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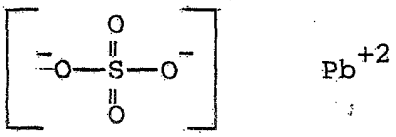
*This review reflects the available toxicity literature, both published and unpublished. Studies have not been evaluated for scientific merit. Contact Haskell Laboratory if you have questions.*

Common Name: Lead Sulfate
Chemical Name: Sulfuric Acid, lead (2+) salt (1:1)
Synonyms: C.I. Pigment White 3, Anglislite
CAS Registry No.: 7446-14-2
Chemical Structure:



Physical Properties:

| | | |
|---|---|---|
| Description | : | White solid |
| Molecular Weight | : | 303.25 |
| Boiling Point | : | ---- |
| Melting Point | : | 1170°C |
| Density/Specific Gravity | | ---- |
| Vapor Pressure | | ---- |
| Flash Point/Flammability | | ---- |
| Explosive Limits | | ---- |
| Solubility | : | 4.25 mg/100 mL water @ 25°C<br>5.6 mg/100 mL water @ 40°C<br>Slightly soluble in concentrated sulfuric acid<br>See Reference 16 for additional information |
| Conversion Factors | : | ---- |

Exposure Standards

OSHA PEL = 50µg/$m^3$ (1a)

DOT Classification

Lead sulfate containing more than 3% sulfuric acid is considered a corrosive material (1c).

EPA Status

Lead sulfate is listed as a hazardous substance under the Federal Water Pollution Control Act (lb).

FDA Status

None

TSCA Inventory

Yes

## TOXICITY

### A. Acute

#### 1. Oral

- LD50 (guinea pigs) = 35 grams/kg (11)
- ALD (dog) = 2000-3000 mg/kg (4)

#### 2. Skin

No information was found

#### 3. Eye

- Lead sulfate, placed in the anterior chamber of rabbit eyes, caused a moderate purulent reaction and general inflammation (4).

#### 4. Inhalation

- Related Reference 14 contains some information on inhalation exposure to lead sulfate containing 32% lead oxide (white lead).

#### 5. Injection Studies

a) Intraperitoneal

- LD10 (guinea pigs) = 146 mg/kg (3)
- LD75 (guinea pigs) = 290 mg/kg (3)

### B. Extended Studies

#### 1. Oral

- Lead sulfate was administered orally to groups of four rats at doses of 25 and 37.5 mg/day for four consecutive days. On day two each animal received 100 mg/kg of phenobarbital. No change in body weight, liver weight and microsomal protein and blood hemoglobin levels was observed. The lead content of the liver was four times that in control animals. Slight decreases in the induction of cytochrome $P_{450}$ and aminopyrine demethylase was seen (10).

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- Severe lead poisoning was produced in a cat by the administration of 167 mg/kg/day for 12 days (8).

- Eight-month-old dogs were maintained on a high fat, low calcium diet containing a mixture of lead chloride, lead bromide and lead sulfate at four dose levels. Dogs on high levels of lead showed marked weight loss and gastrointestinal symptoms followed by death. Dogs on low levels of lead developed neurological signs. Highest tissue lead levels were found in bones followed by liver and kidney, brain and spinal cord (5).

- A group of seven cats was administered 1.8-13.5 mg Pb*/kg/day for from 56 to 215 days. Effects from the lead administration included loss of weight and cramps. All the animals died as a result of the lead administration. Autopsy usually showed a somewhat bluish-black coloration of the appendix and of the upper rectum. No histological examinations were made (9).

- A group of three cats was administered 15, 19.2 and 23.1 mg Pb*/kg/day, respectively. The animals died after 57, 50 and 18 days, respectively. Another group of three was administered 50, 47 and 48 mg Pb*/kg/day. These animals died after 42,32 and 61 days, respectively (9).

- A group of three rabbits was administered 43, 44 and 47 mg Pb*/kg/day, respectively. The animals died after 92, 49 and 46 days on test, respectively (9).

- A group of two rabbits was administered 50 mg of lead sulfate* in their diet for up to 79 weeks. One animal was sacrificed after 28 weeks for analysis of body tissues for lead. This rabbit contained 42.9 mg of lead. The other rabbit continued on test. The animals seemed to tolerate the lead without difficulty. They were lively, well nourished and gained weight. When sacrificed the rabbit was well and did not appear to have any compound-related effects. However, lead content of the body had increased three-fold to 121 mg (9).

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*64% $PbSO_4$, 32% PbO

- See Related Reference 13 for additional information

C. Carcinogenic Potential

No information available

D. Mutagenic Potential

- Sister chromatid exchanges (SCEs) in cultured human lymphocytes were increased by $10^{-5}$ molar lead sulfate (12).

E. Embryotoxic Potential

No information available

F. Other Reproduction Studies

None

G. Aquatic/Environmental Studies

- Twenty-six (26) mg/L of lead sulfate has been reported as the lethal concentration for goldfish (6).

- In distilled water, 25 mg/L of lead sulfate killed goldfish in four days and killed minnows in two to three hours (2).

H. Clinical Reports of Human Intoxication

None

I. Epidemiology

No information available

J. Metabolism

No information available

K. Biochemical Studies

- See Related Reference 15

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REFERENCES

1. Code of Federal Regulations

   (a) Title 29, Section 1910.1025

   (b) Title 40, Sections 116.4A and 117.3

   (c) Title 49, Section 172.101

2. Ellis, M. M., "Detection and Measurement of Stream Pollution" United States Department of Bur. of Fisheries Bull. 22 (1937) (From McKee and Wolf, Water Quality Criteria, p. 209 (1963).

3. Fairhall, L. T., et al., U.S. Pub. Health Bull., No. 253, 1-40 (1940) (CA34:5563) (J- ).

4. Flury, F., Abderhalden's Hdb., 4(7b):1289-1314 (1935) (RTECS).

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8. Lehmann, K. B., Arch. Hyg., 16 (1893) (Ref. from Lehmann, K. B., Arch. Hyg., 101:197-204 (1929) (J-3867).

9. Lehmann, K. B., Arch Hyg., 101:197-204 (1929) (Verified CA23:5050) (J-3867).

10. Norpoth, K., et al., Int. Arch. Arbeitsmed 33:139-151 (1974) (Verified CA84:160262).

11. Tartler, G., Arch. Hyg., 125:273-292 (1941) (CA36:4911)

12. Wulf, H. C., Dan. Med. Bull., 27(1):40-42 (1980) (CA93: 1976) (J- ).

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RELATED REFERENCES

Oral

13. Gage, J. C. and M. H. Litchfield, Food Cosmet. Toxicol., 6:329-338 (1968) (Verified CA69:104754).

"Migration of lead from polymers in the rat gastrointestinal tract"

Inhalation

14. Koelsch, F., et al., Arch. Hyg., 101:234-256 (1929) (CA23: 5050).

"Comparative investigations on the toxicity of basic lead sulfate and basic lead carbonate"

Biochemical Studies

15. Granata, A. and D. Germano, Boll. Soc. Ital. Biol. Sper., 39(16):928-931 (1963) (CA60:4564c).

"Action of lead and its principal inorganic salts on red blood cells"

Solubility

16. Horiguchi, S., et al., Sumitomo Sangyo Eisei, 13:48-51 (1977) (CA88:99845).

"Studies on occupational lead poisoning. I. An experiment on the solubility of several lead compounds in water, stimulated gastric and intestinal juice"

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December 14, 1982

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