**ENGLISH PAPER**

**TOXIC AND HAZARDOUS MATERIAL**



**ENVIRONMENTAL HEALTH STUDY PROGRAM**

**WIDYAGAMA HUSADASCHOOL OF HEALTH SCIENCE**

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**TOXIC**

1. **Toxic**

Toxic is any substance or substance which in a certain amount when it enters the body by being swallowed, inhaled, absorbed, smeared and injected will cause a chemical reaction that causes damage to the structure or function disorders that cause symptoms, illness and death.

1. **Toxic Type**
2. Based on the source, toxic materials can be classified as follows:
3. Plant toxin
4. Animal toxin
5. Environmental toxins (water, soil, air)
6. Based on the compound:
7. Heavy metal
8. Organic compounds
9. Poison gas
10. Based on usage:
11. Drugs
12. Pesticide
13. Organic solvent
14. Heavy metal
15. **Main Route of Toxic Entry**
	* + 1. Skin (Absorption)

The easiest and most common exposure (exposure) to humans or animals with all foreign substances, such as cosmetics, household products, topical drugs, environmental contaminants, or industrial contaminants in the workplace, is intentional or unintentional exposure to the skin.

* + - 1. Breathing (Inhalation)

Exposure to xenobiotics in the air can occur through inhalation of these xenobiotics. Toxons present in the air are in the form of gases, vapors, liquid droplets, and solid particles of different sizes. Besides, keep in mind, that the respiratory tract is a complex system, which can naturally select particles based on their size. Therefore, the uptake and toxic effects of inhaled toxins depend not only on their toxicity but also on their physical properties.

* + - 1. Digestion

Toxic ingestion through the gastrointestinal tract can occur with food, drink, or alone, either as a drug or as a pure chemical substance. In this pathway, the toxin may be absorbed from the oral cavity (sub lingual), from the stomach to the small intestine, or the exposition of the toxon may be intentionally via the rectal route. Except for substances that are alkaline or strong acids, or substances that can stimulate the mucosa, generally will not have a toxic effect if not absorbed.

1. **Toxic Effect**

Toxic effects are adverse effects or adverse effects caused by use or exposure to agents, chemicals, or toxicants. These effects vary widely, ranging from mild complaints such as itching or headaches to dangerous conditions such as death. The following are various types of toxic effects, including:

Adverse effects are changes in morphology, physiology, growth, development, reproduction, or life span of living organisms, systems, or (sub-)populations resulting from impaired functional capacity, or impaired capacity that can adapt to pressure or stress. other influences (OECD, 2003).

Toxic effects on biological systems due to toxicant exposure will occur when these chemicals or their metabolism products (metabolites) have reached the target organ with sufficient concentration and residence time to produce these effects. The target organ is not always the organ where the toxicant or its metabolites are most deposited, but the organ where the toxic response is elicited. For example, lead is deposited in bones, but its health effects appear in the brain because the target organ of lead is the brain, not bone. There are various kinds of toxic responses, which can be classified into local or systemic effects, reversible or irreversible effects, acute or chronic effects, or based on the target organ being attacked. The definition of these various effects will be explained below.

Local effects are effects that occur where the toxicant comes into contact with the human body. For example, contact between hydrochloric acid and the skin will cause irritation to the skin where the hydrochloric acid is in contact.

Systemic effects are effects that appear on the target organ and are far from the site of first contact. This effect appears after the tokikan undergoes a process of absorption, distribution, and metabolism. Several toxicants exhibit local and systemic effects simultaneously, such as tetraethyl lead (tetraethyllead/TEL) which causes effects on the skin (local effects) and the central nervous system (systemic effects).

Toxic effects can also be categorized into reversible (reversible) and non-reversible or irreversible (irreversible) effects. It is the ability of the body's organs that determines whether an effect is reversible or not. Effects on the liver are generally reversible due to the ability of the liver to regenerate. Meanwhile, the central nervous system cannot regenerate so that when exposed to toxicants, non-reversible injury can occur.

1. **Toxic Countermeasures**
2. Wash vegetables and fruits thoroughly before processing or eating
3. Using clean (unpolluted) water to handle and process food
4. Do not use cooking utensils or containers that are coated with heavy metal
5. Do not use styrofoam containers or crackle plastic to accommodate hot and fatty ready-to-eat food because there is a chance of transfer of chemical compounds from the container to the food
6. Use personal protective equipment

**HAZARD**

1. **Hazard**

Hazards are sources, situations, actions and components that have the potential to cause harm and are considered to cause damage or disruption of processes/activities therein to work accidents.

1. **Source of Danger**

In the work process there are sources of danger, namely:

1. Human

Humans can be a source of danger in the workplace when carrying out their respective activities. For example, when workers are doing welding, the welding process will cause various types of hazards.

1. Equipment

Work equipment used in the workplace, such as machines, steam planes, lift planes, conveyances, ladders and so on can be a source of danger for humans who use them. For example, the use of stairs that are not good or damaged can cause a danger of falling from a height.

1. Material

Materials in the form of raw materials or production products contain various types of hazards according to their respective properties and characteristics. For example, materials in the form of chemicals contain hazards such as irritation, poisoning, environmental pollution and fires

1. Process Production activities in the workplace use various types of physical or chemical processes. The production process carried out in the company is a complex series of complex processes. Each production process can cause various impacts (hazard risks) such as exposure to dust, smoke, heat, noise and so on
2. System and Procedure

The production process in the workplace is carried out through a system and required operating procedures according to the type and nature of each activity. Systems and procedures are not directly dangerous, but can encourage various types of potential hazards

1. Unsafe Action

Unsafe action is a dangerous action from workers that may be motivated by various reasons

1. Unsafe Condition

Unsafe condition is an unsafe condition of machinery, equipment, aircraft, materials, work processes, environment and workplace as well as the nature of work and work systems.

1. **Hazard Control**

How to control risk is done through (Soputan, 2014):

* 1. Elimination: this control is carried out by eliminating the source of the hazard (hazard).
	2. Substitution: reduce the risk of harm by changing processes, replacing inputs with lower risk ones.
	3. Engineering: reduce the risk of harm by engineering methods on tools, machines, infrastructure, environment, and or buildings.
	4. Administrative: reducing the risk of danger by making procedures, rules, installation of safety signs, warning signs, training and selection of contractors, materials and machines, handling methods, storage and labeling.
	5. Personal Protective Equipment: reduce the risk of danger by using personal protective equipment such as safety helmets, masks, safety shoes, coveralls, safety glasses, and other personal protective equipment in accordance with the type of work performed.

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