ECOLOGY MONITORING OF SOIL CONTAMINATED WITH PETROLEUM BY MODERN TECHNIQUES OF ANALYSIS

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ABSTRACT

Oil spill pollution has become a serious problem to the environment. There is a great complexity to establish polluters of oil spill accidents. Currently, one of the effective analytical techniques used to carry out this determination is gas chromatography coupled with mass-spectrometry. In this research it was used to analyze selected kazakh petroleum samples and spiked soils, and for data processing was developed an automated software. This techniques allowed to qualitatively and quickly establish the component composition of crude oil and oil-contaminated soil.

Keywords: contaminated soil, ecology monitoring, petroleum, gas chromatography, mass spectrometry.

INTRODUCTION

Kazakhstan holds the largest proven oil reserves in Caspian region, having 3% of the world's total oil reserves. 62% of the country is occupied by oil and gas areas, and there are 172 oil fields, of which more than 80 are under development. More than 90% of oil reserves are concentrated in the 15 largest oil fields - Tengiz, Kashagan, Karachaganak, Uzen, Zhetybai, Zhanazhol, Kalamkas, Kenkiyak, Karazhanbas, Kumkol, North Buzachi, Alibekmola, Central and Eastern Prorva, Kenbai, Korolevskoye. About 70% of the hydrocarbon reserves are concentrated in western deposits of Kazakhstan.

However, oil drilling has many harmful ecological and environmental effects. Oil spills, accidents, and illegal dumping of oil barrels and produced water lead to devastating ecological and health consequences that can last for decades. Many of these chemicals are detrimental or deadly to animals. Entire ecosystems can dissolve as a result of oil contamination. Illegal oil spills and accumulation of oil waste results in significant pollution of soil, surface water and groundwater in Kazakhstan and many other oil countries. Nowadays the petroleum contaminated soil of the Eastern Caspian is a complex environmental problem. The sources of oil pollution are accidents on wells, pipelines and other technical facilities. The pollution also occurs during transport of petroleum, its processing and storage [1]. In many cases, it is very difficult to identify the illegal polluter. Modern detailed analysis of oil is needed for assessment, trasological and forensic investigations.

Study of the component composition of oil is a difficult task, since the composition of the oil is extremely complex. It is a mixture of a huge number of organic (hydrocarbon) and inorganic compounds. The content of the individual components in the mixture varies