

Light-Induced Decomposition of Surface Litter from the Cerrado in Central Brazil

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It is well-established that light-induced decomposition can accelerate the decomposition of the organic matter in aquatic environments. Recent studies have shown that exposed surface dead plant material (litter) also can be photodecomposed and that this can be the major pathway for its decomposition in certain terrestrial ecosystems in South America (A. T. Austin and L. Vivanco, *Nature*, 2006, **442**, 555-558). In this study, using the production of carbon monoxide as an indicator of decomposition, we investigated the wavelength dependence of the photodegradation of the litter derived from several plant species of the Cerrado. Using polychromatic UV and visible radiation with a series of cutoff filters, as originally described by Rundel (*Physiol. Plant.* 1986, 58, 360-366), we determined action spectra for the photodegradation. The action spectra indicated that the UV component of sunlight is primarily responsible for litter photodegradation. We also used the action spectra to model relationships between litter photodegradation rates and measurements of solar irradiance such as PAR or total irradiance that are commonly used to model terrestrial carbon dynamics based on satellite data. In addition to the litter photodecomposition studies, we conducted laboratory incubation studies on the effects of added fertilizers on bacterial consumption of carbon monoxide in soil samples obtained from native Cerrado areas (20-50% canopy cover). The studies were conducted in gas-tight jars maintaining the same soil moisture level throughout treatments. CO was taken up by the soil cores in all cases and the uptake was quantified as deposition velocities.