Prevalence of microplastics in Ankobra water system, south western, Ghana

Indiscriminate use and alteration of land is evidently related to the proliferation in the transport levels and subsequent high concentrations of dissolved organic matter in water systems. In addition, little is known about the spatio-temporal variability and characteristics in DOM composition of the Ankobra water systems and it flow into the Ocean. The objective of this paper is to extract and determine DOM concentrations in soils and water samples based on the Walkley & Black acid wet oxidation method, using a purpose oriented sampling, to observe the dynamics between land uses (landscape dynamics) and dissolved organic matter. DOM concentration in Ankobra water systems were thoroughly characterized, where their optical characteristics and fluorescence components were analysed using Fourier transform infrared spectroscopy and excitation emission matrix (EMM) methods respectively. These analysis allows the identification of various peaks of DOM components. Optical (EEM & FTIR) properties of DOM indicated notable changes in composition along a land use gradient. Findings further indicated an increase in DOM concentration along the river-ocean transect (i.e., highest values at riverine-estuary site and lowest at the marine site) especially in the rainy season. FTIR results showed a considerable presence of different percent of DOM compound, i.e. liable OM (57%) and recalcitrant OM (43%) in rainy season and in the dry season, liable OM represented 63% and recalcitrant OM 37%. The results also demonstrated a link between DOM composition and land use activities. Compared with agricultural streams, forested streams exported structurally complex and aromatic DOM, a difference that was significant during both the dry and wet seasons. Also, in river-ocean areas, high DOM concentration likely originated from altered farm and agriculture lands where vegetation cover and other organic materials were removed from soils are during excavations from mining and subsequently transported into rivers and nearby ocean by runoff. The study demonstrated that coupling FTIR with EEM analyses could provide insights into the variability and characteristics of DOM composition in different aquatic systems.

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