Processing of switchgrass (*Panicum virgatum*) into a substrate.

Biomass crops can be mowed and harvested anytime of the year, depending on the intended use of the biomass. For purposes of substrates, we only harvest the grass during late fall or very early spring when most of the grass material is relatively dry and brown (i.e. not green).

Grass is harvested and stored in bales using standard farming practices (photo 1). Bales would typically be stored at approximately 8% moisture content. Bales should be protected to avoid weather and excessive moisture, but no research has yet been done to determine how unprotected bales would function as a substrate.

When needed, bales are ground or hammermilled to an appropriate particle size. While there may be many methods for particle size reduction, use of a common 'tub grinder' would be easiest (photo 2).

We used ¼ inch screens for most of our research to date (photo 3). This produces a range of particles that results in appropriate water holding characteristics for a nursery crop substrate. The table below shows typical particle size distribution for switchgrass generated with a ¼ inch screen on a tub grinder. Notice that switchgrass has more coarser particles, while pine bark has more particles in the medium range, and both materials have a similar percentage of fine particles. Also note that the particle size distributions for pine bark can vary wildly by source, but this is typical of potting-grade pine bark. We are experimenting with larger screen sizes for substrates to be used in large containers. For now, our recommendation is to use a ¼ inch screen or as close to that as possible.

The resulting material can be stored in piles, or in large sacks such as those shown here (photo 4).

Particle size distribution of switchgrass generated
from a hammermill equipped with a 1/4 inch screen,
and a 'typical' potting-grade pine bark.

Particle size (mm)	Switchgrass (%)	Pine bark (%)
<0.11	1.6	1.0
0.11	2.7	1.9
0.18	2.8	2.6
0.25	4.3	5.3
0.35	4.9	9.4
0.50	6.4	14.8
0.71	7.0	17.4
1.00	7.7	21.4
1.40	10.6	18.0
2.00	10.3	4.9
2.80	12.6	2.2
4.00	16.3	0.8
6.30	12.7	0.2
12.50	0.0	0.1