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Lignin and Optional Sugars Analysis for Woodchips

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1 Works for me This protocol is published without a DOI.

PDI Test

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ABSTRACT

Lignin and Optional Sugars Analysis for Woodchips
SOP 005-S-GF-19

PROTOCOL CITATION

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GUIDELINES

Klason lignin % = (mass paper and tin + lignin – mass paper and tin) / mass ODW sample
% Total Solids = [mass dry pan + sample – mass dry pan)/ mass of wet sample] x 100
Mass ODW sample =(mass air dry sample x % Total solids)/100
% Ash =[(mass crucible + ash - mass crucible)/ODW sample] x 100

Frozen and labeled sample filtrate should be given to Dr. Tirschner for HPLC sugars analysis

DISCLAIMER:

SOP 005-S-GF-19

BEFORE STARTING

Required Safety Supplies: Lab Coat, Nitrile Gloves, Eye Goggles, High Temperature Gloves

1 Prepare washed filter papers (VWR part # 28297-984)

2 Rinse the filter papers on a vacuum apparatus by flushing 3x with a 20 mL aliquot of nano-pure water

3 Place the rinsed filter paper onto an aluminum tray, up to 20 filter papers may be places onto one tray

4 Put the aluminum tray with rinsed filter papers into the muffle furnace at 550o C for 30 minutes

5 Take out the filter papers after 30 minutes, using heat resistant gloves and the tongs

6 Allow the aluminum tray and filter papers to cool for 1 hour at room temperature

7 Rinse the filter papers again on a filtration apparatus with 3 aliquots of nano-pure water

8 Place the filter papers onto another aluminum tray, and into an oven at 105o C overnight

9 Weigh the mass of the washed filter paper, and the mass of the filter paper plus aluminum tray

10 Weigh 250 – 300 mg of dried woodchips into a clean 250 ml beaker, add a clean glass rod to the beaker for later steps

11 Add 3 mL of 72% H2SO4 to the 250 mL beaker with pipettor while stirring the sample well, wear safety glasses, lab coat, and nitrile gloves while handling H2SO4

12 Place the beaker, sample, and glass rod into the vacuum desiccator and put under vacuum for 15 minutes

13 Take the beakers out of the desiccator and cover with aluminum foil

14 Place the covered beaker into a water bath at 30o C

15 Stir the contents of the beaker frequently over the 60 minutes with the glass rod

16 After 60 minutes, remove the beaker from the water bath

17 Add 84 mL of nano-pure water to the beaker, stir, and remove the glass rod free of any particles

18 Cover samples with aluminum foil and autoclave for 60 minutes at 120o C

19 Allow the beakers to cool to room temperature

20 Samples can sit here overnight at room temperature

21 If doing sugars, add 5 mL of 500 mg cellobiose solution (Internal Standard Solution)

22 Weigh a washed filter paper and labeled aluminum tin to the nearest 0.1 mg

23 Place the filter paper onto a filtration apparatus with a CLEAN Erlenmeyer vacuum flask

24 Pour the beaker through the filter paper and wash materials with 5 mL of nano-pure water

25 Transfer the filtrate to a 100 mL volumetric flask and dilute to the mark with nano-pure water.

26 Invert the volumetric flask 3 times to mix, and store 15 mL of filtrate into a clean, labeled scintillation vial

27 Scintillation vials can be frozen after the filtrate is diluted and collected

28 Wash the materials on the filter paper with nano-pure DI until the filtrate pH is neutral

29 Place the filter paper into the labeled tin and into the oven at 105o C to dry for 24-48 hours

30 Weigh 2-3 g of bulk material into a weighed and labeled aluminum tin for moisture determination

31 Ash the glass fiber filter paper/lignin sample (filter paper only, not the aluminum tray) in the muffle furnace (follow ashing SOP)