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Project title: Enhancing Fiber-Based Packaging: Comparative Modeling and Innovation in Press Forming and Thermoforming of Paperboard

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Abstract (approx. 200 words)**:**

This research investigates advanced forming techniques, press forming and thermoforming, for converting paperboard into three-dimensional packaging structures. Through a combined approach of Finite Element modeling and experimental validation, the study aims to identify critical process parameters such as heat, friction, and tool-material interactions that influence production efficiency and product quality. Additional focus is placed on integrating sliding mechanisms to improve formability and surface finish, and on employing 3D-printed molds to accelerate prototyping and enable more complex geometries.

The work addresses key challenges in the forest-based packaging industry, where the demand for renewable, recyclable, and biodegradable materials is rapidly increasing as a sustainable alternative to plastics. By optimizing forming processes, this research seeks to reduce production time, enhance tool durability, and improve the precision and versatility of fiber-based packaging.

The intended outcome is to enable the forest-based industry to scale up high-quality, eco-friendly packaging solutions, strengthening its contribution to the circular economy. This research will support the industry's transition toward smarter, greener, and more adaptive manufacturing practices, positioning paperboard-based packaging as a competitive and sustainable solution for the future.

Key words:
Paperboard forming; Fiber-based materials; Sustainable packaging; Process optimization