

Modified Van Soest method for lignocellulosic content analysis

Reagents

(a) Neutral-detergent solution. (I) Add 18.6 g ethylenediaminetetraacetic acid disodium salt (EDTA) and 6.8 g sodium borate in a 1 L flask with a little water for solution. (II) Place 30 g sodium dodecyl sulfate (SDS), 4.56 g Na_2HPO_4 , and 10 mL 2-Ethoxyethanol in another 1 L flask with hot water for solution. Mix (I) with (II), add water to 1 L, adjust pH to 6.9-7.1.

Experiment method for the determination of hemicellulose, cellulose and lignin

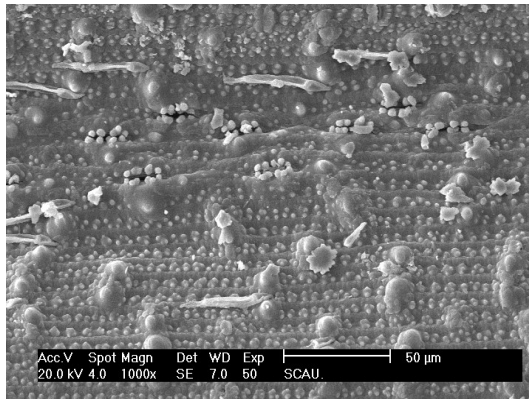
Weigh 1 g air-dry sample in a 100 mL iodine flask and add 70 mL neutral-detergent solution into the iodine flask. Place the iodine bottle into the pressure cooker at 100 °C for 40 min and 115-121 °C for 20 min. Using a 30 mL G3 sand core filter (aperture 15-40 μm) filtered the sample and wash the sample with hot water to pH 6.5-7.0. And then wash with 95% ethanol, ethanol, and acetone twice successively. Dry the residue in the oven until balance weight and record the weight W_0 .

Place the residue and the sand core filter in a 100 mL beaker. Add 70 mL HCl (2 mol/L) and take it into a pressure cooker at 100 °C for 50 min. Using the sand core filter filtered the sample and wash the sample with hot water to pH 7.0. And then wash with 95% ethanol, ethanol, and acetone twice successively. Dry the residue in the oven until balance weight and record the weight W_1 .

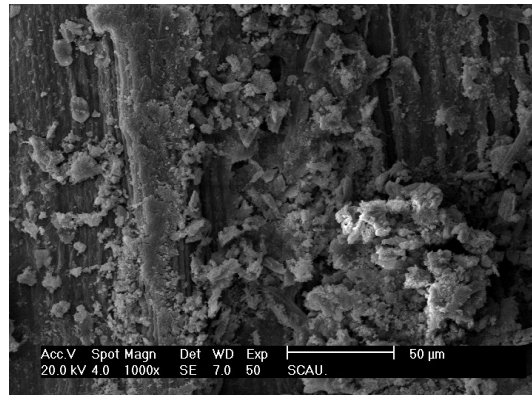
Place the residue and the sand core filter in a 150 mL beaker. Add 10 mL cooling 72% H_2SO_4 and degrade at 20 °C for 4 h. And then add 90 mL water to the residue and place it overnight at room temperature. Dry the residue in the oven until balance weight and record the weight W_2 .

The residue was incinerated in an electric muffle furnace at 575 °C for 4 h. The weight of ashed sample was recorded as W_3 .

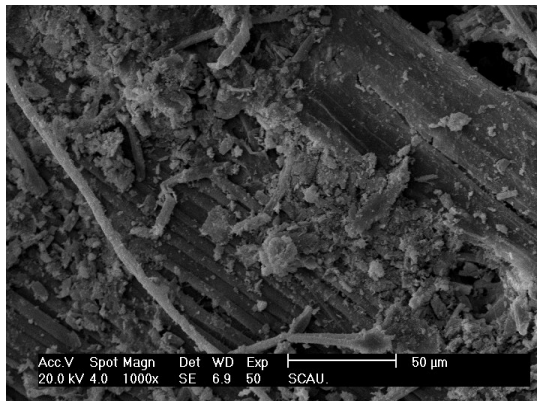
The lignocellulosic content was calculated as: **hemicellulose (W_0-W_1)**, **cellulose (W_1-W_2)**, **lignin (W_2-W_3)**, and **ash (W_3)**.



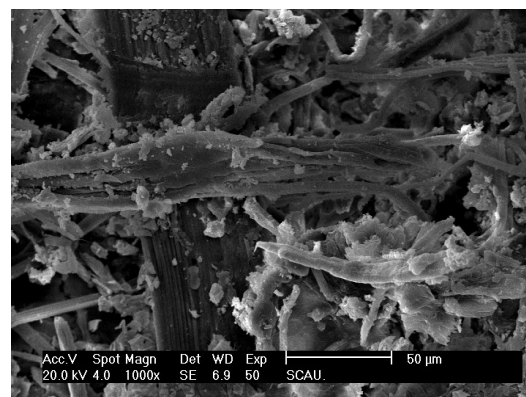
Raw rice straw



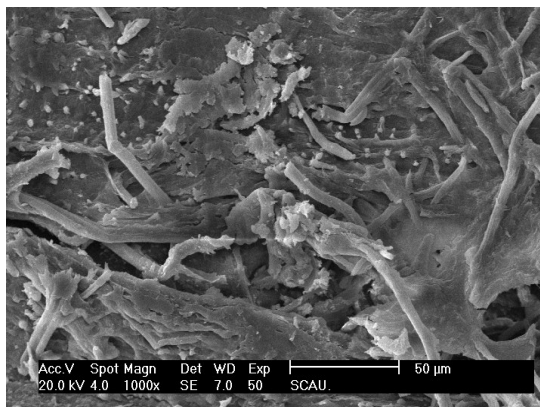
0.5%



1.0%



2.0%



4.0%

Supplement Fig. 1 SEM photographs of rice straw degraded by OEM1 for 12 days under various organic loads