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RAPID AND GREENER METHODS FOR EXTRACTION OF HALOGENS IN FOSSIL-FUEL SAMPLES PRIOR TO SPECTROMETRIC AND CHROMATOGRAPHIC DETECTION

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Halogens are commonly detrimental when present in fossil fuels as they have negative impacts, including corrosion, catalyst poisoning during processing and environmental pollution. Therefore, spectrometric [1] and chromatographic [2] techniques are the promising detection techniques and well reported for quantification of halogens in various matrices. Although, ICP-OES/MS are proven to provide multi-elemental capabilities and good sensibilities, target analytes are predisposed to numerous spectral, isobaric and polyatomic interferences; mainly due to concentrated inorganic acids traditionally used during microwave digestion procedures of the solid matrices.[3] Additionally, the utilization of concentrated acids during microwave digestion methods hinders the detection of halogens by ion-chromatography, due to interferences that are caused by the anions of the acids.

[4] Therefore, the current study reports the usage of hydrogen peroxide for rapid microwave digestion of energy recourses prior to halogen detection using spectrometric and chromatographic techniques. The halogen concentration levels from the microwave digestion method have shown consistent agreement ($\%R \geq 80$) with certified concentration values of the CRMs. This correlation, in addition to the good precision ($RSD \leq 5\%$) achieved by the proposed procedure, recommends that the extraction procedure is reliable, accurate and reproducible. Therefore, the proposed microwave procedure can be applied in routine laboratories for the determination of halogens in fossil-fuels and related matrices.

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