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# TOXICOLOGICAL EVALUATIONS

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**TOXICOLOGICAL EVALUATION**

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# 6-Amino-4-hydroxy-2-naphthalene-sulfonic acid

**No. 227**

CAS No. 90-51-7

BG Chemie
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# 6-Amino-4-hydroxy-2-naphthalenesulfonic acid

This Toxicological Evaluation replaces the previously published version in volume 10.

## 1 Summary and assessment

On single oral administration to rats, 6-amino-4-hydroxy-2-naphthalenesulfonic acid does not cause clinical signs of toxicity ($LD_{50}$ rat oral > 5000 mg/kg body weight).

In rabbits, 6-amino-4-hydroxy-2-naphthalenesulfonic acid is not irritating to the intact skin or the eye.

6-Amino-4-hydroxy-2-naphthalenesulfonic acid of high purity is not mutagenic in the Salmonella/microsome test. Technical-grade product and test substance of unknown purity have given weakly positive results in this test system.

## 2 Name of substance

| | | |
|---|---|---|
| 2.1 | Usual name | 6-Amino-4-hydroxy-2-naphthalenesulfonic acid |
| 2.2 | IUPAC name | 6-Amino-4-hydroxynaphthalene-2-sulfonic acid |
| 2.3 | CAS No. | 90-51-7 |
| 2.4 | EINECS No. | 202-000-8 |

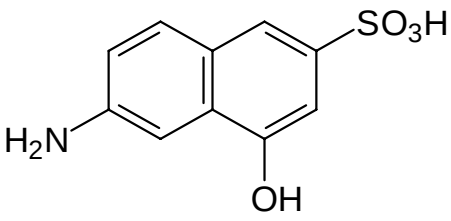
## 3 Synonyms, common and trade names

γ-Acid
2-Amino-8-hydroxynaphthalin-6-sulfonsäure
6-Amino-4-hydroxy-2-naphthalinsulfonsäure

2-Amino-8-naphthol-6-sulfonic acid
Aminonaphthol sulfonic acid γ
2-Amino-8-naphthol-6-sulfonsäure
6-Amino-4-naphthol-2-sulfonsäure
7-Amino-1-naphthol-3-sulfonsäure
Aminonaphtholsulfonsäure γ
7-Amino-1-hydroxy-3-sulfonaphthalin
Gamma acid
Gammasäure
Gammasäure TR
2-Naphthalenesulfonic acid, 6-amino-4-hydroxy-
1-Naphthol-3-sulfonic acid, 7-amino-
γ-Säure

## 4 Structural and molecular formulae

4.1 Structural formula




4.2 Molecular formula $C_{10}H_9NO_4S$

## 5 Physical and chemical properties

| | | | |
|---|---|---|---|
| 5.1 | Molecular mass, g/mol | 239.25 | |
| 5.2 | Melting point, °C | 180–200 (decomposition) | (Bayer, 1990 a) |
| 5.3 | Boiling point, °C | No information available | |
| 5.4 | Vapour pressure, hPa | No information available | |
| 5.5 | Density, g/cm³ | Ca. 0.6 (bulk density) | (Bayer, 1990 a) |
| 5.6 | Solubility in water | Ca. 1 g/l (at 20 °C)<br>Ca. 4 g/l (at 100 °C) | (Bayer, 1990 a)<br>(Booth, 1991) |
| 5.7 | Solubility in organic solvents | No information available | |

| | | |
|---|---|---|
| 5.8 | Solubility in fat | No information available |
| 5.9 | pH value | Ca. 3.7 (at 1 g/l water) (Bayer, 1990 b) |
| 5.10 | Conversion factor | 1 ml/m³ (ppm) $\triangleq$ 9.77 mg/m³<br>1 mg/m³ $\triangleq$ 0.10 ml/m³ (ppm)<br>(at 1013 hPa and 25 °C) |

# 6 Uses

Coupling component for azo dyes (Booth, 1991).

# 7 Experimental results

## 7.1 Toxicokinetics and metabolism

No information available.

## 7.2 Acute and subacute toxicity

On single oral administration of 6-amino-4-hydroxy-2-naphthalenesulfonic acid solution (gamma acid solution; no details of purity or concentration), an $LD_{50}$ value > 15000 mg/kg body weight was found for female Wistar rats (10 animals/dose) following a 14-day observation period. No clinical signs of toxicity were observed (no further details; Bayer, 1974 a).

