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STUDY ON THE NATURE AND STATUS OF AIR QUALITY OF GOPALGANJ DISTRICT WITH REFERENCE TO RESIDENTIAL AREAS

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ABSTRACT:

Indoor air pollutants can originate within the building or be drawn in from outdoors. Air contaminants consist of numerous particulates, fibers, mists, bio aerosols, and gases. In addition, another complicating factor is that indoor air pollutant concentration levels can vary by time and location with sensitive environments of college. Pollutants can emit from variety of sources, related to building or around the buildings. A number of studies have revealed that college air may be a source of a wide spectrum of air pollutants, such as noise, NO_2, CO, volatile organic compounds, aerosols. The highest importance is currently attributed to aerosols because they represent a complex mixture of organic and inorganic substances with potential toxic, carcinogenic, inflammatory, allergenic, and other adverse properties. Indoor air quality is affected by outdoor pollution from traffic, industrial construction, and combustion activities, but also by ventilation, furnishings, and the indoor activities of occupants.

INTRODUCTION:

In the absence of significant indoor activities, such as smoking, cooking, outdoor particles often penetrate houses and increase the concentration of indoor particles. The contribution of PM10 to total suspended particulate matter (TSP) has been found to been much as 68.8%, as compared to PM2.5 and PM1 dust storm (consisting numerous particulates, fibers, mists, bio aerosols, and gases) (Lin T.H., 2001). Sometimes they also originate from building and construction materials and furnishings, building occupants and activities, inadequate building design, lack of maintenance. In addition, an abundance of studies has shown high contamination levels of carbon dioxide in classrooms. Moreover, a preliminary intervention study of two classrooms in Berlin in the winter 2004 and 2005 indicated that intensified cleaning and ventilation helped to significantly reduce the indoor particulate matter. The actual culprit being visible to normal human sight in the form of airborne smoke and as dirt on surfaces, they are figured easily in public perceptions of urban air quality. Indeed, controlling them in large cities of the currently developed world in some cases took three quarters of a millennium. Moreover, indoor sources were also found independently contributing, like a study done by Dufault et al., in 2000, which reported that during laboratory renovations, environmental risks are always the result of activities relating to the laboratory facility or property (e.g., asbestos, storage tank, lead paint), or research associated with it (e.g., radioactive, microbiological, and chemical contamination). Therefore, renovation and remodeling of buildings are also known, as one of the main sources of indoor air pollutants,

with dust, heavy metals, fibers, gases, bioaerosols, volatile and semi- volatile organic compounds the major air pollutants generated by renovation actions . Exposure to lead, for example, can occur when lead based paints are improperly removed from surfaces through sanding, dry scraping, flame burning, and demolition . Such renovation actions carried during school have been affecting the long term health of human beings as stated by Lyons and Reynolds 1996.

METHODOLOGY:

Air pollution around a college may result from industries or heavy traffic, and this happens both in developed and developing countries; but more serious in developing countries. However, indoor pollutants can also add exposure such as outdoor dust, paint chipping from walls or ceilings, chalk dust particles and uncleanliness (WHO, 2002). Indoor air quality in schools has been much less studied than IAQ in other buildings (e.g.offices and other workplaces). In fact, scarce attention has been given to IAQ in college, the related health effects, and the effectiveness of remedial measures (Franchi, 2001) Sampling was conducted both inside and outside the classrooms. Measurements were taken during complete college hours (5-6 h), along with 30 min before (in morning) and after the college (in afternoon). This feature was practiced to evaluate PM levels when classrooms were occupied and unoccupied, as the sampling duration was restricted within the teaching hours only. The sampling duration taken in winter season was different from that in summer due to different college timings in cold and hot seasons (08:30 am to 02:30pm in winter and 07:00 am to 01:00 pm in summer, respectively).

RESULTS AND DISCUSSION:

Thus, the total number of samples collected during the monitoring was 210 in number from all the sampling locations. Outdoor measurements were taken outside the sampled classroom in open area, 2 meters away from classroom. Due to a lack of multiple samplers, a methodology was applied, which showed a variation of only 5% to 16% in concentrations of PM sampled in indoor and outdoor locations. Therefore, the results obtained by applying such methodology are discussed further: data presents the average concentrations of PM sizes accounted in indoor and outdoor during sampling duration. This showed that the mean concentrations of PM was positively skewed i.e. the data is distributed to the right of the median, at both roadside and residential. Indoor was higher for all PM sizes. Skewness of PM2.5 and PM1.0 concentrations were higher at residential schools in indoor (1.19 and 1.08 respectively), while, PM10 was higher at roadside college (0.62). Such positive skewness depicts that there are some higher values that are not offset by corresponding lower values in the data distribution, especially in indoors; that tend to make the mean greater than the median. Furthermore, to compare mean concentration at both indoor and outdoor locations, paired sample T Test was applied. This showed that the p-value for PM10, PM2.5 and PM1.0 at Roadside college was < 0.01which signifies 99% significant difference in their mean values. Similar to roadside, college also showed $p < 0.01$, 99% significance in indoor and outdoor for mean PM2.5 and PM1.0 . Whereas, PM10 concentrations showed $p < 0.05$, which signifies 95% significant difference in their mean values. The above results indicated that the average concentrations of particulate sizes are decreasing with a significant difference in their mean values.

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