



計畫名稱：土壤中總石油碳氫化合物(TPHs)檢測方法之研究

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計畫執行單位：工業技術研究院環境與安全衛生技術發展中心計畫主持人：許麗娟計畫期程：92年1月16日起至92年12月31日止計畫經費：1,220,000元

摘要

總石油碳氫化合物的涵蓋範圍很廣，舉凡日常生活上所使用之汽油、柴油、燃料油、潤滑油、機油等皆是屬於總石油碳氫化合物。由於近年來開放油品進口及加油站民營化，與國內汽機車的使用大量成長，也增加了對汽油、機油、潤滑油的需求。因此，此類油品一旦發生意外或洩漏，容易危及公眾安全且造成嚴重的環境污染事件，此類事件的發生須要有檢測方法為依據，判定其污染的含量，以作為後續清理及罰款之依據。

在油污染事件發生時，如何快速又有效分析出油污染樣品濃度及類型是很重要，因此在本計畫中建立了一套油污染樣品篩選方法，以快速了解油污染樣品是屬於汽油類、柴油類或柴油類以上之油污染類型，然後在依篩選結果選擇適當前處理及分析方法與定量方法。在本計畫中亦建立了以高溫氣相層析GC/FID同時分析柴油與柴油以上油品之檢測方法。以別於目前公告方法只能分析汽油與柴油之缺點，此外在本計畫中亦收集各國有關土壤中總石油碳氫化合物檢測方法，評估其優缺點及適用性，以建立一套適合本土化檢驗方法，並建議土壤中總石油碳氫化合物(TPHs)之檢測範圍是C₆~C₄₀，由本計畫執行土壤中總石油碳氫化合物(TPHs)檢測之驗證結果，在柴油部分之精密度RSD(%)為9.6，準確性X(%)為73.3~108.1，在機油部分之精密度RSD(%)為3.47，準確性X(%)為94.6~108.7。

TPHs (total petroleum hydrocarbons) comprise wide range of compounds and include various compounds used in our daily life such as gasoline, diesel, fuel oils, lubricants and engine oil. Because in the past few years foreign oils and gasoline have been allowed to be imported into the country, the gas stations have become privatized and the use of automobiles and motorcycles has been on the rise, the use of gasoline, engine oil and lubricants have been increased. Therefore, when an accident or a leakage occurs, it will be likely that public safety will be jeopardized and serious pollution to the environment will be resulted. Consequently, there is a need to have a testing methods to be used to determine to the levels of pollution in such incidents so as to be used as a basis for the subsequent clean-up operation and punitive fine.

When an incident of pollution occurs, it will be very important to be able to swiftly determine the level or concentration of pollution and identify the type of pollutant. In this project, a set of fast pollutant screening method is established and such method may be used to determine the types of pollutants (gasoline, diesel or oil that has a larger molecular weight than diesel); then, according to the screening result, suitable preliminary handling method, analytical method and quantitative method may be selected. In this project, a testing method by using GC/FID is established, and the method may be employed to carry out simultaneous analyses of diesel and oils that have a larger molecular weight than diesel. As a breakthrough from the current method that can be used to determine the pollution levels of gasoline and diesel only. In the project, testing methods to evaluate the levels or concentrations of TPHs contained in soil employed by various countries have been gathered, and the advantages, disadvantages and adaptability of these methods have been evaluated so as to establish a set of testing method that is suitable to be used for this country. Also, in the project, we suggest the range of pollution level determination of the soil method covers the range from C₆ to C₄₀. In the project, according to the test results, the RSD (i.e., precision) and X value (i.e., accuracy) for diesel pollution level are 9.6% and 73.3 to 108.1%, respectively; and the RSD (i.e., precision) and X value (i.e., accuracy) for engine oil pollution level are 3.47% and 94.6 to 108.7%, respectively

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