



## Molecular-level chemical characterization and bioavailability of dissolved organic matter in stream water using electrospray-ionization mass spectrometry

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**ABSTRACT:** We used electrospray-ionization mass spectrometry (ESI-MS) to characterize, at the compound level, dissolved organic matter (DOM) composition and bioavailability in two streams. There was considerable consistency in the composition of the DOM between the two streams (unit mass resolution): >70% of the masses detected occurred in both streams. Approximately 40-50% of the bulk dissolved organic carbon in the stream water was bioavailable during a 12-d microbial decomposition experiment. ESI-MS compound level analysis identified which masses were used, which were not, and their patterns of utilization. In both streams, ~40% of the masses decreased in concentration, ~55% did not change, and <5% increased. Despite the complex system (>1,500 DOM compounds and a natural consortia of bacteria), there was a high degree of similarity in which masses were used and the amount of each mass used between replicate flasks for a stream. There was also good agreement between the two streams in which masses were used and the amount of each mass used. This suggests that the selection by the microbial consortia of organic compounds in the complex and heretofore largely uncharacterized DOM pool is repeatable and, therefore, ultimately predictable.

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