

# **Biodegradation effects on the source discrimination capability of selected chemical biomarkers: implications from controlled end-member mixing experiments**

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Organic matter (OM) refers to the largest reactive reservoir of carbon-based compounds on Earth. Aside of its role as a source of carbon, OM is also actively involved in a wide range of ecological functions and its dynamic can potentially impact a large number of biogeochemical processes and/or systems with several consequences on climate, aquatic life, and global habitability. Therefore, OM is a key component in the local and global carbon cycle and a better understanding of OM source, transport, and dynamics in the environment is crucial.

Although lipid biomarkers and carbon stable isotopes are the most commonly-used source tracking tools for OM, their applicability and potential limitations have not been rigorously examined yet. To fully validate their use, two critical points need to be examined: 1) conservative behavior with sources mixing, and 2) conservative behavior under diagenetic processes (e.g., microbial degradation). In this study, two end-members (e.g., soil and algae), which represent the most common and contrasted sources of OM in the aquatic environment, were mixed in different ratios and then incubated under different oxygen conditions (oxic versus anoxic) in the dark at 25°C for 60 days. The initial and final chemical biomarker signals (sterols and stanols fingerprint and  $\delta^{13}\text{C}$ ) for each mixing ratio were analyzed and thus compared.

This study allows us to state on the applicability of these tools to trace the OM in aquatic environment but also to understand the effect of several environmental factors on the selected chemical biomarkers signal.