PRODUCTION OF BIORESIN BY PARTIAL REPLACEMENT OF PHENOL IN PHENOL-FORMALDEHYDE FORMULATION WITH LIGNOSULFONATE

NADHIRA ABDULLAH

Final Year Project Report Submitted in
Partial Fulfilment of the Requirements for the
Degree Bachelor of Science (Hons.) Chemistry
in the Faculty of Applied Sciences
Universiti Teknologi MARA

JANUARY 2016

ACKNOWLEDGEMENTS

Upon completion of this project, I would like to express the deepest appreciation to my supervisor, En. Haslizaidi bin Zakaria and my co-supervisor Prof. Madya Dr. Nor Yuziah binti Mohd Yunus, who has the attitude and substance of a genius; they continually and convincingly conveyed a spirit of adventure in regard to research and scholarship, and excitement in regard to teaching. Without their guidance and persistent help this dissertation would not have been possible.

I also would like to thank to my friends, who helped me when I'm in need, also lending a hand in completing the project. A thank you to the lab assistants En. Fauzi, En. Rudaini, En. Zahir, En. Azman, En. Hafiz and En. Suhairi who help me a lot in this final year project for my final semester. Moreover, love and affection to our parents for the tireless supports and prayers in everything I do. Finally Alhamdulillah all praise to Allah, the merciful and compassionate, for without Him all things are impossible.

Nadhira Abdullah

TABLE OF CONTENTS

ABSTRACT

PRODUCTION OF BIORESIN BY PARTIAL REPLACEMENT OF PHENOL IN PHENOL-FORMALDEHYDE FORMULATION WITH LIGNOSULFONATE

Lignin was isolated from "serai wangi" black liquor with sulfuric acid at ambient temperature. It was found that the percentage lignin content in lignin sample was 82.55%. Phenol-formaldehyde (PF) was prepared to act as reference. Lignosulfonate-phenol-formaldehyde (LPF) resin was prepared by using two steps. First step consists of preparation of lignin phenol adduct (LP) and second step is the preparation of LPF resin. The properties of resin such as viscosity, non-volatile content and pH were investigated. In this study, LPF resin has lower pH value (4.91) and non-volatile content (29.36%) but higher in viscosity compared to PF resin. The isolated lignin, PF and LPF resins were analyzed by using Fourier transformed infrared (FTIR) and thermal gravimetric analysis (TGA). The analysis of LPF resin by FTIR showed similar structure to phenol resin while analysis of resins and lignin by using TGA showed degradation temperature was higher than 200 °C.