

Analysis of Chemical Structures of EOL (Nitrobenzene oxidation method)

Since lignin is a polydisperse polymer with no extended sequences of regularly repeating units, its composition is generally characterized by the relative abundance of G/S/H units and by the distribution of interunit linkages in the polymer.

There are many classical analytical degradative methods such as nitrobenzene oxidation, thioacidolysis and derivatization followed by reductive cleavage (DFRC), permanganate oxidation, which reveal the G/S/H composition of the lignin.

1. Materials

- ① Lignin sample : Ethanol organosolv lignin (6th week)
- ② Equipment : Heating block, evaporator

2. Methods

- ① 40 mg of EOL is introduced in a glass bomb, and then 4 ml of 2 M NaOH and 250 μ l of nitrobenzene are added.
- ② The mixture is reacted in a heating vessel at 170°C for 2h and shaken every 20 min.
- ③ After reaction, the mixture is cooled in an ice bath and 20 μ l of 3-ethoxy-4-hydroxybenzaldehyde (1.0g/ 20ml) was injected as an internal standard.
- ④ Then, the mixture is extracted with 20 ml CH₂Cl₂ (x 2) followed by acidification with HCl (4M) until the pH below 2.
- ⑤ Afterward, a new extraction with 20 ml CH₂Cl₂ is carried out.
- ⑥ Combined extracts are dried over anhydrous sodium sulfate, and solvent is removed by evaporation.
- ⑦ The obtained products are silylated with pyridine and *N,O*-bis(trimethylsilyl) trifluoroacetamide (BSTFA) (1:1, v/v) at 105 for 2h.
- ⑧ The final products is analyzed by using GC/MS.

◆ Report

- ※ Investigate several analytical methods for determining lignin composition.
- ※ Interpret FT-IR graph and explain the overall lignin structure.

◆ Notice

- ※ Report should be written by MS words (10 points, line spacing 1) or Hancm office (10 points, line spacing 120).
- ※ Writing procedure of report (in Korean): 1. Introduction, 2. Materials and methods, 3. Results and discussion, 4. Conclusions, 5. References
- ※ Assignment should be appended to report. (If you copy and paste, you cannot get a grade)
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