

INTRODUCTION:

Vehicular Emissions are gases and fumes emitted due to internal combustion. These emissions most commonly contain **Carbon dioxide (CO₂)**, **Carbon monoxide (CO)**, **Methane (CH₄)**, **Nitrous oxide (N₂O)**, **Nitrogen oxides (NO_x)**, **Sulphur Oxides (SO_x)**, **Particulate Matter (PM)** and **Hydrocarbons (HC)**. These emissions have serious impacts on air quality and many of them also contribute to the Green House Effect.

Rapid Urbanisation, improved mobility, economical and technological developments have lead to an increase in the number of vehicles on the roads and this in turn has greatly increased vehicular emission levels in the environment. In India, the stress is larger due to overpopulation and economic disparities. A report released by the Central Pollution Control Board, New Delhi in March 2010 establishes that a study conducted by Centre of Science and Environment, Delhi predicts that the CO₂ emissions will rise from 205 million tonnes in 2005 to 1212 million tonnes in the year 2035. This close to six-fold increase in CO₂ emissions in 30 years is an alarming phenomenon. Similarly, other gas emissions will also increase leading to reduced air quality.

Increased privatisation of vehicles has contributed significantly to air quality levels in India. The CPCB 2010 report states that the total motor vehicle population in India increased from 3, 10,000 in 1951 to about 89,00,000 in 2005-2006. This number has only multiplied in the recent years. Also use of older standards such as Bharat Stage 4 when nations are following EURO 6 standards is grave concern for air health and quality in our country. Further, unsatisfactory public transport systems, unorganised urban land planning, inadequate inspection and maintenance facilities, adulteration of fuel and fuel products are other reasons why air pollution is at glaring levels. According to the recent report by the World Health Organisation New Delhi, our capital, as the highest levels of air pollution in the world.

Carbon dioxide is the primary component of vehicular emission. Along with being a health hazard, it is Green house Gas that contributes to global warming, climate change and ocean acidification. It is a long persisting gas and has a long term effect.

Carbon monoxide (CO) is a colourless, odourless gas emitted from combustion processes. Nationally and, particularly in urban areas, the majority of CO emissions to ambient air come from automobiles.

CO can cause harmful health effects by reducing oxygen delivery to the body's organs (like the heart and brain) and tissues. At extremely high levels, CO can cause death.

Nitrogen oxides (NO_x) form a significant part of vehicular emissions. On combining with Ammonia and Water Vapour they lead to the formation of Nitric Acid that comes down as acid rain corroding buildings and bridges. Small particles may enter the sensitive lung tissue and enhance respiratory problems.

Hydrocarbons like benzene released with vehicular emission can have serious impact on human health. Benzene is a potential health hazard released with vehicle exhaust. It is carcinogenic and low term exposure to high level ambient benzene has been shown to cause cancer to cells that produce white blood cells. Prolonged Exposure has also been linked to genetic changes in humans and animals.

Formaldehyde has been classified as a probable human carcinogen. Studies suggest that long term inhalation maybe associated with tumours of nasopharyngeal cavity, nasal cavity and sinuses.

Acute exposure to 1, 3-butadiene results in irritation of the mucous membranes. Higher levels can result in neurological effects such as blurred vision, fatigue, headache and vertigo. Exposure to the skin can lead to frostbite. Long-term exposure has been associated with cardiovascular diseases; there is a consistent association with leukemia, and weaker association with other cancers.

Particulate matter (PM) represents a broad class of chemically and physically diverse substances that exist as discrete particles (liquid droplets or solids) over a wide range of sizes. Particles may be emitted directly to the atmosphere or may be formed by transformations of gaseous emissions such as sulfur dioxide or nitrogen oxides. The key health effects associated with PM include premature death; aggravation of respiratory and cardiovascular disease, as indicated by increased hospital admissions and emergency room visits, school absences, work loss days, and restricted activity days; changes in lung function and increased respiratory symptoms; changes to lung tissues and structure; and altered respiratory defense mechanisms.

Exposure to coarse fraction particles is primarily associated with the aggravation of respiratory conditions such as asthma. Fine particles are most closely associated with health effects such as premature death or hospital admissions, and for cardiopulmonary diseases. Particulate Matter below 2.5 microns is grave health hazard and is present in large quantities in the air of Delhi. The World Health Organization's report states that they are present at a level of 156 in New Delhi while only 10 is the permissible limit.