



Characterisation of humic substances from sediments along a tropical reservoir in Brazil

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The number of reservoirs around the world is still increasing in face of the growing need for water storage, hydroelectric power, irrigation and flood control. In these artificial bodies, the natural dissolved organic matter, especially humic substances (HS), has an important role in affecting physical attributes (colour and odour) of water and controlling the availability of metals and metalloids at the water-sediment interface. Consequently, HS have the potential to affect the water quality besides being a key factor in the carbon cycle. This study aimed to evaluate the origin, characteristics and reactivity of HS from sediments along a tropical reservoir. Sediment grab samples were taken at 7 points along Itupararanga reservoir (longitudinal profile), located in southeast of Brazil. Humic substances were extracted from the sediments and part of them were partitioned in humic (HA) and fulvic acids (FA). The samples were characterised using elemental analysis and fluorescence in order to get information about their origin and characteristics. Furthermore, all diluted extracts were fractionated in several fractions (<1 kDa; 1-5 kDa; 5-10 kDa; 10-30 kDa; 30-100 kDa and >100 kDa) using a tangential ultrafiltration (TU) system, since the size of organic matter is directly linked to its reactivity. Trace elements originally present in the extracts were also evaluated. The results indicated that the samples closer to the dam had a smaller degree of humification and smaller size (lower humification index and higher A₂₅₄:A₃₆₅ ratio, respectively) and were recently produced (higher freshness index, 0.68). The analysis also suggested that all samples had predominantly terrestrial origin (fluorescence index between 1.2 and 1.3). The C:N ratio varied between 13.4 and 14.9 among the samples. The different characteristics of HS along the reservoir can impact on the rate that metal, metalloids and organic contaminants are buried/released in/from sediments.