

ELEMENTS OF INDUSTRIAL TOXICOLOGY

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Industrial toxicology is primarily concerned with the physiological effects produced in individuals who have been exposed to harmful materials encountered during the course of their employment.

These effects usually result from inhalation of the toxic agent. Local skin injury can be caused by direct contact with some solids and liquids and some materials can also be ingested or absorbed through the skin. In these cases, however, there would usually be considerable inhalation of the toxic agent. In the majority of situations, therefore, the toxic agent absorbed by the body is suspended in the air in the worker's breathing zone.

Toxicity vs Hazard

The toxicity of a material is not synonymous with its health hazard. Toxicity is the *capacity* of a material to produce injury or harm. Hazard is the *possibility* that a material will cause injury when a specific quantity is used under specific conditions. The key elements to be considered in evaluating a health hazard are: (1) how much of the material is needed to produce injury, and (2) the probability of the material being absorbed by the body to produce it.

Since toxicity is not a definite physical constant, but rather the degree to which a substance will affect living cells under certain conditions, it can be measured only after recognizable changes have occurred following absorption. Some changes—impaired judgment, delayed reaction time—may be produced at levels too low to cause actual cell damage. Then too, toxicity is dependent on the dose, rate, method, and site of absorption, and many other factors, including general state of health, individual differences, tolerance, diet, and temperature.

Toxicity Values

The first attempts at estimating the toxicity of a substance are usually made on the basis of animal experiments. Data from these experiments are expressed as lethal doses (LD) in milligrams of substance per kilogram of body weight of the test animal.

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