Sulfur Dioxide (SO_2)

SOx are a group of highly reactive gases, with SO2 being the most prevalent in the lower atmosphere. It is produced from the burning of fossil fuels (coal and oil) and the smelting of mineral ores that contain sulfur. It is heavy, colorless, and possesses a pungent, irritating odor. It dissolves easily in water and eventually forms sulfuric acid (H2SO4), the primary component of acid rain (WHO).

In addition to acid rain, SO2 causes foliar damage, which inhibits plant growth. When it settles in soil, it leaches aluminum, which is toxic to plants and flows into streams, harming fish by disrupting their salt-water balance (EPA). It converts to sulfate particles in the air, contributing to haze in parks and cities, and altering the amount of sunlight reaching plants.

SO2 targets the upper respiratory tract in humans. Even brief exposure (i.e., 10 minutes) to high concentrations can cause a significant drop in lung function. It also contributes to the formation of PM2.5 (fine particulate matter), which can penetrate deep into the lungs and enter the bloodstream (EPA, ALA). Studies have shown that long-term exposure increases mortality rates, especially among those with cardiac and lung diseases. A combination of particulates and SO2 is significantly more toxic because it reaches deeper into the lungs, whereas either pollutant alone would not.

Children living near industrial hubs show higher rates of decreased peak flow rates (the speed of air leaving the lungs). Long-term exposure is correlated with the development of chronic cough and increased phlegm production (UNICEF).