SESSION 2B – GREEN MATERIALS AND PRODUCTS II

A SHORT REVIEW ON PLA BIODEGRADABLE GREEN PACKAGING REINFORCED NANO FILLER

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Polylactic acid (PLA) is gaining popularity for green packaging due to its eco-friendly nature. However, drawbacks like brittleness and low heat resistance limit its wider use. This review explores how reinforcing PLA with nanoclay fillers can improve its properties, including mechanical strength, heat tolerance, and barrier functions, while maintaining biodegradability for sustainable packaging. While these enhancements offer advantages, challenges such as dispersion of the fillers, cost factors, and safety regulations will also be addressed. Future research will focus on developing efficient techniques for using nanofillers. Overall, this review emphasises the immense potential of PLA-nanofiller composites as a promising and practical alternative for eco-friendly packaging, aligning with global efforts to reduce plastic waste and environmental damage.

Keywords— polylactic acid (PLA); nano fillers; green packaging; biodegradability

RELEASE KINETICS OF THYMOL AND ANTIBACTERIAL PROPERTIES OF STARCH FILMS CONTAINING CNP-T AND FREE THYMOL

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Millions of tons of food are wasted globally every year, usually due to inadequate storage and handling practices. This not only leads to food insecurity but also emits greenhouse gases that are harmful to the environment. Plastics are frequently used for food storage, but their non-biodegradable nature is also harmful to the environment. Addressing these challenges requires sustainable packaging alternatives with active attributes such as antibacterial properties that can prolong the food shelf-life. Starch-based films incorporated with chitosan nanoparticles encapsulating thymol (CNP-T) and free thymol were produced via solvent casting. The release kinetics of thymol from films into food simulants were investigated. The antibacterial activity of films on Staphylococcus aureus and Salmonella typhimurium was also investigated via disc diffusion analysis. The results indicate that the starch films containing CNP-T exhibited a significantly improved controlled release profile of thymol compared to that of free thymol. The films incorporated with CNP-T show a larger inhibition zone of all bacteria than those incorporated with free thymol. The starch-based films with CNP-T present a promising approach to maintaining food quality while mitigating the environmental impact. This research contributes to the development of sustainable solutions for addressing global challenges in food.