

EMISSION FACTOR OF VOCs FROM NON-POINT SOURCE:
CASE STUDY OF CHEMICAL LABORATORY

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ABSTRACT

The emission factors, used to estimate the release of chemicals into the environment were researched in this study. These emission factors were obtained from direct measurements and were calculated as emission rates, expressed in the unit of kg of release per 1000 kg of chemical used.

In this study, the emission factors of three scientific analytical laboratories were studied. The release of chemicals from a school, a university and a commercial laboratory were estimated. The results from the study in the school using ethyl acetate found that emission factors to air were 383.09 and 174.13 kg/1000 kg for open and closed laboratory conditions, respectively. As for the university, analytical results using ethyl acetate found that the emission rate to air was 445.53 kg/1000 kg. Emission factors to air of the commercial laboratory using isopropyl alcohol and toluene were 2.20 and 10.77 kg/1000 kg, respectively. The study results indicated the emission rate from the open-room condition was higher than the closed-room condition. The lowest emission rate was estimated at the commercial laboratory. Good practice and using of appropriate VOC control equipment were found to reduce the emission of VOCs from this laboratory.

Releases of chemicals to other environmental media were estimated by using mass balance calculation. The emission rate of ethyl acetate to water from the school's laboratory was estimated as 119.40 and 328.36 kg/1000 kg for open-room and closed-room conditions, respectively. There were no releases of chemicals to waste. The emission rate of ethyl acetate to waste from the university's laboratory was 425.75 kg/1000 kg. There was no emission to water. As for the commercial laboratory, the emission rates of isopropyl alcohol and toluene to waste were estimated as 497.80 and 489.23 kg/1000 kg, respectively. There were no emissions to water from this source.

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