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Bulk Density: Arundo Donax, Miscanthus, and Switchgrass

Estimate of Bulk Density Performed by Auburn University Professor David Bransby

In a bulk density test performed for White Technology by Auburn University Professor David Bransby comparing chopped Miscanthus, Switchgrass, and Arundo Donax the results were similar for two of the materials, but the third was far superior. To ensure uniformity, all samples included in this test were obtained from the same region in South Central Alabama, and all three grasses were chopped into 2-3 inch segments. Using the samples mentioned above the bulk density was calculated for all three grasses after being dried in a forced air oven. In conclusion, Miscanthus possessed the lowest bulk density at only 2.24 lbs/ft³ but Switchgrass's bulk density was not much higher, 2.49 lbs/ft³. On the other hand, Arundo Donax's bulk density was 6.53 lbs/ft³, far superior to the density of Miscanthus and more than 2.5 times greater than the bulk density of Switchgrass.

Another bulk density test was performed by Professor David Bransby, this time using shredded material. The shredded material was taken from the same samples the chopped material came from, and was shredded using a TroyBuilt garden shredder. The shredded material was then dried using the same forced air oven the chopped samples were dried in, and then the bulk densities were calculated. Arundo Donax once again had the highest bulk density, 6.53 lbs/ft³, of the three materials. To conclude, Switchgrass's bulk density was 4.32 lbs/ft³ and Miscanthus's bulk density was the lowest once again, 3.7 lbs/ft³.

Estimate of Bulk Density Performed by White Technology

White Technology calculated bulk density for Arundo Donax as well as Miscanthus in a study performed with both grasses at a moisture content of 9.5%. After the moisture content had been determined using a BM2 moisture reader, both materials were placed in identical cylindrical containers. The weight of each containers and the weight of the grasses were calculated and then recorded to calculate the bulk density. As hypothesized, Arundo Donax had a much higher bulk density than Miscanthus. Arundo's bulk density was 13.76 lbs/ft³ and Miscanthus's was only 8.04 lbs/ft³.

A similar second test was performed on Arundo Donax immediately after harvesting the energy crop. Through this study White Technology calculated Arundo's bulk density to be 10.17 lbs/ft³ at 38% moisture.

Conclusion

The outcome of the studies exposes very important results in terms of hauling harvested energy crop material. In all the studies above mentioned, Arundo Donax has the highest bulk density of the three energy grasses compared, therefore making it the superior energy grass to transport post-harvest.