



Chemical characteristics of dissolved organic matter in an oligotrophic subtropical wetland/estuarine ecosystem

Maie, Nagamitsu, Chengyong Yang, Toshikazu Miyoshi, Kathleen Parish, Rudolf Jaffé

Limnol. Oceanogr., 50(1), 2005, 23-35 | DOI: 10.4319/lo.2005.50.1.0023

ABSTRACT: Fluorescence properties of whole water samples and molecular characteristics of ultrafiltrated dissolved organic matter (UDOM > 1,000 D) such as lignin phenol and neutral sugar compositions and ¹³C nuclear magnetic resonance (NMR) spectra were determined along a freshwater to marine gradient in Everglades National Park. Furthermore, UDOM samples were categorized by hierarchical cluster analysis based on their pyrolysis gas chromatography/mass spectrometry products. Fluorescence properties suggest that autochthonous DOM leached/exuded from biomass is quantitatively important in this system. ¹³C NMR spectra showed that UDOM from the oligotrophic Taylor Slough (TS) and Florida Bay (FB) ecosystems has low aromatic C (13% ± 3% for TS; 2% ± 2% for FB) and very high O-alkyl C (54% ± 4% for TS; 75% ± 4% for FB) concentrations. High O-alkyl C concentrations in FB suggest seagrass/phytoplankton communities as dominant sources of UDOM. The amount of neutral sugars was not appreciably different between the TS and FB sites (115 ± 12 mg C g C⁻¹ UDOM) but their concentrations suggest a low level of diagenesis and high production rates of this material in this oligotrophic environment. Total yield of lignin phenols (vanillyl + syringyl phenols) in TS was low (0.20-0.39 mg 100 mg C⁻¹ UDOM) compared with other riverine environments and even lower in FB (0.04-0.07 mg 100 mg C⁻¹ UDOM) and could be a result of photodegradation and/or dilution by other autochthonous DOM. The high O-alkyl and low aromatic nature of this UDOM suggests significant biogenic inputs (as compared with soils) and limited bioavailability in this ecosystem.

Article Links

[Download Full-text PDF](#)

[Return to Table of Contents](#)

Please Note

Articles in L&O appear in PDF format. Open access articles may be freely downloaded by anyone. Other articles are available for download to subscribers only, or may be purchased for \$10 per