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during most large oil spills fingerprinting is used to confirm that oil in the environment is from the suspected source and not from other inputs like bilge tanks from nearby ships or natural oil seeps oil fingerprinting is essential for the prevention preparedness and response to oil spills the aim of forensic oil fingerprinting is to identify the spill sources if suspected sources are available or to identify the oil type if not and to allocate the liability of spills if a spill is contributed by multiple spillers the fingerprinting this chapter overviews and discusses oil chemistry analytical methodologies for separation and analysis of selected petroleum hydrocarbons in crude oils and various refined petroleum products and identification and correlation of spilled oil to its source in this study crude oil and oil products from the atmospheric and vacuum distillation units of a refinery were analyzed by gas chromatography mass spectrometry gc ms to evaluate their chemical variability before and after refinery oil fingerprinting analysis is essential to monitor the contamination to evaluate the damage and to overlook the environmental recovery accurate analysis and unambiguous results are critical in order to identify the source of the hydrocarbons and to allocate the legal liability the fingerprinting of oil spills can be a considerable successful oil fingerprinting usually involves appropriate strategies for sample preparation analytical approach and data interpretation forensic oil spill identification has largely relied on elaboration of the individual source specific petroleum hydrocarbons 1 2 the fingerprinting and data interpretation techniques discussed include oil spill identification protocol tiered analytical approach generic features and chemical composition of oils effects of weathering on hydrocarbon fingerprinting recognition of distribution patterns of petroleum hydrocarbons oil type screening and differentiation anal to extract the most representative and meaningful indicators for the oil fingerprinting and identification this paper proposes a method based on principal component difference to select a simplified set of biomarkers providing the possibility of faster elution and analysis procedures this spe gc ms method was used for the fingerprinting analysis of various crude oils refined petroleum products and environmental sediment samples the characterized target hydrocarbons included n alkanes unsubstituted priority pahs and alkylated homologues and biomarker terpanes and steranes the aim of forensic oil fingerprinting is to identify the spill sources if suspected sources are available or to identify the oil type if not and to allocate the liability of spills if a oil fingerprinting analysis is essential to monitor the contamination to evaluate the damage and to overlook the environmental recovery accurate analysis and unambiguous results are critical in order to identify the source of the hydrocarbons and to allocate the legal liability spill forensics development and application of computerized oil spill identification cosi and fingerprinting of oil in biological and passive sampling devices contains 13 new chapters on methods and applications including emerging to extract the most representative and meaningful indicators for the oil fingerprinting and identification this paper proposes a method based on principal component difference to select a simplified set of biomarkers providing the possibility of faster elution and analysis procedures fingerprint analysis is an important technology to analyze geographic divergence of petroleum contamination based on the occurrence characters of petroleum components in this study machine learning was first introduced to analyze oil fingerprinting by developing a data driven binary classification framework the modeling integrated dimensionality reduction algorithms e g principal component analysis pca to distinguish oil fingerprinting is a common name for techniques based on geochemical analysis of hydrocarbon fluids composition which could provide valuable and unique information for well and reservoir management crude oil fingerprint analysis is an investigative technique which can be employed during exploration and production to yield useful geochemical parameters needed by the geologist production engineer and oil spill management specialist crude oil fingerprint analysis is an investigative technique which can be employed during exploration and production to yield useful geochemical parameters needed by the geologist this work involved a fingerprinting analysis of a suite of oil samples including a virgin lube oil used motor oils a waste lube oil from a motor workshop a regular diesel oil and a overview problem understanding used oil tiered fingerprinting tier 1 chemical fingerprinting gc fid tier 2 chemical fingerprinting gc ms tier 3 isotopic fingerprinting case studies problem in the world fake car engine oil floods the 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