Chapter 2
Air Pollution Control and Green Chemistry Solutions

P. Selvakumar
https://orcid.org/0000-0002-3650-4548
Nehru Institute of Technology, Coimbatore, India

Nikitha Sreekanthaswamy
https://orcid.org/0009-0009-2627-9365
Dayananda Sagar Business Academy, India

Anubhav
https://orcid.org/0009-0009-2707-8223
Chandigarh Group of Colleges, Jhanjeri, India

Santosh Kumar Nathsharma
https://orcid.org/0000-0003-3935-2938
Stewart Science College, India

Satyajit M. Deshmukh
https://orcid.org/0009-0000-8551-8113
Datta Meghe College of Engineering, Navi Mumbai, India

A. Revathi
https://orcid.org/0000-0003-4387-2442
Kongu Engineering College, India

T. C. Manjunath
https://orcid.org/0000-0003-2545-9160
Rajarajeswari College of Engineering, India

ABSTRACT

These substances, which include particulate matter (PM), nitrogen oxides (NOx), sulfur dioxide (SO2), carbon monoxide (CO), volatile organic compounds (VOCs), and ozone (O3), are primarily produced by human activities such as industrial processes,especially in urban areas, poses a growing concern for public health, ecosystem stability, and the overall well-being of the planet. is well-documented, with a substantial body of scientific evidence linking exposure to various air pollutants to a wide range of chronic and acute health conditions. Particulate matter, particularly

DOI: 10.4018/979-8-3373-1409-9.ch002

fine particles with a diameter of 2.5 micrometers or smaller (PM2.5), is one of the most dangerous forms of air pollution. These tiny particles can penetrate deep into the lungs and enter the bloodstream, leading to respiratory diseases such as asthma, chronic obstructive pulmonary disease (COPD), and lung cancer. governments and health organizations worldwide. Beyond respiratory and cardiovascular health, air pollution has a profound effect on the environment.,

INTRODUCTION TO AIR POLLUTION AND ITS IMPACT ON HUMAN HEALTH AND THE ENVIRONMENT

These substances, which include particulate matter (PM), nitrogen oxides (NOx), sulfur dioxide (SO2), carbon monoxide (CO), volatile organic compounds (VOCs), and ozone (O3), are primarily produced by human activities such as industrial processes,especially in urban areas, poses a growing concern for public health, ecosystem stability, and the overall well-being of the planet. is well-documented, with a substantial body of scientific evidence linking exposure to various air pollutants to a wide range of chronic and acute health conditions. Particulate matter, particularly fine particles with a diameter of 2.5 micrometers or smaller (PM2.5), is one of the most dangerous forms of air pollution. These tiny particles can penetrate deep into the lungs and enter the bloodstream, leading to respiratory diseases such as asthma, chronic obstructive pulmonary disease (COPD), and lung cancer. governments and health organizations worldwide.

Beyond respiratory and cardiovascular health, air pollution has a profound effect on the environment., droughts, and heatwaves, which in turn have far-reaching consequences for ecosystems, agriculture, and human settlements.Another significant environmental Additionally, air pollution can have a detrimental effect on soil quality, contaminating it with heavy metals and chemicals that can harm plant life and reduce agricultural productivity. The electrification of transportation, along with the promotion of public transport, cycling, and walking, can also help reduce emissions from vehicles, one of the primary sources of air pollution in urban areas. In addition,, and encouraging sustainable agricultural practices can significantly lower emissions and improve air quality.On the regulatory side, governments must enact and enforce strict air quality standards, monitor pollution levels, and International cooperation is also essential in addressing transboundary pollution and sharing knowledge and technology to mitigate air pollution on a global scale. programs can help individuals understand the sources and impacts of air pollution and encourage more sustainable lifestyles.In conclusion, highlights the need for immediate and sustained action to address its causes and mitigate its effects. The reduction of air pollution requires concerted efforts from governments, the challenge of air pollution will only intensify,