

CHAPTER 4

CONCLUSIONS

The NO₂ passive sampler consists of a PP diffusion tube contains a GF/A filter paper impregnated with 50 µl of 20 % TEA and a shelter for reduction of meteorological effect. Twenty sampling sites were randomly selected from urban (8 sites), sub-urban (6 sites) and rural (6 sites) areas in Chiang Mai City. Sampling has been done once a month during November 2007 to April 2008 by 3 days exposure of the diffusion tubes prior to extraction and analysis by NO₂ test kit, which was fabricated by Environmental Chemistry Research Laboratory (ECRL), Chemistry Department, Chiang Mai University and spectrophotometry.

The NO₂ concentrations in ambient air of urban areas of Chiang Mai Province (8 sampling sites) obtained from passive sampling and spectrophotometry were compared with values from chemiluminescence automatic active air quality monitoring station of Pollution Control Department (PCD) at Yupparaj Wittayalai School. The NO₂ concentrations of the chemiluminescence were 32.7% difference from those of the passive sampler and spectrophotometry. NO₂ concentrations of the rural area were significantly less than those of urban area and sub-urban area, while the NO₂ concentrations of urban area were higher than sub-urban area. The highest NO₂ concentrations was found at site U3 (Waroros market), which is located in the urban area of Chiang Mai with high traffic density. Another factor that affect to the NO₂ concentrations detected at site U3 was incense burning from the shrine nearby. The test was performed and it was found that the outdoor NO₂ concentrations were 1.5-2.0 times higher than those of indoors. It can be concluded that NO₂ produced from

incense burning in the shrine could partly increase outdoor NO₂ level, while higher impact must be from traffic conditions outside.

In urban and sub-urban areas, the highest NO₂ concentrations was found in January 2008, while in rural area the highest value was found in December 2007. This is probably due to open burning of agricultural waste, which takes place in the rural area in December (harvesting period). Concentrations of NO₂ from December 2007 to March 2008 were significantly higher than those in November 2007 and April 2008.

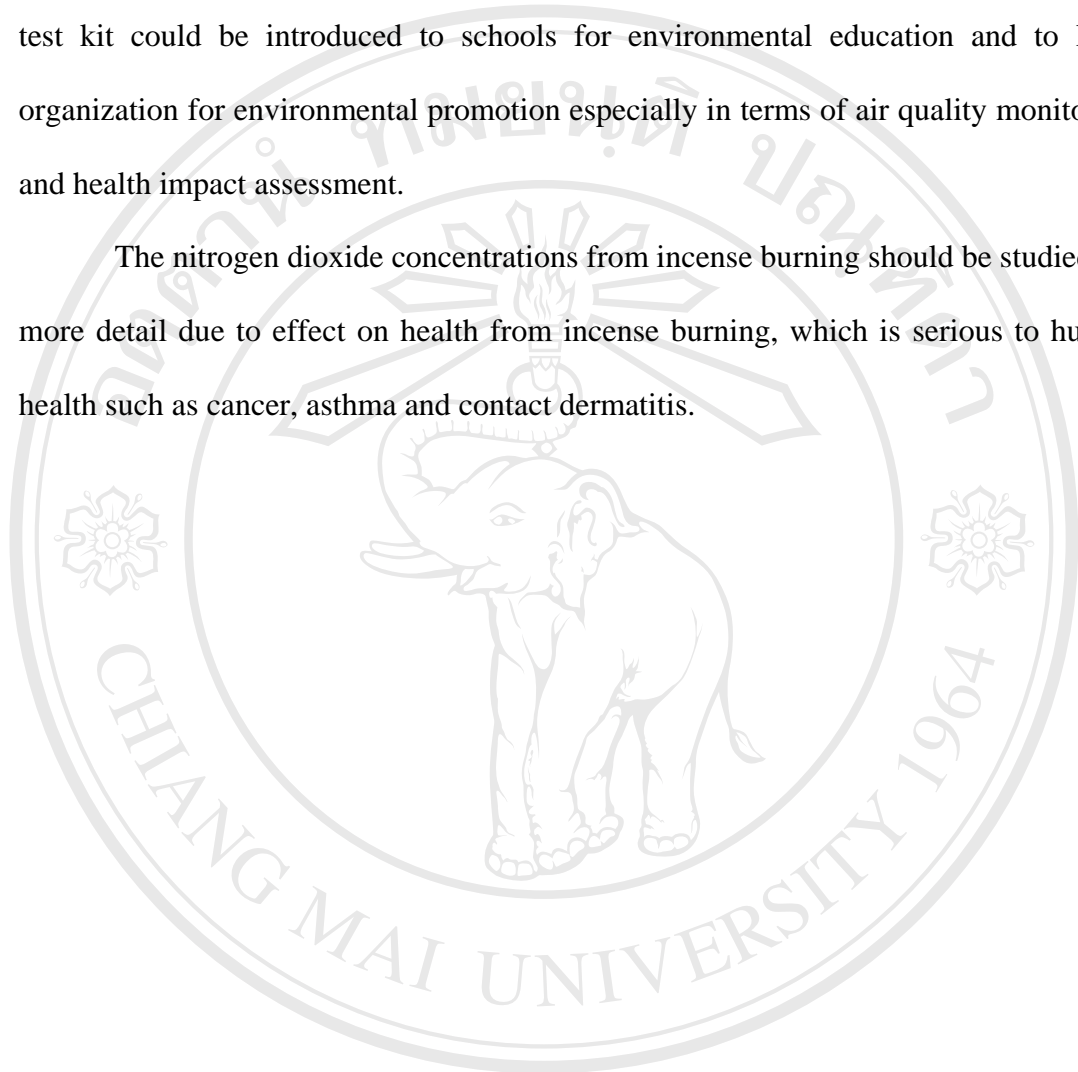
The NO₂ concentrations in ambient air determined by the NO₂ test kit and spectrophotometry were strongly correlated with each other ($r = 0.899$). However, there is some limitation of using the NO₂ standard color chart. A value obtained from the color chart can either be single or range, which depends on matching between colors of sample and standard. The application of passive sampler in the field depended on different conditions i.e. meteorological parameters and geographic conditions, which might affect to mass diffusion of pollutant.

Recommendation for further work

The limitation of using the nitrogen dioxide standard color chart was a read value obtained, which can be single or range values. There were some limitations of using the NO₂ test kit. Capacity of sorbent should be improved especially when the test kit will be used at the area with high NO₂ level i.e. urban area. Sampling condition need to be taking into consideration. Sampling shelter should be fixed without movement to reduce effects of wind velocity and to remain constant gas diffusion into the sampler.

Based on the results that NO_2 concentrations obtained from the test kit were strongly correlated with spectrophotometry, so that field application was achieved. The test kit could be introduced to schools for environmental education and to local organization for environmental promotion especially in terms of air quality monitoring and health impact assessment.

The nitrogen dioxide concentrations from incense burning should be studied for more detail due to effect on health from incense burning, which is serious to human health such as cancer, asthma and contact dermatitis.



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright© by Chiang Mai University
All rights reserved