



**Ministry of Higher Education and Scientific
Research Al-Mustaqbal University College**

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Pollution

2nd Stage

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Air Pollutants and their Major Sources

No.	Air Pollutant	Source
1	Particulate , Dust	Abrasion , Soil erosion, Fuel combustion in automobiles, Buildings and other civil instructions , industrial effluents , mining, power station etc.
2	Sulfur oxides SO _x	Power houses, smelters, coal and other fossil fuel combustion, sulfuric acid plants, automobiles
3	Nitrogen oxides	Combustion, automobiles, acid manufacturing
4	Hydrogen sulfide	Petroleum industry, waste water treatment, tanneries المدابغ, Oil Refineries etc.
5	Carbon monoxide	Metabolic activity, fuel combustion, automobile exhaust
6	Ozone	Photochemical reactors
7	Lead	Automobile exhaust
8	Organic solvents	Solvent use, paints, Pesticides ,cooking cosmetics etc.
9	Mercury	Pesticides, paints , laboratories
10	Fluorides	Glass and ceramics, cement factories, aluminum industry, fertilizers industry

Toxicity is described as the **direct harmful effect of a substance on organisms**. It can refer to the effect on a whole organism or on a substructure of the organism, such as a cell.

The toxic effect depends on the **concentration** of toxic substances, on the **sensitivity of the organisms** as well as on the **incubation period**. Toxicity can already occur at low concentrations.

Types

There are generally four types of toxicants; chemical, biological, physical and radiation:

- Chemical toxicants include inorganic substances such as, lead, mercury, hydrofluoric acid, and chlorine gas, and organic compounds such as methyl alcohol, most medications, and toxins. While some weakly radioactive substances, such as uranium, are *also* chemical toxicants, more strongly radioactive materials

like radium are not, their harmful effects (radiation poisoning) being caused by the ionizing radiation produced by the substance rather than chemical interactions with the substance itself.

- Disease-causing microorganisms and parasites are toxic in a broad sense but are generally called pathogens rather than toxicants. Theoretically one virus, bacterium e.g. cholera and COVID-19.
- Physical toxicants are substances that, due to their physical nature, interfere with biological processes. Examples include coal dust, asbestos fibers or finely divided silicon dioxide, all of which can ultimately be fatal if inhaled. Corrosive chemicals possess physical toxicity because they destroy tissues, but they're not directly poisonous unless they interfere directly with biological activity. Water can act as a physical toxicant if taken in extremely high doses because the concentration of vital ions decreases dramatically if there's too much water in the body. Gases can be considered physical toxicants because they act by displacing oxygen in the environment but they are inert, not chemically toxic gases.
- As already mentioned, radiation can have a toxic effect on organisms.

- As already mentioned, radiation can have a toxic effect on organisms.

Toxicity can be measured by its effects on the target (organism, organ, tissue or cell). Because individuals typically have different levels of response to the same dose of a toxic substance, a population-level measure of toxicity is often used which relates the probabilities of an outcome for a given individual in a population. One such measure is the [LD₅₀](#). When such data does not exist, estimates are made by comparison to known similar toxic things, or to similar exposures in similar organisms. Then, "[safety factors](#)" are added to account for uncertainties in data and evaluation processes. For

example, if a dose of a toxic substance is safe for a laboratory rat, one might assume that one-tenth that dose would be safe for a human, allowing a safety factor of 10 to allow for interspecies differences between two mammals.

It is more difficult to determine the toxicity of chemical mixtures than a pure chemical because each component displays its own toxicity, and components may interact to produce enhanced or diminished effects. Common mixtures include [gasoline](#), [cigarette smoke](#), and [industrial waste](#). Even more complex are situations with more than one type of toxic entity, such as the discharge from a malfunctioning sewage treatment plant, with both chemical and biological agents.

In [toxicology](#), the **median lethal dose, LD₅₀**. The value of LD₅₀ for a substance is the [dose](#) required to kill half the members of a tested population after a specified test duration. LD₅₀ figures are frequently used as a general indicator of a substance's [acute toxicity](#). A lower LD₅₀ is indicative of increased toxicity.