

SPECTRAL EVOLUTION

Using a portable spectroradiometer to estimate lignin content

Determining the amount of lignin in plant cell walls is important for plant breeding, genetic engineering, analysis of biomass as a fuel source, classification of forages, and the wood pulping process. Lignin is essential for mechanical support, water transport and disease resistance in plants.

Using a field spectroradiometer such as the Spectral Evolution PSR+, a researcher can get an estimate of lignin content in the field or in a lab. Lignin is a polymer of phenylpropanoid and accounts for 10 to 35% of dry weight of plants and acts as a barrier to decomposition of cellulose and hemicellulose. NIR spectroscopy provides a useful tool for lignin measurement with key absorption features at 1120, 1143, 1200, 1420, 1450, 1680, 1930, 2050-2140, 2270, 2330, 2380 and 2500nm. All spectra taken by the PSR+ are stored as ASCII files for use with other third party software that includes R, ENVI, and various chemometrics software programs.

The PSR+ is a full range, UV-VIS-NIR instruments with high resolution and low noise. DARWin SP Data Acquisition software is included with every instrument. The PSR+ provides the field researcher with the option of using direct attach lenses for standoff measurements or a fiberoptic cable with FOV lenses, a contact probe, sphere, pistol grip, our unique leaf clip and other accessories. The PSR+ offers auto-exposure, auto-dark correction, and auto-shutter for one touch operation.

By measuring lignin, process decisions can be made before pulping, biomass can be characterized for use as fuel, and different species with lower lignin content can be planted for forage.

The PSR+ is lightweight and rugged—built with photodiode arrays and no moving parts for consistent reliable operation in field conditions. Additional vegetation remote sensing applications include:

- ◆ Species identification
- ◆ Assessment of phosphorous and potassium nutrients in plants
- ◆ Measurement of moisture and water content
- ◆ Soil characterization and analysis
- ◆ Ground truthing satellite imagery and measurements
- ◆ Total organic carbon (TOC) in soil
- ◆ Biomass research



Take leaf reflectance measurements in the field with the PSR+ and our leaf clip attachment.



PSR+ has a spectral range from 350-2500nm and features auto-dark correction, auto-exposure, and auto-shutter for one-touch operation.

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