

Development of active agents filled polylactic acid films for food packaging application

ABSTRACT

The growing global awareness for environmental protection has inspired the exploration on producing active packaging films from bio-based materials. In present work, three types of active agents were studied by incorporating thymol(T), kesum(K), and curry(C) (10% wt.) into polylactic acid (PLA) to produce PLA-10T, PLA-10K, and PLA10-C packaging films via solvent casting method. The morphology, functional chemistry, thermal stability, permeability, and antimicrobial properties were evaluated for PLA films. Functional chemical analysis confirmed the presence of interfacial bonding between aromatic groups of active agents and PLA carbonyl group. PLA-10K exhibited the highest thermal resistance comparing to PLA-10T and PLA-10C while water vapor barrier was enhanced after incorporation of active agents. Qualitative observation had indicated that chicken meat could be preserved in the active films until 15 days, while odourless and firm texture properties retained in food sample. For disc diffusion assay (in vitro), it showed positive results against Gram-positive bacteria (*Staphylococcus aureus*) whereas with negative results against Gram-negative bacteria (*Escherichia coli*) and *Aspergillus Brasiliensis* due to embedded active agents within PLA matrix. We concluded that produced active agents filled PLA films potential to use in food packaging application to enhance the shelf life of meats, fruits and vegetables product.

Keyword: Polylactic acid; Essential oil; Thermal behavior; Meat preservation