

Suwarat Rakchoy 2009: The Development of Antimicrobial Vanillin Coated Paperboard for Packing Bakery Products. Master of Science (Packaging Technology), Major Field: Packaging Technology, Department of Packaging Technology. Thesis Advisor: Assistant Professor Tunyarut Jinkarn, Ph.D. 149 pages.

Paperboard is considered a widely used packaging material for retail sales of bakery products. In general, bakery products are easily deteriorated and have limited shelf life. This study aimed to develop antimicrobial paperboards by coating with vanillin for packing bakery products. The study composed of three parts. First part was to investigate antimicrobial effects of vanillin in different solvents including vanillin in Dimethylsulfoxide (DMSO), vanillin in alcohol and vanillin in chitosan solution. 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. The second part of the study was to develop vanillin coated paperboard using vanillin in alcohol and vanillin in chitosan solution. Physical properties and antimicrobial inhibitory of coated paperboard were observed via headspace diffusion and a total plate count method. Suitable coating solution derived from this part was selected for the next part of the study. The last part of the study was the application test of coated paperboard with bakery product and roll cake was selected for a case study. Results showed that vanillin in DMSO and vanillin in alcohol were more effective over *E. coli* with a minimum inhibitory concentration (MICs) for all bacteria under investigation at 2.5 % (w/w). On the other hand, vanillin in chitosan solution was more effective over *B. cereus* with a minimum inhibitory concentration (MICs) at 0.625 % (w/w) followed by *E. coli* and *S. aureus* respectively with the MICs for both *E. coli* and *S. aureus* at 5%. Results of the second part of the study showed that paperboard coating with vanillin in alcohol has similar appearance as uncoated sample. Furthermore, physical properties of coated paperboard were under general standard. Coated paperboard also explicitly showed inhibitory effect against all bacteria under the study and vanillin in alcohol at 10% (w/w) demonstrated the most suitable results. Antimicrobial paperboard carton was used for packing roll cake and shelf life can be extended for 3 days at room temperature and for 6 days at 4 °C. In addition, vanillin coated paperboard were preferred by all sensory panelists. Results of this study pointed out feasibility of applying vanillin coated paperboard for packing bakery products to extend shelf, to ensure consumer safety and to enhance product flavoring.

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Student's signature

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Thesis Advisor's signature