



Keywords: Biodegradable polymers, Sustainable materials, Renewable resources, Packaging materials, Polymer synthesis, Structural characterization, Mechanical properties, Barrier properties, Thermal stability, Environmental degradation, Bio-based monomers, Spectroscopic analysis, Gas permeability, Cytotoxicity, Biocompatibility, Controlled degradation, Shelf-life extension, Eco-friendly materials, Polymer applications, Sustainable development