

# Poison Facts:

## Low Chemicals: Nitric Oxide

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### **Properties of the Chemical**

At room temperature, nitric oxide is a colorless gas with a sweet odor. It is slightly soluble in water, but is highly reactive. Although the gas itself is non-flammable, it will accelerate combustion and increase the risk of fire and explosion in combustible and flammable materials.

### **Uses of the Chemical**

The main sources of nitrogen oxides emissions (including nitric oxide) are combustion processes. Fossil fuel power stations, motor vehicles and domestic combustion appliances emit nitrogen oxides, mostly in the form of nitric oxide. The chemical is used occupationally in the bleaching of rayon and in the manufacture of nitric acid. Nitric oxide can be present at significant concentrations in ambient and indoor air. It is used medically by inhalation to produce selective pulmonary vasodilation and to improve oxygenation in patients with various forms of pulmonary hypertension.

### **Absorption, Distribution, Metabolism and Excretion (ADME)**

Nitric oxide is a gas; therefore, absorption can only occur through the eyes and lungs. However, it will have contact effects with the skin. In the presence of moisture and oxygen, corrosive conditions will develop as a result of the formation of nitric and nitrous acids. The major proportion of inhaled nitric oxide reaches the deeper parts of the lung and reacts with hemoglobin in erythrocytes to form nitrosylhemoglobin which is converted immediately to nitrite and nitrate. The nitrite and nitrate are then transferred to the serum, and the greater part of the nitrate is excreted into the urine through the kidneys. Most of the inhaled nitric oxide is eventually eliminated from the body as nitrate.

### **Clinical Effects of Acute Exposure**

Nitric oxide is a skin, eye and mucous membrane irritant. This is due to the fact that moisture and oxygen convert nitric oxide into nitric and nitrous acids. The most hazardous effects of nitric oxide are to the lungs. Inhalation causes symptoms of coughing and shortness of breath, along with a burning in the throat and chest. Patients may experience nausea and fatigue. Some pulmonary symptoms may be delayed several hours. Methemoglobinemia may also occur.

### **In-Field Treatment Prior to Arrival at a Health Care Facility**

- Remove the patient from the contaminated area. Nitric oxide's effects on the lungs increase upon exertion. All patients should be carried from the contaminated area.
- Flood skin and eyes with water.
- If patient is experiencing difficulty breathing, coughing that does not resolve with fresh air or tightness in the chest, administer oxygen if available. All patients with pulmonary symptoms should be transported to the emergency room.

### **Special note to first responders:**

- Wear a positive-pressure Self-Contained Breathing Apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer.

### **Treatment of Exposures in a Health Care Facility**

- When the patient arrives at the health care facility, irrigate eyes and skin with copious amounts of water.
- Monitor for respiratory distress, and administer oxygen or assist with ventilation as necessary. Treat bronchospasm with inhaled beta<sub>2</sub> agonists.
- Pulmonary edema may develop and is a delayed effect.
- Methemoglobinemia may occur because nitric oxide has a high affinity for hemoglobin. It is the most rapidly binding ligand of hemoglobin currently known and oxidizes reduced hemoglobin to methemoglobin.
- Acidosis may occur secondary to anoxia.
- Anticoagulation: Nitric oxide has been shown to inhibit both platelet adhesion and aggregation.

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**For more poison prevention and first aid information, call the**

Poison Control Center

Serving the Residents of Kansas

Toll-free Hotline

1-800-222-1222

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