

INTISARI

Lignin sebagai salah satu komponen utama penyusun kayu merupakan polimer bercabang yang unit perulangannya tidak teratur dan mekanisme pembentukannya tidak bersifat genetis (diturunkan). Lignin di dalam kayu berfungsi sebagai zat pengikat (*binder*) antar sel sehingga pohon dapat berdiri kokoh. Sifat inilah yang diupayakan pemanfaatannya sebagai bahan perekat dan pengikat, namun demikian pengetahuan tentang sifat karakteristik lignin sebagai zat pengikat masih sangat diperlukan sehingga pemakaian lignin sesuai dengan fungsinya di dalam kayu dapat dioptimalkan. Penelitian ini bertujuan untuk mengetahui sifat karakteristik isolat lignin pinus pasca sadap sehubungan dengan sifatnya sebagai zat pengikat yang memungkinkan penggunaannya sebagai perekat.

Karakterisasi lignin diteliti baik secara kuantitatif maupun kualitatif. Metode kuantitatif meliputi kandungan lignin, kadar metoksil, keasaman lignin, dan kadar abu (berdasarkan ASTM), kadar lignin murni (Browning, 1967), daya absorpsi air (Sathe dan Salunke, 1981), kadar hidroksil-fenolik (Goldschmid, 1957), dan bobot ekuivalen (Beckman). Metode kualitatif ditentukan dengan analisa IR (Rostika *et al.*, 1994), sedang pengujian kualitas perekat dilakukan pada berbagai variasi penambahan lignin, yaitu 0%, 5%, 10%, 15%, 20%, dan 25%, kemudian diuji berdasar SII.0778-83 dan ASTM D 805-63.

Hasil analisis kualitatif dan kuantitatif menunjukkan bahwa lignin pinus pasca sadap termasuk tipe guaiasil dan mempunyai kandungan lignin murni (43,94%), kadar hidroksil-fenolik yang rendah (1,41%), sedang kadar metoksil, daya absorpsi air, bobot ekuivalen tinggi, pH asam, dan kadar abu masing-masing 11,51%, 138,68%, 581,31, 3,45, 15,87%. Hasil pengujian kualitas perekat LFF menunjukkan bahwa penambahan lignin yang semakin tinggi akan meningkatkan kadar air, menurunkan berat jenis, dan keteguhan rekat serta persentase kerusakan kayu baik pada kondisi kering maupun basah. Namun demikian penambahan lignin hingga 10% memberikan indikasi yang baik sebagai pengganti fenol dan memenuhi syarat SII. 0778-83, bahkan penambahan lignin hingga 15% masih dimungkinkan.

Kata Kunci:

Lignin, *binder*, sifat karakteristik, keteguhan rekat



ABSTRACT

Lignin as one of the wood structural components which is a chain polymer, that its repeating structural units is not regular and the formation mechanism is not inherited characteristics. Lignin functions as binder among the cell within the stem that the tree could strongly stand. This characteristic was the idea of utilization as wood adhesive. However, the knowledge of lignin's natures as adhering material is still needed so that lignin utilization in related wood products could be optimized. This study is aimed at determining the characteristics of isolated lignin of sapped pines in accordance with its adhering nature that make possible for use as adhesive (binder).

Lignin was analyzed quantitatively as well as qualitatively. Quantitative method covered lignin contents, methoxyl constituent, lignin acidity, and ash components (according to ASTM), pure lignin constituent (Browning, 1967), water absorption (Sathe and Salunke, 1981), hydroxyl-phenolic (Goldschmid, 1957), equivalent weight (Beckman, 19..). Qualitative method consisted of Infrared spectrophotometer (Rostika *et al.*, 1994), while the adhesive quality was analyzed at various lignin addition i. e. 0%, 5%, 10%, 15%, 20%, and 25%. These were then subject to further analysis to conform with the SII. 0778-83 and ASTM D 805-63.

The qualitative and quantitative analysis results showed that the lignin of sapped pines is a guaiasil type and possessed 43.94% of pure lignin component, low hydroxyl-phenolic content (1.41%). However, the methoxyl, water absorption, equivalent weight, acidic pH, and ash content were high i. e. 11.51%, 138.68%, 581.31, 3.45, and 15.87% respectively. LFF (or Lignin Phenol Formaldehyde) adhesive quality testing results showed that increasing portions of lignin would increase the moisture content, but low the specific gravity, bond strength, and percentage of wood failure in dry and wet conditions as well. The addition of 10% of lignin showed good substitute of phenol and conforms with SII. 0778-83, furthermore additional of lignin up to 15% is still allowed.

Key words:

Lignin, *binder*, nature (basic characteristics), bond strength