Sudsuda Vanit 2010: Development of Antimicrobial Clove Oil - Incorporated Modified Starch - Coated Papers. Master of Science (Packaging Technology), Major Field: Packaging Technology, Department of Packaging and Materials Technology. Thesis Advisor: Assistant Professor Tunyarut Jinkarn, Ph.D. 138 pages.

Papers and paperboards are widely used packaging materials. As a basis property, papers can effectively absorb various substances in solution forms into their structure. Therefore, this study aimed to develop antimicrobial papers by coating with clove oil-incorporated hydrophobic starch. The study composed of three parts. First part was to investigate a minimum inhibitory concentrations (MICs) and antimicrobial inhibitory effects of pure clove oil which was diluted with dimethylsulfoxide (DMSO) (30 µl /ml) and clove oil in hydrophobic starch solution (5% and 8%, w/w). The inhibitory effects were investigated against three types of common food spoilage bacteria including *Escherichia coli, Bacillus cereus* and *Staphylococcus aureus* using the agar well diffusion method. For the second part, three types of antimicrobial papers were developed including duplex board, kraft liner and pure eucalyptus handsheet. The paper samples were coated with clove oil in hydrophobic starch solution, then, antimicrobial inhibitory effects were observed *via* headspace diffusion and a total plate count method. For the last part of the study, physical and mechanical properties of antimicrobial papers were investigated. Results of the first part showed that clove oil diluted with DMSO and clove oil in hydrophobic starch solution (8% w/w) were the most effective against the growth of *E. coli* with an MIC of 1.25 % while MICs for other two bacteria (*B. cereus* and *S. aureus*) was at 2.5%. However, clove oil in hydrophobic starch solution (5% w/w) can only inhibited the growth of *E. coli* with an MIC of 2.5 %. Furthermore, antimicrobial papers coated with 15% (w/w) clove oil in 8% (w/w) hydrophobic starch solution was the most effective against the growth of all bacteria under this study. For the last part of the study, basis weight and thickness of coated papers were significantly increased ($p \leq 0.05$) with slightly color change to a yellow tone. Although the coating had no effect on mechanical properties of duplex board and kraft liner, compression and bursting strength of coated handsheet was significantly increased ($p \leq 0.05$) compared with uncoated samples. In additions, for handsheet, higher amount of hydrophobic starch in the coating solution resulted in better ring crush resistance.

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