



INDOOR AIR QUALITY AND INDOOR/OUTDOOR RELATIONSHIP IN DOMESTIC HOMES OF CENTRAL PART OF INDIA

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ABSTRACT

Indoor Air Quality (IAQ) has gained great attention in recent years, chiefly due to the large amount of time we spend indoors. People spend on average 87% indoors and only a mere 6% outdoors. We also tend to believe that the indoor environment is better and more livable than the outdoor environment, being cleaner, more comfortable and healthier on the obvious ground that the building will shelter us from harmful substances in the ambient environment. For this reason a number of air quality indication system in the world, which are designed for outdoor use also, gives warnings or advice during episodes of poor air quality, to stay indoors. However, the fundamental question is: Is indoor air really cleaner? Is it cleared of outdoor pollutants? Number of studies on the relationship between indoor and outdoor pollutants has been conducted and the results of these studies confirmed the importance of ambient air in determining the quality of air indoors (Lawrence et al, 2005 a, b). The largest exposure to health damaging indoor pollution probably occur in the developing world, not in households, schools and offices of developed countries where most research and controls efforts have focused to date. As a result, much of the health impacts from air pollution worldwide seem to occur among the poorest and most vulnerable populations (Smith, 2002). As India is developing country and as no such relevant studies have been done in this central part of country, this study was carried out at 12 houses in three different microenvironment i.e. urban, rural and roadside in Agra.

Simultaneously measurements of indoor and outdoor CO, CO₂, NO, NO₂ and SO₂ were done during winter season (Oct.2003-Feb.2004) using YES-205 and YES-206 monitors. Results (Table-1) revealed that during winter season CO and CO₂ was maximum at roadside, NO and NO₂ was maximum at urban areas and SO₂ was found maximum in rural locations. A statically correlation analysis (except for SO₂ due to lack of outdoor reading) of indoor concentration with outdoor concentration was carried out which revealed that indoor environment is positively influenced by outdoor sources. An activated scheduled of inside and outside these houses were also prepared and was seen that activities like wood and coal by the residence increases the indoor level concentration of all the pollutant.

This study was done in order to provide useful information to help to understand the microenvironments of different types of residences of which huge population is residing in developing countries like India and thereby contribute towards the improvement of indoor atmosphere in residential homes of Asian countries.

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Table 1.

Micro-Environment	CO ₂		CO		NO _x (NO+NO ₂)		SO ₂	
	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor
Rural	392±19	361±09	1.0±0.3	0.4±0.2	---	---	0.02±0.02	0.03±0.03
Urban	387±10	378±14	1.3±0.4	0.7±0.2	0.6±0.3	0.9±0.5	0.01±0.06	----
Roadside	480±63	390±25	2.3±1.0	1.3±0.2	0.5±0.2	0.6±0.2	---	---

Key Words: Indoor Air Quality, Indoor/Outdoor Relationship, Microenvironments, Statically Correlation.

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