

Cyanide Poisoning

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Sources

- Cyanide (hydrocyanic acid, prussic acid)
- Sodium nitroprusside
- Fire victims
- Trace are produced indigenously from Vitamin B12 metabolism
- **Amygdalins**, which are hydrolyzed to hydrogen cyanide is present in the seeds of **apple, peach, plum, apricot, cherry, and bitter almond**.
- **Industrial chemicals**;
- Electroplating, electro-polishing, extraction of gold and silver from ores, plastic manufacture, fumigant

Mechanism of Toxicity

- Histotoxic anoxia
- It results
 - From binding of CN with the Ferric ion on the $a-a_3$ complex within the **Cytochrome complex**
 - The tissue will not be able to utilize Oxygen
 - Anaerobic respiration
 - No production of ATP
 - Oxygen will remain in the venous blood

Toxicity

- Metabolism:
 - Rhodanese enzyme → thiocyanate → renal excretion (major pathway)
 - Cobalamine + cyanide → Cyanocobalamin
 - Excreted via breath and sweat

Signs and Symptoms cyanide poisoning

- **Major organs affected are CNS and cardiovascular system**
 - **Weakness**
 - **Dizziness**
 - **Headache**
 - **Nausea and vomiting**
 - Tachycardia
 - Flushing

Treatment

- ABC
- Decontamination
- Antidote
- Continuous care

- Antidote :
 - Amyl nitrite inhalation , 0.3 ml
 - Sodium nitrite, 300 mg in 10 ml
 - Sodium thiosulfate, 12.5 g in 50 ml

- $\text{Hb-Fe}^{+2} + \text{NO}_2 \rightarrow \text{Hb-Fe}^{+3} + \text{NO}$
- $\text{Hb-Fe}^{+3} + \text{CN-cytochrome-Fe}^{+3} \rightarrow \text{CN-HB-Fe}^{+3} + \text{cytochrome-Fe}^{+3}$
- $\text{CN-Hb-Fe}^{+3} + \text{Na}_2\text{S}_2\text{O}_3 \rightarrow \text{CN-S} + \text{Na}_2\text{SO}_3 + \text{Hb-Fe}^{+3}$