DEVELOPMENT OF POLYMER CURTAIN TECHNOLOGY BASED ON DRY EXTRACT OF CHAMOMILE (MATRICARIA CHAMOMILLA)

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Abstract

This thesis explores the innovative development of polymer curtain technology utilizing the dry extract of chamomile (Matricaria chamomilla). Chamomile is renowned for its medicinal properties, particularly anti-inflammatory and antimicrobial effects. This research aims to integrate chamomile extract into polymer matrices, enhancing the functional properties of curtains while providing additional health benefits. The study encompasses the extraction process, polymer formulation, and performance evaluation of the resulting curtains.

Introduction

The use of natural extracts in textile applications has gained traction due to increasing consumer demand for eco-friendly and multifunctional materials. Chamomile, a plant known for its healing properties, presents a unique opportunity for incorporation into polymer-based fabrics. This thesis investigates the potential of chamomile extract to impart beneficial characteristics to polymer curtains, such as odor control, antimicrobial activity, and skin-soothing effects.

Literature Review

Chamomile Properties

Chamomile (Matricaria chamomilla) contains several bioactive compounds, including flavonoids, terpenoids, and phenolic acids, which contribute to its therapeutic effects. Studies have indicated that these compounds exhibit anti-inflammatory, antioxidant, and antimicrobial activities, making chamomile an ideal candidate for functional textile applications.

Polymer Materials

Polymers such as polyethylene, polypropylene, and polyvinyl chloride (PVC) are commonly used in curtain manufacturing. Their lightweight, durability, and versatility make them suitable for a variety of applications. However, incorporating natural extracts into these polymers can enhance their functional properties, leading to novel applications in home textiles.

Methodology

Extraction of Chamomile

The dry extract of chamomile was obtained through a standardized extraction process involving maceration and solvent extraction. The extract was characterized using high-performance liquid chromatography (HPLC) to quantify the main bioactive compounds.

Polymer Formulation

Various polymer matrices were tested for compatibility with chamomile extract. Blends of polyvinyl chloride (PVC) and natural fibers were prepared, and chamomile extract was incorporated at varying concentrations. The resultant mixtures were processed using extrusion and molding techniques to create curtain samples.

Performance Evaluation

The curtains were evaluated for mechanical properties, durability, and functional characteristics. Tests included tensile strength, water resistance, and antimicrobial activity against common pathogens such as Staphylococcus aureus and Escherichia coli. Additionally, sensory evaluations were conducted to assess odor control and user comfort.

Results

Extraction Yield and Composition

The extraction process yielded a concentrated chamomile extract rich in flavonoids and essential oils. HPLC analysis revealed significant levels of apigenin and chamazulene, both known for their beneficial properties.

Mechanical and Functional Properties

The incorporation of chamomile extract into the polymer matrix enhanced mechanical strength and flexibility. The antimicrobial tests demonstrated a significant reduction in bacterial growth on treated samples, confirming the efficacy of chamomile in imparting antimicrobial properties.

Sensory Evaluation

User feedback indicated a preference for the chamomile-infused curtains due to their pleasant aroma and perceived health benefits. The curtains were reported to contribute to a calming environment, aligning with chamomile's traditional use in promoting relaxation.

Discussion

The development of polymer curtain technology using chamomile extract presents a promising avenue for creating multifunctional textiles. The successful integration of natural extracts into synthetic materials addresses the growing consumer demand for sustainable and health-oriented products. Further research is needed to optimize the extraction process and enhance the stability of bioactive compounds within the polymer matrix.

Conclusion

This study demonstrates the feasibility of developing polymer curtains infused with chamomile extract, showcasing enhanced mechanical properties and antimicrobial activity. The findings support the potential for broader applications of natural extracts in textile technology, paving the way for innovative, eco-friendly products that cater to consumer health and wellness.

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