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• 中文摘要

環保署爲推動空氣污染物健康風險評估政策，於台？縣新莊運動公園建？？部微？超級測站，以最先進之？續自動監測儀器，進？大氣微？重要物？、化學和光學等特性之監測。爲進一步探討現有微？空氣品質標準修訂之可能性，本整合型研究計畫彙整超級測站所監測的微？資？，並結合微？之基因、動物及人體毒？反應研究，進？健康風險評估，以作爲環保署修訂現有法規之重要？考依據。鑑於戶外生物性微？可能的健康效應及生態危害，且爲超級測站監測項目中所缺乏，本子計畫於新莊超級測站建？大氣中生物性微？之採樣方法、進？長期監測、並監測長程傳輸事件對生物性微？成份及濃？的影響。主要測？之生物性成份包括真菌孢子、常？戶外過敏原(Alternaria 及 Aspergillus)以及細菌內毒素。根據研究結果發現，大台？？會區最常？且濃？最高的真菌爲 Ascospores 子囊孢子、Basidiospores 擔孢子、Cladosporium 分枝孢子菌及 Aspergillus/Penicillium 麴菌/青黴菌屬。常？真菌種？的濃？有明顯的季節變化。今？？監測到的大？沙塵只有一波(4/13 ~ 4/21)且影響微弱。？過初步比較沙塵採樣期間與三月及五月？？採樣結果，可以發現沙塵採樣期間濃？明顯較高的真菌種？爲 Alternaria（交錯黴菌屬）、Aspergillus/Penicillium（麴菌/青黴菌屬、Arthrinium（節？孢屬）、Basidiospores（擔孢子）、Cladosporium（分枝孢子菌）、Nigrospora（黑色孢子黴菌屬）、Oidium/Erysiphe（粉孢菌/白粉菌）、Peronospora（霜霉病菌）、Pithomyces（鼓孢瘤座黴屬）、Rusts（?病菌）、Torula（圓酵母）、Unidentified fungi 及總真菌孢子濃？。其中 Peronospora（霜霉病菌）及 Rusts（?病菌）只有出現在沙塵採樣期間。在多變項？歸分析中，總真菌孢子濃？與溫？、？雨？及 CO 濃？有顯著相關，且在單變項？歸分析中與多種空氣污染物有相關性。本研究提供？台？？會區真菌孢子的基線資？，以及真菌孢子與氣象因子及空氣污染物間的相關性。由於生物性微？與氣象及空氣污染因子間有複雜且重要的相關性，因此未？在進？健康風險評估時應同時納入考？，以釐清各因子的各別及共同作用。生物性微？的長期變化除？受本地污染源的影響外，亦會受到長程傳輸事件、氣候變遷、全球大氣污染所影響，因此在未？的研究中應評估其變化趨勢，以及可能的生態及環境影響。

- 英文摘要

To implement the policy of air pollution health risk assessment, the ROC Environmental Protection Administration (EPA) established a state-of-the-art particulate matter (PM) monitoring station, “Supersite,” at Hsinchuang Sport Park in Taipei County, Taiwan. The Supersite utilizes research grade equipment to automatically and continuously monitor the physical, chemical and optical characteristics of PM. In order to evaluate the possibility of amending current PM air quality standard, this integrated study synthesizes the PM monitoring data at Supersite and the results of PM toxicity investigations to assess the health risk of PM. The results of this integrated study will be the major reference for EPA to amend current PM regulations. Biological particulates have yet to be included in the current Supersite monitoring system. In view of the potential health effects and ecological impacts, we conducted an environmental monitoring study at the Supersite station to assess the profile of ambient biological particulates. We evaluated the best sampling strategies for ambient biological particulates, monitor fungal spores longitudinally, and examine the effects of long-range transported pollutants on biological particulates. The major biological components to be assessed included fungal spores, common outdoor allergens (Alternaria and Aspergillus), and endotoxin. According to our results, the most prevalent fungi in Taipei were ascospores、 basidiospores、Cladosporium and Aspergillus/Penicillium, which had significant seasonal variations. Only one weak episode of China dust storm was monitored this year (4/13 ~ 4/21). However, several fungi had higher average levels during the dust storm sampling period than March and May monthly measurements, including Alternaria, Aspergillus/Penicillium, Arthrinium, basidiospores, Cladosporium, Nigrospora, Oidium/Erysiphe, Peronospora, Pithomyces, Rusts, Torula, unidentified fungi and total fungi. Peronospora and Rusts were only recovered during the dust storm sampling period. Our study provided baseline data for ambient fungi in Taipei and the relationships between fungi and air pollution/meteorological factors. Due to complex interactions among biological particulates, meteorological factors and air pollutants, all these factors should be considered concurrently to assess their health risks in future studies. Long-term variations of biological particulates are influenced not only by local sources, but also by long-range transport events, climate change, and global ambient pollution. Thus the trend of biological particulates should be examined longitudinally in order to evaluate their long-term impacts on ecology and environment.