



University of Zabol
Graduate school
Faculty of Natural resource
Department of Wood Science and Technology

**The Thesis Submitted for the Degree of M.Sc (In wood
Composite products)**

**Manufacture of particleboard by using combination
adhesives from corn flour/black liquor.**

Supervisor:
Dr. H.R. Mansouri

Advisor:
Dr. B. Nosrati

By:
M. Hashemi

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Abstract

The purpose of this study, was improve the internal bonding of particleboard produced by natural adhesive of cornflour / black liquor. The variable factors in this study, were the ratio of cornflour to the black liquor at three levels in 40:60, 45:55, 50:50 and press pressure at three levels in 10, 15, 20 kg/cm². In performing this study of Eremorus, Hegzamyn and Nitric acid, were used as additives. For making the adhesive, Corn flour with boiling water were mixed and then for increasing the bonding properties of Corn flour mixture we added the NaOH 33%, to reducing the viscosity of this mixture and for increasing the adhesion properties, we added the black liquor with the certain ratio to the mixture. Then the wood chips cake containing adhesive-made was pressed at 200° C temperature and in 10 minutes pressing time. After preparation of adhesives, wood chips manually, mixed with an adhesive, uniformly and then wood cake was formed manually, and boards made with name of green board which havent formaldehyde emission and then the wood chips cake was pressed at 200° C temperature and in 10 minutes pressing time. With aim of decrease the final cost of particleboard panels made with synthetic resins we mixed corn flour to synthetic resins (MF,UF,MUF,PF) with various ratios. Internal bonding of this boards were measured according to the EN standard (310, 317, and 319). The results showed that the boards made with this adhesives have a good mechanical strength, so that in corn flour/ black liquor adhesive, the rate of 45% corn flour with 15 kg/cm² press pressure showed the best performance. And in combination adhesive by synthetic resins, for obtain high mechanical properties comparable to the particleboards made from 100% synthetic resins according to the European Norm, the best formulation was 30% corn flour and 70% MF with 20 kg/cm² press pressure and 10 minutes. Due to the created properties can be said that the cornflour / black liquor adhesive have a high potential for replacing the synthetic resins.

Key words: Cornflour, Black liquor, Natural adhesive, Particleboard, Internal bonding.