Triazophos

<table>
<thead>
<tr>
<th>CAS-Number</th>
<th>24017-47-8</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50 oral mg/kg body weight</td>
<td>50</td>
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<tr>
<td>LD50 dermal mg/kg body weight</td>
<td>1948</td>
</tr>
<tr>
<td>LC50 inhalation mg/l</td>
<td>1.05 as aerosol</td>
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Triazophos is an organophosphorus insecticide.

**Signs and Symptoms of Poisoning:**
Organophosphorus insecticides inhibit esterases in the organism, the key enzyme inhibited and accounting for signs and symptoms is the acetylcholinesterase (AChE). The inhibition of AChE leads to the accumulation of the neurotransmitter acetylcholine in the central and peripheral nervous system both at the nicotinic and muscarinic receptors, resulting in an endogeneous acetylcholine intoxication with the following signs and symptoms:

<table>
<thead>
<tr>
<th>Organ</th>
<th>Nicotinic</th>
<th>Muscarinic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye</td>
<td></td>
<td>Miosis (pinpoint pupils), lacrimation (watering of the eyes), vision problems</td>
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<tr>
<td>Mouth</td>
<td></td>
<td>Salivation</td>
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<tr>
<td>Heart/circulation</td>
<td></td>
<td>hypotension, bradycardia</td>
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<tr>
<td>Lung</td>
<td></td>
<td>Bronchial secretion, bronchospasm</td>
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<tr>
<td>Gastrointestinal tract</td>
<td></td>
<td>Nausea, vomiting, diarrhea</td>
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<tr>
<td>Skin</td>
<td></td>
<td>Sweating</td>
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<tr>
<td>Muscles</td>
<td>Fibrillation, tics, myoclonus, paralysis of respiratory muscles, peripheral respiratory failure</td>
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</tr>
<tr>
<td>Central nervous system</td>
<td>Somnolence, coma, central respiratory depression and failure, hypothermia, convulsions</td>
<td></td>
</tr>
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In rare cases endogeneous catecholamines can cause mydriasis and tachycardia. In children the miosis may be missing.

**First Aid:**
- Remove patient from exposure/terminate exposure under self-protection (e.g.long gloves)

January 2015, Dr.W.Steffens
- Thorough skin decontamination with copious amounts of water and slightly alkaline soap/detergent

- Flushing of the eyes with lukewarm water for 15 minutes

- Whilst induction of vomiting may be useful for the active ingredient in case of ingestion, it is strictly forbidden, if a formulation containing solvents has been swallowed. Induction of vomiting should only be considered if a significant amount has been swallowed (more than a mouthful), if the ingestion was less than one hour ago, and if the patient is fully conscious. Induced vomiting can remove maximum 50% of the ingested substance.

**Treatment:**

- In case of ingestion a gastric lavage within the first hour after ingestion and after intubation only with consecutive application of activated charcoal and sodium sulphate should be performed, if a significant amount has been swallowed.

- Before treatment is started, either clear symptoms of organophosphorous insecticide poisoning as described above should be present or a reduction of cholinesterase activity to below 30% of normal should be present.

- The following **antidotes** are generally accepted: atropine and oximes (see below).

- Additionally a benzodiazepine (e.g. diazepam) should be given in case of seizures/convulsions according to standard regimens .

- **Atropine:**
  Atropine will counteract only the muscarinic symptoms.

  2 regimens for initial atropine treatment are currently suggested, in both cases the cessation of the cholinergic symptoms salivation, bronchial secretion, sweating and bradycardia indicates sufficient atropinization. The skin should be dry, the lungs should be clear on auscultation and the heart rate should be in a range of 80 to 100/minute.

  Overdosages of atropine have to be strictly avoided, as these can promote heart rhythm disturbances (torsades des pointes).  

  **Adults:**
  Regimen 1:
  2-10 mg atropine i.v., followed every 15 minutes by 2 mg atropine i.v. until cessation of the symptoms as above

  Regimen 2:
  2 mg atropine i.v., 5 minutes wait, if symptoms persist or reappear
  4 mg atropine i.v., 5 minutes wait, if symptoms persist or reappear
  8 mg atropine i.v., 5 minutes wait, if symptoms persist or reappear
  16 mg atropine i.v., 5 minutes wait, if symptoms persist or reappear
32 mg atropine i.v.
No higher doses of atropine should be given nor are necessary.
It is mandatory to allow 5 minutes after each dose for atropine to become fully effective. The next higher dose must not be given earlier and only if the above symptoms are persisting.

Regimen 2 currently is advisable.

Further atropine treatment should be done by continuous application of 1 – 2 mg/hour.
Atropine treatment can be stopped, when the plasma cholinesterase level has returned to above 30% of normal.

Children:
For children the dosage has to be more careful due to a higher sensitivity of children to atropine. The initial dose should be 0.1 mg/kg body weight, then careful repletion or increase depending on the reversal of symptoms as described above.

- **Oximes:**
Oximes are suggested for the treatment of severe organophosphorous insecticide poisoning, but they are under discussion regarding efficacy. This may be due to different dosage regimens. If decided upon, the treatment should be started as early as possible without further delay after atropine application.

The former contraindication of carbamate poisoning is no longer valid with the single exception of carbaryl poisoning.

Depending on the country 1 or both of the 2 oximes mentioned below are available, the preferable one is obidoxime.

**Regimen obidoxime:**
Initial bolus injection of 250 mg i.v. (about 3 mg/kg body weight) over 15 minutes, Continuous infusion of 30 mg/hour

**Regimen pralidoxime:**
Initial bolus injection of 40 mg/kg body weight
Continuous infusion of 0.5 g/hour

The continuous infusions of oximes should be continued until plasma cholinesterase has returned to above 30% of normal.

Recently, a randomized single-blind study in Iran has indicated a decreased need of atropine and earlier hospital discharge in patients with organophosphate poisoning, who were given, in addition to the usual atropine and oxime treatment, N-acetylcysteine as in paracetamol poisoning. This result needs further confirmation.

January 2015, Dr.W.Steffens
Note:
Survival of patients after severe organophosphorous insecticide poisoning is strongly dependent on effective intensive care treatment, as aspiration pneumonia and multi-organ failure are typically the final causes of death in such cases. Thus in severe cases with cardiorespiratory failure and resuscitation the above regimens, though doubtlessly effective against the cholinesterase inhibition, may not improve the outcome, because adequate ICU therapy is critical.

Of particular importance is the issue of **INTERMEDIATE SYNDROME (IMS)**. IMS does not show a clear correlation to certain OP insecticides, but may occur after poisoning with many of these - in about 20% of patients. It may be more common, as it would be overlooked in patients still on mechanical ventilation. The syndrome can appear 2-7 days after the poisoning incident, usually during/after initial recovery of the patient. Manifestation is with inability to raise the head and weakness of proximal limb muscles. The main and most critical symptom is sudden respiratory failure due to muscle weakness. Often mechanical ventilation has to be continued or started again, and may be required for 5 to 15 days. There is no specific treatment for IMS. Atropine is without effect, oximes are under discussion regarding prophylaxis.