2015 Wood Chemistry – 6th Week Lignin application (Ⅰ)

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Production of Ethanol Organosolve Lignin (EOL) by organosolv pretreatment

Lignin, one of major components in lignocellulosic biomass, is aromatic biopolymer formed by ester, and covalent bonds. However, due to its complexity, effective separation techniques are required for lignin utilization.

Generally, pulping processes such as kraft, soda, and sulfite have been developed for obtaining practical lignin. One of them, organosolv process (pretreatment) using organic solvent or organic solvent and water mixtures has increasing interests for producing lignin. Also, acid-catalyzed organosolv treatment improves the lignin properties, which could be possible to make lignin more desired for many application steps.

1. Materials

① Biomass: Yellow poplar (*Liriodendron tulipifera*) (40 mesh)

② Condition: 1 group – 0.5 % sulfuric acid, 140℃, 10 min
2 group – 1.5 % sulfuric acid, 150℃, 10 min.
3 group – 0.5 % sulfuric acid 180℃, 10 min

③ Equipment: Thermal reactor, aspirator, centrifugal separator

2. Methods

① Put a sample (50 g of wood powder) into glass vessel with 500 ml of a 50:50 % ethanol:water mixture (v/v).

② Sulfuric acid is added to the solution, and diluted with the mixture depending on concentration

③ React the mixture in thermal reactor followed by above each condition.

④ After reaction, cool the vessel down in ice chamber and take off.

⑤ Filter the sample with filter paper, and divide into solid and liquid hydrolysate fractions.

⑥ Liquid hydrolysate and distilled water are mixed, and centrifuged (12000 rpm, 15 min.)

⑦ Supernatants are discarded, and precipitates are lyophilized.

◈ Report

※ Discuss the experimental results according to the each condition by sharing data together

※ Compare differences between organosolv lignin and other practical lignins(kraft, lignosulfonate).

※ Report should be written by MS words (10 points, line spacing 1) or Hancom 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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