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Air pollution monitoring and control status in Asia

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Hong Kong is a densely populated city with heavy traffic volume. A large number of volatile organic compounds (VOCs), which are the precursors of tropospheric ozone and secondary organic aerosols (SOAs), are emitted from traffic-related sources. Special attention has been paid on the characteristics of roadside VOCs and their impacts on the local air quality of Hong Kong during the past decades. In this study, proton transfer reaction-mass spectrometry (PTR-MS) is firstly applied to the simultaneous real-time monitoring of oxygenated volatile organic compound (OVOCs) and VOCs in Hong Kong. The performances of PTR-MS were examined under different relative humidity and temperature of inlet air with hydronium ion (H_3O^+) as the primary ion source. Strong correlation between calibrated reaction rate, inlet relative humidity and temperature was found which matched well by poly 2D regression. Inter-comparison was also performed between the measurement from PTR-MS, off-line DNPH cartridge samples and on-line GC-FID system. Our results suggested that PTR-MS can be applied on the long term measurements of roadside OVOCs and VOCs with good stability and reliability in Hong Kong. VOCs and OVOCs were strongly correlated with traffic conditions at the roadside site, which can be found by high-time resolution monitoring of OVOCs and VOCs by PTR-MS and demonstrated by the source apportionment of VOCs through PMF model. Vehicular emission is still one of the dominant sources of ambient OVOCs and VOCs in Hong Kong.

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Changes to populations might aid the spread antibiotic resistance in the environment

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Resistance to antibiotics has become a threat to public health. As a result of their misuse and overuse, bacteria have become resistant to many common antibiotics. Beta lactam (β -lactam) antibiotics are one of the most significant classes of antimicrobials in providing therapeutic benefits for the treatment of bacterial infections in both human and veterinary medicine, for approximately 60% of all antibiotics are used. In particular, some Enterobacteriaceae produce Extend Spectrum Beta Lactamases (ESBLs) that enable them to some break down multi groups of antibiotics. CTX-M enzymes have rapidly become the most important ESBLs, with increases in mainly CTX-M 15 in many countries during the last decade. Global travel by intercontinental medical 'tourists', migrant employees and overseas students could theoretically be a risk factor for spreading antibiotic resistance genes in different parts of the world. Bangor city, North Wales, is subject to sudden demographic changes due to a large proportion (>25%) of the population being students, most of which arrive over a space of days. This makes it a suitable location to study the impacts of large demographic change on the presence of ESBLs. The aim of this study is to monitor the presence of ESBLs in *Escherichia coli* and fecal coliform bacteria isolated from Bangor wastewater treatment plant, before, during and after the arrival week of students to Bangor University. Over a five week period, water samples were collected twice a week from the influent, primary sedimentation tank, aeration tank and the final effluent. Isolation and counts for *E. coli* and other fecal coliforms were done on selective agar (primary UTI agar). ESBL presence will be confirmed by phenotypic and genotypic methods. Sampling at all points of the tertiary treatment stages will indicate the effectiveness of wastewater treatment in reducing the spread of ESBLs genes. The study will yield valuable information to help tackle a problem which many regard to be the one of the biggest threats to modern-day society.

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