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## Design and fabrication of nanocomposite filters for dairy industry wastewater treatment

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**Statement of the Problem:** Investigating the fabrication and performance of nanocomposite filters including activated carbon (AC), calcium alginate (CA), and Nano silica for the treatment of dairy industry wastewater using cost-effective and eco-friendly method.

**Methodology:** Several techniques such as X-ray fluorescence (XRF), X-ray diffraction (XRD), ultraviolet-visible spectroscopy (UV-VIS), Fourier transform infrared spectroscopy (FTIR), and scanning electron microscopy (SEM) were used to characterize the synthesized materials. The nanocomposite filter performance and efficiency in removing of chemical oxygen demand (COD) were assessed through batch experiments.

**Findings:** Batch experiments revealed that nanocomposite filters work effectively in treating dairy was-

tewater, where the percent of COD removal reached 99.7%. The adsorption isotherm, kinetic and thermodynamic studies were conducted in which the best fitted models of isotherm, and kinetic models was Langmuir, and pseudo-second-order reaction, respectively

**Conclusion & Significance:** Results revealed that the integration of Water-Food-Environment (WEFE) NEXUS was successfully achieved. The nanocomposite filter achieves a remarkable COD removal in dairy wastewater treatment. This research fills a knowledge gap in nanocomposite applications for dairy effluent treatment, offering insights for enhancing operational parameters and promoting sustainable solutions for environmental challenges in the dairy industry.

### Biography

Borhan Aldeen Albiss received the B.S. degree in physics from Yarmouk University, Jordan, in 1987, and the M.S. degree in physics and the Ph.D. degree from Middle East Technical University, Turkey, in 1992 and 1996, respectively. He was appointed as the Director of the Nanotechnology Center at Jordan University of Science and Technology (JUST), Jordan, from 2015 to 2016. He has been a Faculty Member with the Physics Department, JUST since 1999. He worked as a Dean of Graduate Studies at JUST (from 2016 to 2020). He is currently the dean of the nanotechnology institute at JUST. He spent his sabbatical leave at the Physics Institute, University of Erlangen, Germany, from 2009 to 2010. He got various funds related to innovative applications of nanotechnology using engineered nanomaterials and composites prepared by green chemistry. He has published more than 150 publications in international journals. His research interests include nanoscience and nanotechnology, magnetism, solar cells and physical sensors.