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DOM in Oklahoma Waters

Dissolved organic matter (DOM) is a heterogeneous mixture of organic compounds that take place in natural waters across the world. DOM and its major subset colored dissolved organic matter (CDOM) affect important environmental processes like the carbon cycle that influence climate change. One major source of CDOM is runoff and water discharge so analyzing the composition of CDOM will help see if there are harmful substances in Oklahoman natural waters. We have done a systematic analysis using UV-VIS spectroscopy, FT-IR spectroscopy, and proton NMR to help analyze the structures and functional groups of compounds in lake and river water looking for evidence of CDOM and chlorophyll. Water samples were first characterized without pretreatment by measuring conductivity, pH and turbidity to help compare water from different sources. Waters from Lake Overholser, Lake Hefner, the Rt 66 pond, and Stinchcomb had statistically the same pH but significantly varying conductivity and turbidity. Our FT-IR results showed significant similarities with chlorophyll which shows that chlorophyll was a prominent pigment in the water, with amounts varying by water source. Our $^1\text{H-NMR}$ indicated the existence of carboxyls and aliphatics within the waters. Finally, the UV-Vis spectra showed low absorbance throughout the visible spectrum but a high absorbance in the UV-C region, which is consistent with CDOM spectra from peer-reviewed sources.