RESEARCH PAPER:

A correlation of particulate matter with gaseous pollutants in ambient air of Dindigul town

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SUMMARY

The importance of correlation and regression among air pollutants such as gaseous pollutants (SO_2 and NO_x) and particulate matter (SPM and RPM) in ambient air quality were studied. Air pollutant in the ambient air at leather tanneries, traffic-cum-commercial and residential area were collected from Dindigul town. Air quality deterioration especially in Dindigul town was one of the must altering problems of modern civilization. The concentration of gaseous pollutants and particulate matter were found to be high and the results showed good correlation among them. All the correlations were found to be good to excellent indicating an ecosystem under identical or near identical natural condition. Present investigation shows significant positive correlation among the particulate matter and gaseous pollutant.

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The urban population is exposed to higher levels of SO_2 and NOx due to urbanization and industrialization, concentration of ambient air particulates have been found to be associated with a wide range of effects on human health (Dockery and Pope, 1994; Gold berg, 1996; Schwartz, 1991; Zmirou *et al.*, 1998). Approximately 50,000 premature deaths occur annually due to PM10 pollution in India (Brandon and Hommann, 1945). The high concentration of particulate matter (PM) in the environment has become a problem for many countries. (Elbir *et al.*, 2000). PM consists of primary aerosols as well as secondary aerosols such as sulfate, nitrate, sulfur dioxide (SO_2) and oxides of nitrogen (NO_x), if present in excess in ambient air, affect the respiratory tract causing irritation and increasing airway resistance (Tsai and Cheng, 1991).

Several investigators (Keeler *et al.*, 1990; Pope *et al.*, 2002 and Schwartz *et al.*, 1996) have studied the chemical composition of atmospheric aerosols in different parts of India. Dindigul town lies on the banks of Kudavanar river in Tamil Nadu. The population of this town is around 4 lakhs. There are about more than 200 both registered and non-registered tanneries in and around Dindigul.

The increase of tanneries in Dindigul is causing severe environmental degradation as the untreated effluent used in the training process is released into nearby water reservoirs. In addition, air pollution is on the rise with the tanneries burning residuals from the tanning process into the atmosphere. There are reports on gaseous pollutants that get associated with particulate matter (PM) and cause more impact therefore the objective of the present study is to characterize estimate and find out association of SPM and RPM of gaseous pollutant concentration in ambient air.

Correlation among ambient air quality parameters in a specific environmental conditions have been shown to be useful (Shrivastava *et al.*, 1996) Correlation study of ambient air quality would be highly advantageous.

This may greatly facilitate the task of rapid monitoring status of pollution in Dindigul town. In this town, different types of industries emit different types of pollutants. The concentration of each pollutant depends upon the situation of point with respect to the industries that emit the pollutants. As there is large number of variables, the statistical methods only are useful for prediction of