Ovidius University Annals of Chemistry Volume 19, Number 1-2, pp. 34-38, 2008

Phenols pollution sources identification in oil refinery by GC-MS

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Abstract. The content of phenols in water is usually analyzed by spectrophotometric methods for environmental monitoring purposes. The analysis result refers to phenol (benzenol) whatever the chemical structure of the phenolic compound would be, because the method is not able to identify the different types of phenols. Sometimes, it is important to know the exact nature of the phenols in the wastewater in order to identify the pollution source. For example, the phenols found in an oil refinery wastewater are the following: phenol (benzenol), ortho, meta, para-cresols, xylenols and polyphenols. All these compounds are highly biodegradable. Normally, the effluent wouldn't contain chlorinated phenols unless the plants also produce pesticides. In this work the possibility to identify the phenols in wastewater streams by GC-MS has been studied. The parameters of GC-MS method by the thermal desorption technology have been optimized. Using the optimized method, the phenolic compounds and hydrocarbons from the wastewater matrix have been identified giving the opportunity to found the source (the refinery process) evacuating the effluent. After the optimization of the method, there have been analyzed the effluents from the critical processes in an oil refinery in order to observe the differences in composition for further identification of the process producing the phenols pollution.

Keywords: phenolic compounds, GC-MS, SBSE, pollution sources, oil refinery

ISSN-1223-7221