

Health Risk Assessment of Exposure to Nitrogen Dioxide Using A Mass Balance Model and Time-weighted Average

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Abstract

Indoor environment is the dominant contributor to total personal exposure because most people spend a majority of their time indoors. Standard exposure assessments utilize point estimation of the different variables. However, the use of a Monte-Carlo approach to assessing exposure and risk assessment allows all variable information about the ranges of variable previously expressed as point values to be combined and expressed as a distribution of possible exposure with an estimate. Risk assessment consists of 4 components; hazard identification, dose-response assessment, exposure assessment and risk characterization.

In this study, distributions of indoor NO₂ concentrations and personal NO₂ exposures were estimated by mass balance model in indoor environment and time-weighted average model. And probability distribution of hazard quotient (HQ) with average daily dose (ADD) was calculated using Monte-Carlo simulation. Nitrogen dioxide (NO₂) poses a health risk to individuals with 12% in indoor and outdoor environment. Such information is of greater value to the risk manager and the public in terms of understanding the meaning and uncertainty of a risk estimate.