

Poison Lab

(a simulation)

Some Information About the Poisons:

Lead

Lead is a soft, heavy metal which has a metallic luster when freshly cut, but quickly acquires a dull gray color when exposed to air. Because lead is resistant to corrosion, and easy to work with, it is used for roofing, piping, sheeting, and paint pigment. It is primarily used in red primers and white paint. Certain levels of lead in the body are toxic, resulting in seizures, loss of appetite, mental instability, and even death.

In recent years there have been a number of infants and young children suffering from lead poisoning. Lead based paints have been identified as the main cause. As paint ages and weathers it will peel and chip. Apparently, the children ingested the lead based paint chips.

Mercury

Mercury, also known as "quick silver," is a heavy metallic element. It is the only common metal, which is a liquid at room temperature. Mercury will dissolve tin, silver and gold. In past years it was common practice to use such mercury solutions (known as amalgams) in teeth fillings. Other uses of mercury are for thermometers, barometers, mercury-vapor lamps, electrical contacts, and for the extraction of metals from their ores. Mercury vapor is extremely poisonous. In addition mercury has the ability to be dissolved through the skin and into the blood stream. Certain levels of mercury in the body are toxic, resulting in seizures, organ shut down and even death. Once mercury is dissolved into a person's blood it is there to stay. There is no known method for removing it from the body, nor will the body dispose of it naturally.

Obviously mercury in teeth fillings was a major source of poisonings. In addition, the dangers of mercury have only come to light in recent years. It was once common practice for teachers to hand mercury out to students to play with during class. Similarly, many people upon breaking a mercury thermometer would play with the spilled mercury.

Arsenic

Arsenic is a poison found in rat poison and many pesticides and insecticides. Traces of arsenic may be found in the hair and fingernails (white lines across nails) of a poisoned victim for years after their death. Arsenic is a slow poison, that is, it can be given in small doses to someone over a long period of time. Although easily identified if tested for, it often goes unidentified due to the similarity of poisoning symptoms to organ shut down from aging. A victim experiencing arsenic poisoning will often vomit, experience major organ failure, and lose muscle control.

Cyanide

Cyanide is a poison found in bitter almonds. The smell of burnt almonds during the opening of a stomach is a sign of cyanide poisoning. A very small amount of cyanide is lethal. Cyanide in the body halt cellular respiration, thereby robbing cells of needed oxygen. Thus the oxygen taken into the lungs cannot be taken into the body. Although cyanide is not easy to obtain commercially, it is present in several agricultural and industrial products. It is often a poison of choice because of its ability to kill from such a small dose.

Common chemical terms and Procedures you will need to be familiar

with for the lab:

Centrate:

Precipitate:

Hot water bath:

HCl:

HNO₃:

NH₃:

Aqueous (aq):

Salt:

Molarity (M):

Centerfuge:

Hot water bath:

Basic:

Acidic:

Litmus paper:

Procedure:

- (1) To 10 drops of solution being analyzed, add 10 drops of water. Test the solution with litmus. If the solution is basic, acidify it with 6 M HCl by adding 2 drops and stirring. If a precipitate forms, the presence of lead, mercury, or arsenic is indicated. Now add 4 drops of 6 M HCl. Check for completeness by adding another drop of 6 M HCl. When precipitation is complete, centrifuge and separate the mixture. Discard the centrate. Wash the precipitate with 10 drops of 1 M HCl, and add wash solution to centrate. Again wash the precipitate with 10 drops of 1 M HCl and discard the wash.
- (2) To the precipitate, add 1 ml of water, and extract the precipitate by heating and stirring the mixture in a hot water bath for 1 minute. Centrifuge and separate the mixture while the solution is hot. Extract the precipitate again with 1 ml of water in the same manner as before. Combine the two centrates.
- (3) To the centrate, add 4 drops of 0.1 molar K_2CrO_4 . The formation of a yellow precipitate confirms the presence of lead.

(4) To the precipitate, add 6 drops of 6 M NH_3 and stir. The formation of a black, white, or gray precipitate confirms the presence of mercury.

(5) To the remaining filtrate, add 6 M HNO_3 until the solution is definitely acidic. The formation of a white precipitate confirms the presence of arsenic