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Methanol

About Methanol

History
Ancient Egyptians used a mixture of substances that included **Methanol** in their embalming process. They obtained the **Methanol** from pyrolysis of wood. Pyrolysis is the chemical decomposition of condensed organic substances by heating.

However, pure **Methanol** wasn't isolated until 1661 by Robert Boyle, who produced the chemical through the distillation of boxwood. The chemical later became known as pyroxylic spirit. The French chemists Jean-Baptiste Dumas and Eugene Peligot determined its elemental composition in 1834.

The term "methyl" was derived from the word "methylene," which was coined by Dumas and Peligot in 1840. It was then applied to describe "methyl alcohol." The International Conference on Chemical Nomenclature shortened this to "**Methanol**" in 1892. When German chemists Alwin Mittasch and Mathias Pier developed a means to convert sythesis gas into **Methanol**, a patent was filed on Jan. 12, 1926.

In 2006 astronomers at Jodrell Bank Observatory using the Merlin array of radio telescopes, discovered a large clod of **Methanol** in space, 300 billion miles across.

Production
Catalysts that are capable of operating at lower temperatures such as copper are used to efficiently produce modern **Methanol**. Low pressure **Methanol** (LPM) was developed by ICI in the late 1960s with the technology owned by Johnson Matthey, the leading licensor of **Methanol** technology.
Natural gas is the most economical and widely used feedstock for **Methanol** production. However, other feedstocks can be used. Coal is increasing in popularity as a feedstock for **Methanol** production, particularly in China. Additionally, mature technologies available for biomass gasification are being implemented for **Methanol** production.

Toxicity
In humans, **Methanol** has a high toxicity. As little as 10 mL can cause permanent blindness if ingested by destruction of the optic nerve. Only 30 ml can be fatal, although the typical fatal dose is 100-125 ml (4 fl oz). However, toxic effects take hours before they are evident and effective antidotes can often prevent permanent damage.

Methanol is toxic by two mechanisms. First, **Methanol**, whether ingested, inhaled, or absorbed through the skin can be fatal due to its CNS depressant properties in the same manner as ethanol poisoning. Second, in a process of toxication, where it is metabolized to formic acid via formaldehyde in a process initiated by the enzyme alcohol dehydrogenase in the liver. The reaction to formate proceeds completely, with no detectable formaldehyde remaining. Formate is toxic because it inhibits mitochondrial cyochrome c oxidase, causing the symptoms of hypoxia at the cellular level, and also causing metabolic acidosis among a variety of other metabolic disturbances. Fetal tissue will not tolerate **Methanol**.

Methanol poisoning can be treated with the antidotes ethanol or fomepizole. Both of these drugs act to reduce the action of alcohol dehydrogenase on **Methanol** by means of competitive inhibition so it is excreted by the kidneys rather than being transformed into toxic metabolites.

The initial symptoms of **Methanol** intoxication include central nervous system depression, headache, dizziness, nausea, lack of coordination, confusion, and with sufficiently large doses, unconsciousness and death. The initial symptoms of **Methanol** exposure are usually less severe than the symptoms resulting from the ingestion of a similar quantity of ethanol.

Once the initial symptoms have passed, a second set of symptoms come into play, 10 to as many as 30 hours after the initial exposure to **Methanol**, including blurring or complete loss of vision and acidosis. These symptoms are the result of the accumulation of toxic levels of formate in the bloodstream, and may progress to death by respiratory failure. The **Methanol** ester derivatives do not share this toxicity.