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Commentary

A Short Note on Arsenic Trioxide

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DESCRIPTION

Arsenic trioxide is an inorganic compound and medication that is sold under the trade names Trisenox and others. As an industrial chemical, it's used to make insecticides, and drugs, among other things. It's a drug that's used to treat Acute Promyelocytic Leukaemia, a form of malignancy. It is injected into a vein for this use. Vomiting, diarrhea, edema, shortness of breath, and headaches are all common adverse effects. APL differentiation syndrome and cardiac difficulties are possible severe adverse effects. It is possible that use during pregnancy or nursing will damage the infant. AS2O3 is the formula for arsenic trioxide. Its method of action in cancer treatment is uncertain. In the United States, arsenic trioxide was approved for medical use in 2000. The World Health Organization classifies it as an essential medication. A total of 50,000 tones is produced annually. Because of its toxicity, a number of countries have place restrictions on its manufacture and sale.

Medical

A kind of malignancy known as Acute Promyelocytic Leukaemia (APL) is treated with arsenic trioxide. It can be used in cases when previous therapies, such as All-Trans Retinoic Acid (ATRA), have failed or as part of the first therapy of newly diagnosed patients. Arsenic trioxide and all-trans retinoic acid may be used in combination as an initial treatment (ATRA). Realgar/Indigo naturalis, which may be taken by mouth and is less expensive but less available, appears to be effective. This was discovered the Chinese researcher Zhang Tingdong and colleagues in the 1970s. In the United States, it was approved for the treatment of leukaemia in 2000. The University of Hong Kong developed a liquid form of arsenic trioxide for orally administered. Arsenic trioxide is used to make oregano-arsenic compounds such feed additives (roxarsone) and medication (neosalvarsan).

Manufacturing

Industrial uses include use as a precursor to forestry products, colorless glass production, and electronics. The trioxide is the precursor of elemental arsenic, arsenic alloys, and arsenide semiconductors because it is the main compound of arsenic. The trioxide is used to make the bulk arsenic-based compounds sodium arsenate and sodium cacodylate. The toxicity of arsenic is used in a variety of applications, including the use of arsenic oxide as a wood preservative. Copper arsenates, which are derived from arsenic trioxide, are widely used as a wood preservative in the United States and Malaysia, although they are banned in many other nations. This practice is still controversial. Arsenic trioxide is a vivid pigment that is used in paints and as a rodenticide when combined with copper (II) acetate. This application is no longer accessible.

Alternative therapies

Despite its well-known toxicity, arsenic trioxide, also known as pi-shuang, was used in traditional Chinese medicine. It's called as arsenicum album in homoeopathy. Arsenic oxide compounds were found in some discredited patent medicines, including Fowler's solution.

Toxicology

Arsenic trioxide is easily absorbed by the digestive system, and its toxic effects on inhalation and skin contact are well-known. At first, methylation to mono methylarsonic acid and dimethylarsinic acid and excretion in the urine results in rapid elimination (half-life of 1-2 days), but a part (30-%40% in the case of repeated exposure) is incorporated into the bones, muscles, skin, hair, and nails (all keratin-rich tissues) and eliminated over weeks or months. The first signs of acute arsenic poisoning after ingestion are digestive issues such as vomiting, stomach aches, and diarrhea, which is often followed by bleeding. Convulsions, cardiovascular problems, liver and kidney inflammation, and blood coagulation disorders are all possible side effects of sub-lethal dosage. The emergence of distinctive white lines (Mees' lines) on the nails, as well as hair loss, follow. Lower dosages cause liver and renal issues, as well as changes in skin color. While arsenic trioxide comes into contact with the eyes, even weak solutions are dangerous.

The toxic properties are well-known and have been the focus of much research. Arsenicosis is the clinical term for chronic arsenic poisoning. Workers at smelters, people with high levels of arsenic in their drinking water (0.3-0.4 ppm), and patients treated for long periods with arsenic-based drugs are all

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impacted. Similarly, studies on copper casting workers in the United States, Japan, and Sweden show that the most exposed workers had a 6-10 times higher risk of lung cancer than the general population. Skin cancer is caused by long-term ingestion of arsenic trioxide, which can be found in drinking water or as a medical therapy. One study of women exposed to arsenic trioxide dust as employees or neighbors of a copper foundry found reproductive problems (high rates of miscarriage, low birth weight, and congenital deformations). The so-called "arsenic eaters of Styria" lived in Austria and took doses of arsenic trioxide considerably beyond the lethal dose without harm. Arsenic is thought to make heavy work feasible at high altitudes, such as those seen in the Alps. The occupational permissible exposure limit for inorganic arsenic compounds in breathing zone air in is 0.010 mg/m^3 .

Environmental effect

Smelting and related ore processing often generate arsenic trioxide, which is toxic to the environment. The Giant Mine in Canada, for example, handled large amounts of arsenopyrite-contaminated gold ores.