

THESIS

**FINISHING COTTON AND SILK FABRIC WITH
GLYOXAL- β -CYCLODEXTRIN COMPLEXES**

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**A Thesis Submitted in Partial Fulfillment of
the Requirements for the Degree of
Master of Science (Chemistry)
Graduate School, Kasetsart University**

2007

Taweesak Boonsod 2007: Finishing Cotton and Silk Fabrics with Glyoxal- β -cyclodextrin Complexes. Master of Science (Chemistry), Major Field: Chemistry, Department of Chemistry. Thesis Advisor: Mrs. Potjanart Suwanruji, Ph.D. 92 pages.

The preparation of glyoxal- β -cyclodextrin complexes were studied using different molar ratios of β -cyclodextrin to glyoxal (1 : 7, 1 : 14 and 1 : 21), catalysts ($\text{Al}_2(\text{SO}_4)_3$ and Na_2CO_3) and reaction temperatures (Room temperature (RT), 50 °C, and 80 °C). The formation of the complexes was confirmed by FTIR, TGA, and DSC analysis. The synthesized glyoxal- β -cyclodextrin complexes were applied on cotton and silk fabrics by pad-dry-cure process. The conditions of time and temperature in the dry and cure processes for each fabric were studied. The amount of glyoxal- β -cyclodextrin complexes on the fabrics were analyzed using a phenolphthalein indicator. TGA and SEM techniques were also used to confirm the complexes on the treated fabrics. The glyoxal- β -cyclodextrin treated fabric was washed once to study the durability of the complexes on the fabric. The fabric retained the complexes after a cycle of washing. Vanillin was loaded to the fabrics by immersing and padding processes. UV-Vis spectrophotometer was used to analyze the concentration of vanillin on the fabric. The result showed that immersing method can load more vanillin on fabrics than padding method. During the 25-day experiment, the amount of vanillin on the glyoxal- β -cyclodextrin treated fabrics was higher than the untreated fabrics. The results indicated that finishing fabrics with glyoxal- β -cyclodextrin complexes could encapsulate loaded vanillin to release over a longer period of time.

Student's signature

Thesis Advisor's signature

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ACKNOWLEDGMENTS

I wish to express my sincere gratitude and appreciation to my advisor, Dr. Potjanart Suwanruji, for her valuable advice, stimulating, helpful discussion, encouragement and kindness throughout the course of my graduate study at Kasetsart University. I am also deeply grateful to Dr. Monthon Nakpathom, my co-advisor, for his technical advice and helpful assistance. My appreciation goes to Associate Professor Dr. Cholticha Noomhorm, Dr. Pinsuda Viravathana, the graduate committee, and Associate Professor Dr. Thongchai Srinophakhun who is the representative of the Graduate School of Kasetsart University, for their valuable comments and suggestions.

I would like to sincerely thank the Thailand Institute of National Science and Technology Development Agency to all those and many others who helped make this possible, I extend my heartfelt thanks and appreciation.

I would like to thank the Department of Chemistry and staffs, Faculty of Science, and Kasetsart University.

I also would like to thank my friends for their help in various ways during this work. Finally, I would like to express my deep gratitude to my family for their kindness and encouragement.

Taweesak Boonsod

October 2007