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A Brief Note on Indoor Air Quality in Buildings

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Abstract

Around 90% of the time, people around the world spend their time in different indoor settings. In addition to the penetration of pollutants into the outside air, various activities like heating, cooling, cooking, and emissions from building materials and products produce contaminants in indoor environments. The fact that people spend the majority of their lives inside has a significant impact on their health and productivity. Peer-reviewed IAQ studies that specifically cover the relationship between the internal characteristics of various types of building environments with IAQ still do not have a comprehensive evaluation to help understand the progress and limitations of IAQ research worldwide, despite the two decades of IAQ research from various perspectives. As a result, this review of scientific studies highlights IAQ research trends and gaps by presenting a wide range of pollutants found in both residential and commercial indoor environments. In addition, we were able to evaluate the various IAQs in buildings located in various nations and regions through literature data analysis, reflecting the current global scientific understanding of IAQ. By establishing indoor air regulations that take into account all sources of indoor contaminant in order to create healthy and sustainable building environments; this review has the potential to benefit building professionals.

Keywords: Indoor air quality; Environmental pollution

Introduction

Over 90% of people's daily lives are spent in indoor environments, according to urban population research. In addition to residential indoor environments, offices, educational institutions, and various commercial and industrial buildings are where people spend the majority of their time. According to specific North American research, adults spend 87% of their time in buildings, while the remaining 6% and 7% of their time are spent outdoors and in vehicles [1]. Exposure to indoor air pollutants has a significant impact on both human health and workplace effectiveness because people spend the majority of their time indoors. In any case, research on air quality has generally centered around the outside, though indoor air quality (IAQ) and its effects stand out until the last ten years [2]. Because research has established that indoor air is more contaminated than outdoor air, risks associated with IAQ have recently been the focus of both scientists and the general public [3]. There have been significant changes in the nature and complex compositions of indoor air pollutants as a result of continuous changes in living styles and the materials used in indoor environments. This opens up avenues that require in-depth investigation.

Discussion

The energy emergency of the 1970s presented the significance of energy reserve funds in structures, which at last prompted more sealed shut and protected structures overall. Air conditioning systems circulate less fresh air in order to save energy. In addition, as living standards have improved, more synthetic materials and chemicals are being used in building construction and decoration. Pesticides, cleaning products, air fresheners, and cooking gas emissions are additional sources of indoor air pollution.

Since deficient ventilation, absence of cooling frameworks, human exercises, and various materials, synthetics, and gases fundamentally impact indoor contamination, various associations, like the US Natural Security Organization (US EPA) and World Wellbeing Association (WHO) have perceived IAQ as a multi-disciplinary peculiarity and characterized toxins into a few classifications. Indoor air pollution was the cause of over 1.5 million deaths in 2000, according to the World Health Organization. In addition, indoor air pollution has been identified as the third most significant cause of disability-adjusted life years all over the world [4-6].

The demand for high quality of life and the steady expansion of the population and economy have introduced a variety of new elements into indoor building environments. Additionally, the evolution of various building types over time has an effect on indoor air quality and human health. As a result, it is of the utmost importance to examine the indoor air quality (IAQ) of various end-use buildings to identify each potential indoor pollutant with adverse health effects. There is still a lack of organized evaluation of peer-reviewed IAQ studies that specifically cover both residential and commercial building environments, despite two decades of IAQ research from various perspectives. These could be used to highlight the advancements and limitations of IAQ research worldwide and assist in comprehending the factors that influence IAQ in various building environments. To make it possible for possible long-term solutions to improve indoor air quality (IAQ), a deeper comprehension of the relationship that exists between various building characteristics and concentrations of air pollutants is required [7-10].

Conclusions

We looked at scientific studies that looked at IAQ in residential and commercial buildings in different parts of the world to fill this gap. This review therefore identifies the trends and gaps in scientific research that focus on quantitative changes in air parameters as a result of IAQ for both the residential and commercial sectors. In addition, we examined the peer-reviewed study sampling methods and internationally accepted IAQ standards. The scope of this review was taken in order to speed up and support future research on how to design the best building environments to provide the best IAQ benefits

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for healthy indoor spaces in the future.

This review includes scientific studies from various relevant scientific databases to accomplish these goals. The remaining sections of this review paper are organized under four main headings: international IAQ standards and assessment methods; residential buildings and IAQ assessment; commercial buildings and IAQ assessment; and the conclusions and the direction that this study will take in the future.

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