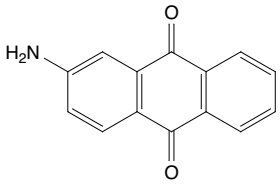
2-Aminoanthraquinone

CAS No. 117-79-3

Reasonably anticipated to be a human carcinogen

First listed in the *Third Annual Report on Carcinogens* (1983)



Carcinogenicity

2-Aminoanthraquinone is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity from studies in experimental animals.

Cancer Studies in Experimental Animals

Oral exposure to 2-aminoanthraquinone caused tumors in two rodent species and at two different tissue sites. Dietary administration of 2-aminoanthraquinone caused liver cancer (hepatocellular carcinoma) in mice of both sexes and increased the combined incidence of benign and malignant liver tumors (hepatocellular adenoma and carcinoma) in male rats. It also caused lymphoma in female mice (NCI 1978).

Cancer Studies in Humans

No epidemiological studies were identified that evaluated the relationship between human cancer and exposure specifically to 2-aminoanthraquinone.

Properties

2-Aminoanthraquinone is an aromatic amine that exists at room temperature as red needle-like crystals or a dark-brown granular solid (NCI 1978). It is practically insoluble in water and diethyl ether, slightly soluble in ethanol, and soluble in chloroform, benzene, and acetone (IARC 1982). It decomposes at its melting point (NCI 1978). Physical and chemical properties of 2-aminoanthraquinone are listed in the following table.

Property	Information
Molecular weight	223.2[a]
Density	1.45 g/mL[b]
Melting point	302°C[a]
Log K_{ow}	3.31[a]
Water solubility	0.163 mg/L at 25°C[a]
Vapor pressure	5×10^{-11} mm Hg[c]

Sources: [a]HSDB 2009, [b]Akron 2009, [c]ChemIDplus 2009.

Use

2-Aminoanthraquinone is used as an intermediate in the industrial synthesis of anthraquinone dyes and pharmaceuticals (HSDB 2009). It is the precursor of 22 dyes and 4 pigments, which include the following: C.I. vat blue 4, 6, 12, and 24, vat yellow 1, and pigment blue 22 (NCI 1978). These dyes are used in automotive paints, high-quality paints and enamels, plastics, rubber, and printing inks, and as textile dyes (HSDB 2009).

Production

2-Aminoanthraquinone was first produced commercially in the United States in 1921 (IARC 1982). In 1965, 520,000 kg (1.1 million pounds) was produced in the United States, but production had decreased to 200,000 lb by 1971 (NCI 1978, IARC 1982). In 2009, 2-aminoanthraquinone was produced by five manufacturers worldwide (three in China, one in Europe, and one in India) (SRI 2009) and was available from 21 suppliers, including 10 U.S. suppliers (ChemSources 2009). In 1974, 360,000 lb of 2-aminoanthraquinone was imported into the United States (NCI 1978), but by 2000, imports had decreased to 1 kg (2.2 lb) (USITC 2009). No other data on U.S. imports or exports of 2-aminoanthraquinone were found.

Exposure

The primary route of potential human exposure to 2-aminoanthraquinone is dermal contact (NCI 1978). Consumers may potentially be exposed to 2-aminoanthraquinone through contact with products containing residues of anthraquinone dyes. Data were not available on the levels of 2-aminoanthraquinone impurities in the final dyes, the potential for consumer exposure, or the potential for human uptake. No environmental releases of 2-aminoanthraquinone were reported in the U.S. Environmental Protection Agency's Toxics Release Inventory. If released to the environment, 2-aminoanthraquinone is expected to exist as a particulate in the atmosphere and to be removed by deposition to water and soil. If released to water, it is expected to adsorb to sediment and not volatilize to the atmosphere. In soil, it is expected to be immobile. It is not expected to biodegrade and has a low potential for bioaccumulation (HSDB 2009).

Because 2-aminoanthraquinone is used on a commercial scale solely by the dye industry, the potential for occupational exposure is greatest for workers at dye-manufacturing facilities. No data were available on the number of facilities using 2-aminoanthraquinone or on the numbers of workers potentially exposed.

Regulations

Environmental Protection Agency (EPA)

Emergency Planning and Community Right-To-Know Act

Toxics Release Inventory: Listed substance subject to reporting requirements.

References

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