PHOTOCATALYTIC AND ANTIBACTERIAL BEHAVIOR OF COMPOSITE NANOFILMS, CONTAINING POLYLACTIDE (PLA), POLYVINYLPYRROLIDONE (PVP) AND HYDROZINCITE

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Materials and Methods

The nanocomposite poly (lactide)/hydrozincite film is prepared by the following steps: A. Preparation of a hydrozincite suspension (\(\text{Zn}_2(\text{OH})_2\text{CO}_3\)), 5wt% (synthesized by hydrothermal method at 180° C using Mentha Arvensis) and dichloromethane; B. A solution of poly (lactide)/PLA/ in dichloromethane was added. After mixing the hydrozincite and PLA, the resulting solution was sonicated for 15 minutes until the suspension became homogeneous; C. Thin films of poly (lactide)/hydrozincite with copolymer polyvinylpyrrolidone/PVP/ were prepared as described above, but PVP was dissolved in ethanol added to the nanocomposite suspension.

Characterization

The comparative photocatalytic investigations about degradation of two model dyes – Malachite Green (MG) and Reactive Black 5 (RBS) in aqueous solution (5 ppm) under UV light were performed. The PLA/Hydrozincite and PLA/Hydrozincite/PVP photocatalysts have higher degradation degree towards MG dye after 150 minutes UV irradiation (31 and 87 % resp.) than those towards RBS dye (about 25%).

Antimicrobial activity

The photocalytic activity and antibacterial efficacy against Escherichia coli (food pathogen) of the synthesized nanofilms were investigated.

CONCLUSIONS

- The photocalytic activity and antibacterial efficacy against Escherichia coli (food pathogen) of the synthesized nanofilms were investigated.
- The films have excellent bactericidal activity against E.Coli. After 1 hour of contact, the bacterial concentration decreased by about 97% and 99% for PLA/Hydrozincite and PLA/Hydrozincite/PVP, respectively.
- The biocomposite films of PLA and PLA/PVP containing 5wt% hydrozincite powders could be used as an alternative of standart food package materials.