

Microbial study of pH sensitive starch based film using agar diffusion method (zone inhibition assay)

ABSTRACT

Active and smart packaging is a promising form of food packaging that offers a great economical potential due to consumer demand for a packaging that accommodate a hectic way of life. An antimicrobial film with pH colour indicator (pHF) can be made by incorporating suitable antimicrobial (AM) agent and colour indicator into food package matrices whilst applying a bio switch concept to inhibit the pathogenic microorganisms and respond automatically to changes (external stimuli) in the environment. The present work aimed to study the developed formulation of hydroxyethylcellulose (HEC)/wheat-starch based pHF film in which the active compound, thymol (0.5, 1, 1.5, 2, and 2.5% w/w) and 50:50% w/w bromothymol blue and methyl red (as the colour indicator) against microbial growth. A solution casting method was used in the film preparation while thymol and colourant were incorporated prior to casting. The effect of thymol showed a range of microbial inhibition zones of 16.3 - 26.4% and 22.1 - 39.9% towards *E. coli* and *B. subtilis*, respectively. Whilst, a lower inhibition zone of 0.4 - 5.1% was demonstrated for fungus *A. niger*.

Keyword: Active and smart packaging; Antimicrobial; Thymol; Hydroxyethylcellulose; Methylr; Bromothymol blue