Sorghum

REFERENCE MATERIAL

Pedigree

Institution: Oklahoma State University
Location: Garvin County, OK
Genotype: Hybrid E5200

Harvested: 2012
Received at INL: 2013
Sample Preparation: Ground to pass through a 1-inch sieve using a Vermeer BG480 grinder and a Bliss Hammermill with no screen

Composition

Table 1. *Chemical composition[a] of Reference Sorghum*

%Structural Ash	%Extractable Inorganics	%Structural Protein	%Extractable Protein	%Water Extracted Glucan[b]
4.07	2.57	2.18	1.39	0.58
%Water Extracted Xylan[b]	**%Water Extractives Others**	**%EtOH Extractives**	**%Lignin**	**%Glucan**
0.34	6.99	2.42	16.01	34.82
%Xylan	**%Galactan**	**%Arabinan**	**%Acetic Acid**	**%Total**
20.44	1.14	2.82	0.84	96.61

[a]Determined using NREL "Summative Mass Closure" LAP (NREL/TP-510-48087)
[b]Determined by HPLC following an acid hydrolysis of the water extractives

Proximate, Ultimate & Calorimetry

Table 2. *Proximate, ultimate, and calorific values for Reference Sorghum (reported on a dry basis)*

Proximate[a]			Ultimate[b]			Calorimetry[c]	
%Volatile	%Ash	%Fixed Carbon	%Hydrogen	%Carbon	%Nitrogen	HHV	LHV
77.81	7.77	14.42	5.63	45.62	0.68	7880	6554

[a]Proximate analysis was done according to ASTM D 5142-09
[b]Ultimate analysis was conducted using a modified ASTM D5373-10 method (Flour and Plant Tissue Method) that uses a slightly different burn profile
[c]Heating values (HHV, LHV) were determined with a calorimeter using ASTM D5865-10

Elemental Ash

Table 3. *Elemental ash composition[a] of Reference Sorghum*

%Al as Al_2O_3	%Ca as CaO	%Fe as Fe_2O_3	%K as K_2O	%Mg as MgO	%Mn as MnO	%Na as Na_2O	%P as P_2O_5	%Si as SiO_2	%Ti as TiO_2	%S as SO_3
2.65	4.37	1.07	18.58	7.37	0.08	0.41	2.52	50.70	0.19	1.98

[a]Determined as described in ASTM standards D3174, D3682 and D6349

Particle Characteristics

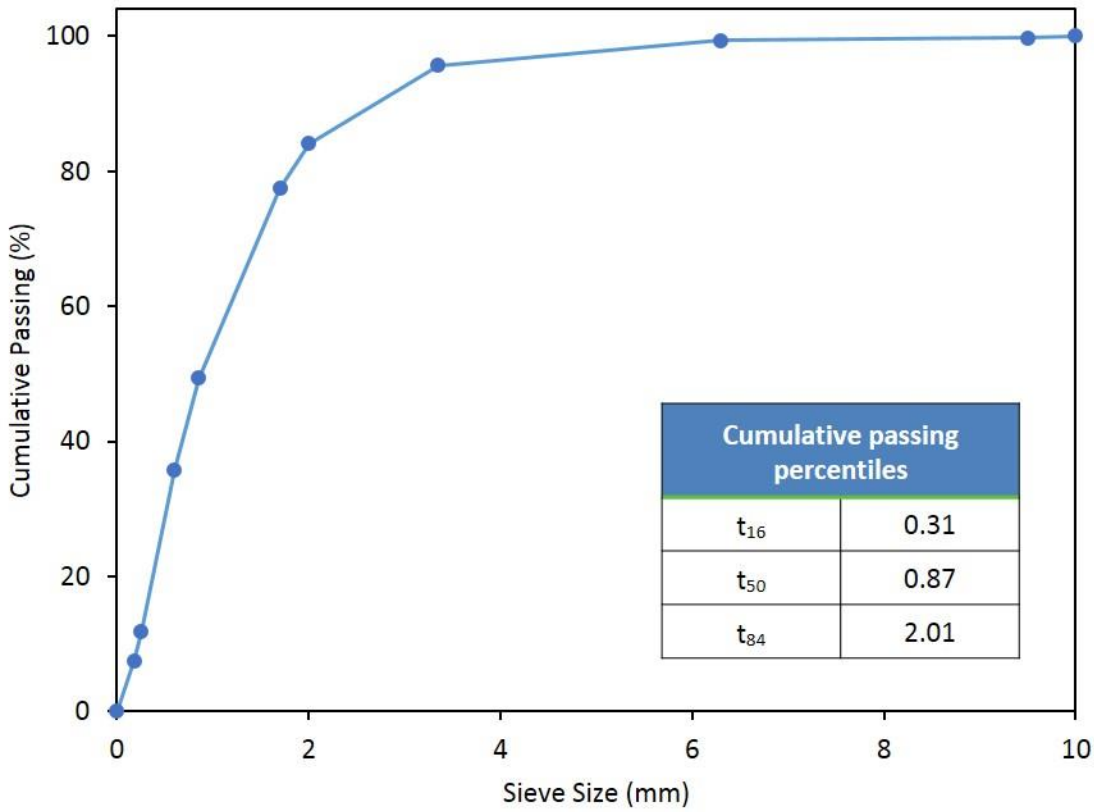

Figure 1. *Cumulative passing percent of 1-inch Reference Sorghum determined according to ANSI/ASAE S319.4 using a Ro-Tap test sieve shaker (Model RX-29, W.S. Tyler) and a 15 minute total sieving time. The cumulative passing percentile sieve sizes (e.g., t_{16}) were calculated by interpolation and represent theoretical sieve sizes that would retain 16, 50 or 84% of the particles by mass.*

Contact

For questions regarding biomass material or analytical data please contact Dr. Garold Gresham at garold.gresham@inl.gov or 208-526-6684.