Masters Thesis Information Showcase
Spring Semester-2026
Year 2026

	Department: Chemistry Programme: MS Industrial Chemistry Specialization: Industrial Chemistry
1	**Title of the Thesis** Synthesis of Biodegradable Carbohydrate-based Coatings/Films for packaging food commodities.
2	**Abstract** (min 300 to 500 words) Biodegradable packaging films are receiving a lot of interest as eco-friendly alternatives to regular plastic packaging. This is driven by growing concerns about the environment and food waste. Among different biodegradable materials, composite films made from biopolymers and natural waxes have shown great potential for improving food preservation and moisture barrier properties. Sugarcane wax (SCW) has a hydrophobic nature that can improve the performance of edible and biodegradable films used in food packaging. However, hydrophilic polymer-based films such as gelatin, PVA, and chitosan generally exhibit poor resistance to water vapor transmission, limiting their practical application in food packaging systems. Therefore, improving the moisture barrier properties of these films remains a major challenge. The present study aimed to develop and optimize biodegradable composite films containing gelatin, PVA, chitosan, glycerol, Tween 80, and varying concentrations of SCW (0.5-2.0%). The films were prepared through the casting method and characterized for water vapor transmission rate (WVTR) and related barrier properties to evaluate the effect of SCW incorporation on film performance. The results revealed that the incorporation of SCW significantly improved the moisture barrier properties of the films. Among all formulations, the optimized film (G-1.5) exhibited the lowest WVTR value (81.52 g/m²·day), indicating superior resistance against water vapor transmission. The improved barrier performance was attributed to the uniform dispersion of SCW within the polymer matrix, which created a more compact and hydrophobic structure, thereby reducing moisture diffusion through the films. In conclusion, the optimized SCW-based composite film demonstrated enhanced moisture barrier properties and showed strong potential for sustainable biodegradable food packaging applications.
3	**Impact on SDG#___"** (min 500 words) (Please mention the impact of the relevant attained SDG) 12 RESPONSIBLE CONSUMPTION AND PRODUCTION This project supports SDG 12 by developing a biodegradable film using renewable and natural materials such as Aloe vera extract and sugarcane wax. It reduces reliance on conventional plastic packaging and promotes sustainable production practices.

	The project contributes to SDG 13 by providing an eco-friendly alternative to petroleum-based plastics, helping to reduce plastic waste and its associated environmental impacts. This project supports SDG 15 by reducing the accumulation of non-biodegradable plastic waste that can harm terrestrial ecosystems. The use of biodegradable materials helps minimize soil pollution and promotes a healthier environment for land-based biodiversity.
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6	**Graphical Abstract**