

## **INVESTIGATION OF THE PRESENCE OF $\text{SO}_4^{2-}$ IN HUMIC SUBSTANCES EXTRACTED FROM DRINKING WATER**

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Humic substances (HS) are a fraction of dissolved organic carbon. There are two main fractions of HSs: humic acid (HA) and fulvic acid (FA). Recent research on HS in water indicates that they can bind with charged species, such as metals and ligands, leading to severe health problems. Further, recent studies have highlighted the increase of manganese ( $\text{Mn}^{2+}$ ) levels in ground water in some areas in Sri Lanka, and it is hard to remove manganese by filtration. Therefore, this study focused on the investigation of the presence of  $\text{SO}_4^{2-}$  species bound to HAs in drinking water with and without  $\text{Mn}^{2+}$ . First, the presence of humic substances was confirmed by extracting HA from some selected well water samples in Sri Lanka and characterised using Fourier transform infrared (FTIR) spectroscopy by identifying major functional groups present in the most acceptable model structure of HAs and comparing them with authentic standards. To identify the potential interactions of  $\text{SO}_4^{2-}$  with HAs, two methods were followed: adding  $\text{SO}_4^{2-}$  directly from a  $\text{SO}_4^{2-}$  source and adding through a metal salt. By comparing the FTIR spectra and Raman spectra, the effective binding of  $\text{SO}_4^{2-}$  with HAs could be proven. Overall, this study was able to prove that  $\text{SO}_4^{2-}$  binding happens through an elimination/exchange reaction and electrostatic interaction with HAs, and  $\text{SO}_4^{2-}$  followed by metal binding causes sulphate to bind via the metal.

**Keywords:** Dissolved organic carbon, Humic acid, Humic substances, Sulphate