

Vortex-assisted Dispersive Magnetic Solid Phase Microextraction Of Organosulfur Compounds On Magnetic Cellulose Gold Nanocomposite Followed By HPLC Analysis In Selected Liquid Fuels

Authors : Kgomotso G. Mabena, Philiswa Nomngongo, Nomvano Mketso

Abstract : This study describes the synthesis and characterization of a magnetic cellulose gold nanocomposite (MCNC@Au) for vortex-assisted dispersive magnetic solid phase microextraction (VA-d- μ -mSPE) of organosulfur compounds (OSCs) in selected liquid fuel samples followed by high-pressure liquid chromatography (HPLC) analysis. The nanocomposite was synthesized utilizing an in-situ co-precipitation approach and characterization data from FTIR, P-XRD, TGA, TEM and SEM-EDX methods validated the formation of the desired nanocomposite. The most important parameters of the suggested VA-mSPE method were examined using the 2-level half-fractional factorial design and the central composite design in order to achieve high extraction efficiency. With pH as an insignificant parameter, the multivariate optimization results demonstrated that effective extraction was achieved when 20 mg of sorbent mass, 8 minutes of extraction time, and 20 mL sample volume were used. The acquired optimal condition will be used to assess the analytical performance of the VA-d- μ -mSPE technique. The quantitative parameters, including relative standard deviation (RSD), accuracy, precision, limit of quantification (LOQ), and limit of detection (LOD), will be determined. Additionally, real fuel oil samples, including crude oil, gasoline, diesel, and kerosene, will be subjected to the optimum and validated VA-d- μ -mSPE method in order to quantitatively determine various OSCs.

Keywords : MCNC@Au, VA-d- μ -mSPE, OSCs, HPLC.

Conference Title : ICACMS 2025 : International Conference on Applied Chemistry and Materials Science

Conference Location : Cape Town, South Africa

Conference Dates : April 10-11, 2025