

COMPARISON OF TSP MEASUREMENTS BY TWO HI-VOL
SAMPLERS LOCATED SIDE BY SIDE

by:

Mohd. Rashid Mohd. Yusoff
Chemical Engineering Department
Universiti Teknologi Malaysia
54100 Kuala Lumpur
MALAYSIA

submitted to:

ASIAN ENVIRONMENT
(Journal of Environmental Science & Technology
for Balanced Development)
P.O. Box 90, MCC
Makati, Manila
PHILIPPINES

August, 1987

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Department of Chemical Engineering
Universiti Teknologi Malaysia
54100 Kuala Lumpur
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ABSTRACT

A simultaneous sampling of total suspended particulate (TSP) matter by two hi-vol air samplers located side by side were studied. The mean TSP concentrations samples over 20 sampling days were $66.3 \mu\text{g}/\text{m}^3$ and $68.2 \mu\text{g}/\text{m}^3$. Both TSP concentrations were highly correlated ($r = 0.975$) with the regression line forced through the origin. This suggests that a consistent TSP measurement can be obtained using two hi-vol samplers located at one site.

INTRODUCTION

The Universiti Teknologi Malaysia has embarked a rigorous ambient air quality monitoring program since January 1986. The existing monitoring station is fully equipped with almost all the standard air particulate samplers found in any given air quality monitoring station. The program has been established as part of the National Ambient Air Quality Monitoring Network program which involves the setting up of sampling stations in selected city areas throughout the country. The primary objective of the Network is to obtain information on pollution levels and trends in pollution levels over the years to come. Therefore, a strict quality control must be emphasized for such program.

As part of maintaining good quality control on the collection of data, a comparative study of simultaneous sampling of TSP by two hi-vol samplers positioned side by side were scrutinized at the station.

METHODS

Two standards hi-vol samplers (operated and calibrated at $1.13 \text{ m}^3/\text{min}$) were positioned 1.2 m away from each other. The samplers were run on 24-h period starting at midnight with a sampling frequency of once in four days. Glass fiber filters (whatman-2000) were employed. These filters were weighed with 3 control filters after conditioning in a humidity controlled atmosphere for at least 24-h before and after the sampling event. But the use of control filters were later found to be unnecessary.

RESULTS

Table 1 presents the daily TSP concentrations sampled by the two samplers as well as the study period averages and standard deviations.

On average, the difference in TSP concentrations measured by the two samplers was $3.6 \mu\text{g}/\text{m}^3$ which is relatively small. A linear regression analysis of the data forced through the origin (assuming equal weights) is given in Figure 1. The data are highly correlated with $r = 0.975$. This strongly suggests that there is small variation in daily TSP concentrations sampled by the two separate hi-vols.

CONCLUSION

A consistent TSP measurements can be made using two hi-vol samplers place side by side, at one site as long as good quality control is maintained.

ACKNOWLEDGEMENTS:

This study is part of a research project funded by the Research & Consultancy Unit of Universiti Teknologi Malaysia.

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TABLE 1: Comparison of the TSP Measurements
($\mu\text{g}/\text{m}^3$)

Day	Hi-vol # 1	Hi-vol # 2	diff.
1	54.2	52.1	2.1
2	71.3	67.1	4.2
3	51.7	50.2	1.5
4	85.9	83.0	2.9
5	64.7	63.7	1.0
6	81.2	77.5	3.7
7	62.4	60.8	1.6
8	53.0	52.9	0.1
9	62.8	68.4	5.6
10	76.4	82.0	5.6
11	92.5	99.7	7.2
12	33.5	33.3	0.2
13	46.4	50.8	4.4
14	95.1	103	7.9
15	68.1	72.8	4.7
16	66.5	70.2	3.7
17	85.0	91.8	6.8
18	61.0	63.8	2.8
19	69.2	71.4	2.2
20	45.7	48.8	3.1
Mean	66.3	68.2	3.6
Std. dev.	16.4	17.9	2.2

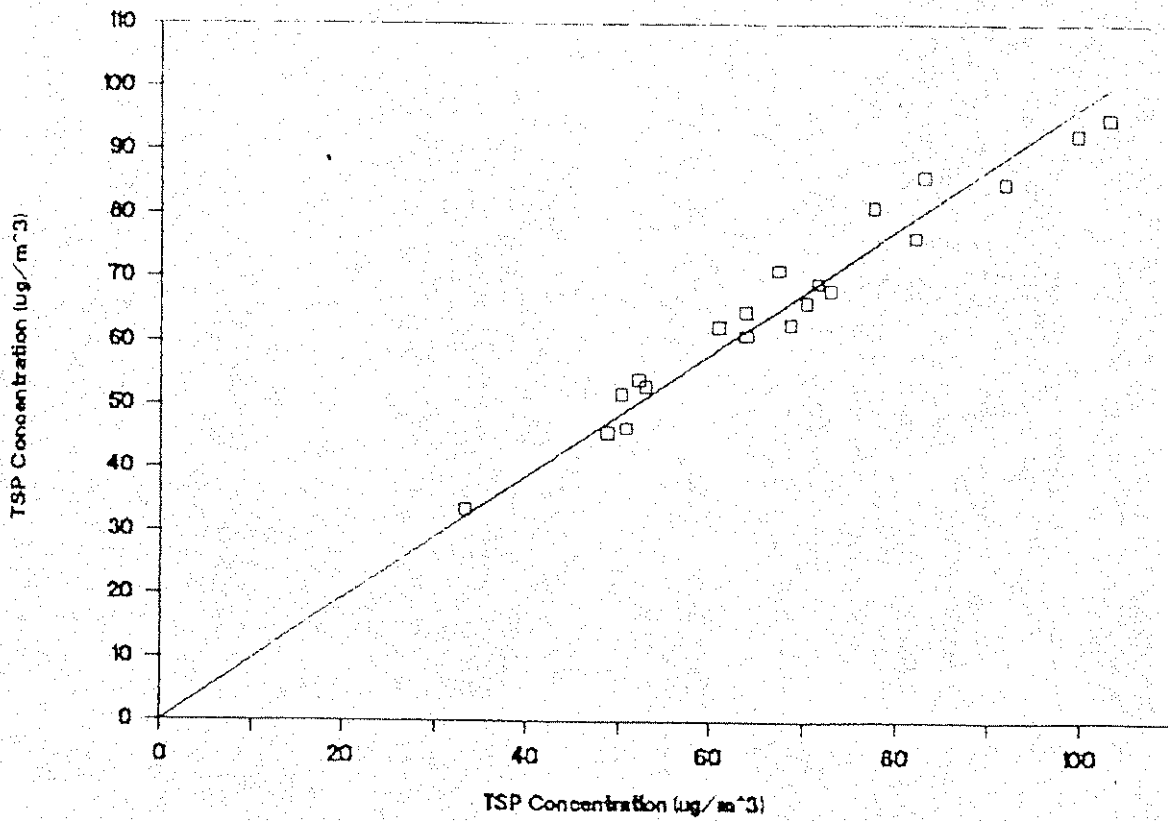


FIGURE 1 : Regression Analysis of the TSP