

# ASA, CSSA, and SSSA 2010 International Annual Meetings

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## Green Revolution 2.0: Food+Energy and Environmental Security

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56-38 The Potential for Using the ARS Switchgrass Bioenergy NIRS Calibration On C4 Tropical Grasses.

Poster Number 820

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Monday, November 1, 2010

Long Beach Convention Center, Exhibit Hall BC, Lower Level

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Research at USDA-ARS Forage, Grain and Bioenergy Research Unit (GFBRU) has demonstrated that Near-Infrared Spectroscopy (NIRS) can be used to determine soluble and cell wall sugars of switchgrass biomass in addition to traditional forage quality traits. Composition data on cell wall and soluble sugars in biomass can be used to estimate potential ethanol yields from biomass. The applicability of the ARS Switchgrass Bioenergy NIRS Calibration to samples of *Brachiaria brizantha*, a tropical C4 forage grass was determined. One-hundred and fifty samples, taken from a *Brachiaria* field experiment and encompassing a range of physiological conditions, were evaluated using the switchgrass NIRS equations. A subset of samples (15%) were analyzed for composition using wet chemistry. Samples were also evaluated for forage quality traits including IVDMD, NDF, ADF, ADL and CP contents, using NIRS and predictions equations as practiced at Embrapa Beef Cattle, Brazil, and then compared with their measurements at GFBRU. There was a very good relationship with measurements from both laboratories for all these quality parameters. However, direct determinations of soluble and cell wall sugars of *B.brizantha* samples were not as well correlated with the predicted NIRS results using the ARS switchgrass calibration. Total measured and predicted C5 sugars yielded the same content, but there was twice as much arabinan in *B. brizantha* than that predicted by the switchgrass NIRS calibration. There were also significant differences in predicted and measured total C6 sugars which will significantly affect potential ethanol yield. As a result of these comparisons, it is concluded that biomass bioenergy NIRS prediction equations will need to be developed specifically for tropical grasses, using the model already used by ARS in developing a switchgrass NIRS calibration.

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