عنوان مقاله:

Multiple Headspace Extraction for Benzene and Toluene Quantitative Analysis in Hot Oils

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خلاصه مقاله:

In this article, the concentration of some volatile organic compounds (VOCs) in the hot oil sample of the Pars petrochemical ethylbenzene unit is presented. Pars Petrochemical is one of the largest producers of ethylbenzene in the Middle East. The hot oil impurities that were analyzed were benzene and toluene (BT). The hot oil sample was taken in May ۲۰۲۳ at a special sampling station on the site. The presence of BT is related to its intensity in the hot oil sample. The Multiple Headspace Extraction (MHE) method was used for the extraction and quantitative analysis of BT followed by gas chromatography (GC) analysis. A GC with flame ionization detector (FID) instrument was used for the analysis of BT. This method offers advantages for the analysis of volatile pollutants because it eliminates the use of organic solvents and various sample purification steps that often lead to erroneous results. The MHE method is independent of standard concentration and could be used in a wide range of BT in Hot Oil without calibration for different ranges. Also, linearity, detection limits, and accuracy were looked into as part of the validation process. The limit of detection (LOD) and limit of quantification (LOQ), respectively, were between ۰.۰۵ – ۰.۵۶, and ۰.۱۷ – ۱.۹ mg/kg. Less than ۱۳.۹۵ percent (n= ۱۵) was the relative standard deviation statistically. A quick and easy method for detecting BT in hot oil samples was used for the first time. This work will be a step forward for the detection of other aromatic and cyclic hydrocarbons in hot oil samples.

کلمات کلیدی:

Ethylbenzene, Headspace, Heat transfer oils, Multiple headspace extraction method

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