

SEAG-Symposium, October 14-18, 2002, Vietnam

“The role of dialogue and networking:
From a transitional to an industrialized country”

The Potential of Tannin from *Acacia mangium* Barks as Wood-Adhesive in Indonesia

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Abstract

Plantation forests of fast growing species have been very common in many countries. In Indonesia, through the industrial timber estates programs, more than 1 million hectares of fast growing species are planted every 5 years. *Acacia mangium* is mostly used for the development of timber estates, since it belongs to the most important wood species as raw materials for pulp and paper or medium density fiberboard (MDF) industries in Indonesia. In these industries, synthetic resins (e.g. urea formaldehyde, phenol formaldehyde, melamine formaldehyde) are used as adhesives. However, the supply of raw materials for the manufacture of synthetic resins are always in deficit and the prices for those have been escalating. In the industrial processing, the raw material of wood has to be debarked, because the bark decreases the pulp quality. Approximately 10–15% volume of every log is bark. Until now, the most utilization of bark in the factory is for energy production by burning. Better utilization of this product is preferable and on demand in order to reduce the proportion of synthetic resin used in wood-panel products, i.e. MDF. It is known that tannin extract, produced from tree bark, can be used as wood adhesive for the manufacture of wood based panels. To date, no serious attention has been given yet to use tannin as wood adhesive, especially in Indonesia. Research has been carried out in order to determine the potential of tannin from *Acacia mangium* as wood-adhesive. The key factors for the successful utilization of bark as adhesives are the polyphenol content in the bark and its reactivity to form condensation products. Results shown that the consumption of tannin in the bonded of wood based panels can decrease formaldehyde release. In general, the glueability of tannin is acceptable, except for low water resistance. Variation in the strength of the products bonded with tannin may be explained when the characteristics of these tannin are identified and their properties are evaluated.

Keywords: *Acacia mangium*, bark, synthetic resins, tannin, wood-based panel