

## **Predicting the capability of oxidized CNW adsorbents for the remediation of copper under optimal operating conditions using RSM and ANN models**

### **ABSTRACT**

Metal pollutants such as copper released into the aqueous environment have been increasing as a result of anthropogenic activities. Adsorption-based treatment technologies offer opportunities to remediate metal pollutants from municipal and industrial wastewater effluent. The aim of this work was to evaluate the capability of modified cellulose nanowhisker (CNW) adsorbents for the remediation of copper from water matrices under realistic conditions using response surface methodology (RSM) and artificial neural network (ANN) models. Considerations for design and application to remediate Cu(II) from wastewater by developing a continuous flow experiment are described in this study. However, the physical structure of modified CNW adsorbents renders them unsuitable for use in column operation. Therefore, a more detailed study of the mechanical properties of CNW adsorbents would be necessary in order to improve the strength and stability of the adsorbents. This work has demonstrated that modified CNW are promising adsorbents to remediate copper from water matrices under realistic conditions including wastewater complexity and variability. The use of models to predict the test parameter system and account for matrix variability when evaluating CNW adsorbents for remediating Cu from a real-world wastewater matrix may also provide the foundation for assessing other treatment technologies in the future.

**Keyword:** Adsorption; Copper; Cellulose; Optimization; Wastewater