

Surfactants in South East Asian aerosols

Abstract

The concentration of surfactants in aerosols was determined at several sites in South East Asia, Bangi, Penang and Kota Kinabalu in Malaysia and Bangkok, Thailand, as methylene blue active substances (MBAS) and ethyl violet active substances (EVAS) for anionic surfactants and disulphine blue active substances (DBAS) for cationic surfactants. The methodology used is based on the formation of extractable ion-association complexes of surfactants and dye in organic solvents followed by spectrometric measurement of the intensity of the extracted coloured complex. Results showed surfactants in aerosols are mostly in the anionic form as MBAS and EVAS, and higher in aerosols collected in congested areas, especially in times of forest fires. Concentrations are in the range of 34.6 to 285.0 pmol m⁽⁻³⁾ for MBAS and 129.9 to 932.2 pmol m⁽⁻³⁾ for EVAS. Several different types of soot and humic acid seem possible sources of surfactants in atmospheric aerosols. Laboratory experiments suggested that combustion products, especially from motor vehicles, are important primary sources of surfactants in aerosols. There is also some laboratory evidence that there are secondary sources for these surfactants in aerosols, possibly humic-like substances (HULIS) from the oxidation and photochemical reaction of soots and humic acid.