Ten male Wistar-rats survived a single oral administration of 5000 mg 6-amino-4-hydroxy-2-naphthalenesulfonic acid (gamma acid, dry and ground, formulated in water)/kg body weight without developing clinical signs of toxicity. The observation period was 14 days. Thus the $LD_{50}$ was > 5000 mg/kg body weight (no further details; Bayer, 1979 a).

In mice, the lethal dose for intraperitoneal administration of 6-amino-4-hydroxy-2-naphthalenesulfonic acid was reported as > 500 mg/kg body weight (no further details; RTECS, 1998).

## 7.3 Skin and mucous membrane effects

The application of a solution of 6-amino-4-hydroxy-2-naphthalenesulfonic acid (no details of purity or concentration) to the skin of 2 rabbits was with-

out effect after an exposure period of 8 hours, while after a 24-hour exposure period mild reddening was observed in one of the exposed animals (no further details; Bayer, 1974 b).

In a further skin irritation study, approx. 500 mg 6-amino-4-hydroxy-2-naphthalenesulfonic acid (gamma acid, dry and ground, made into a paste with water) was applied to the inner surface of the ears of 2 New Zealand white rabbits under an adhesive dressing for 24 hours. At the end of the exposure period, the test substance was washed off with water and soap. The observation period was 7 days. No skin irritation was observed (Bayer, 1979 b).

In an eye irritation study in rabbits, instillation of a solution of 6-amino-4-hydroxy-2-naphthalenesulfonic acid (no details of purity or concentration) caused slight reddening for a short time in 2 animals (no further details; Bayer, 1974 b).

In a further eye irritation study, approx. 50 mg 6-amino-4-hydroxy-2-naphthalenesulfonic acid (gamma acid, dry and ground, made into a paste with water) was instilled into the conjunctival sac of 2 New Zealand white rabbits. The observation period was 7 days. Slight reddening, which had cleared up completely after 3 days, was seen in one of the 2 exposed rabbits one hour after application (Bayer, 1979 b). The substance therefore had no irritating effect on the eye.

## 7.4 Sensitisation

No information available.

## 7.5 Subchronic and chronic toxicity

No information available.

## 7.6 Genotoxicity

### 7.6.1 In vitro

6-Amino-4-hydroxy-2-naphthalenesulfonic acid (purity: 85%) was tested for mutagenicity in the Salmonella/microsome assay (standard-plate incorpo-

ration test) in the *Salmonella typhimurium* strains TA 98, TA 100, TA 1535 and TA 1537 with and without metabolic activation (S-9 mix from Aroclor 1254-induced rat liver). Concentrations of 50 to 5000 µg/plate were used, and 3 plates were employed per concentration. 6-Amino-4-hydroxy-2-naphthalenesulfonic acid exhibited strain-specific bacteriotoxicity at concentrations of 500 µg/plate and above. In the presence of metabolic activation, a weakly positive result (2-fold increase as compared with the controls) was observed in strain TA 98 only, although the revertant count was within the range of historical control values. No mutagenic effect was observed in the remaining strains, either with or without metabolic activation (Mobay, 1984).

In a further Salmonella/microsome assay in *Salmonella typhimurium* strains, 6-amino-4-hydroxy-2-naphthalenesulfonic acid showed a weak mutagenic effect, which in the opinion of the authors was possibly attributable to contaminants in the product tested. The study was carried out in the *Salmonella typhimurium* strains TA 98, TA 100, TA 1535, TA 1537 and TA 1538 as a standard-plate incorporation test with and without metabolic activation (S-9 mix from Aroclor 1254-induced rat liver), and as a special preincubation test with metabolic activation (including 3-fold amounts of S-9 mix from non-induced Syrian hamster liver) according to the method of Prival and Mitchell (1982). In the presence of metabolic activation, 15.0 and 32.6 revertants/µmol test substance were recorded in the direct plate test and the Prival modification, respectively. Details of concentrations employed and the strains exhibiting increased revertant counts were not given in the publication (Freeman et al., 1987).

High purity 6-amino-4-hydroxy-naphthalenesulfonic acid (gamma acid 95%, water 5.9%) was studied in the *Salmonella typhimurium* strains TA 98, TA 100, TA 1535 and TA 1537 in a further standard-plate incorporation test (in accordance with OECD guideline No. 471) at concentrations ranging from 8 to 5000 µg/plate, with and without metabolic activation (S-9 mix from Aroclor 1254-induced livers of male Sprague-Dawley rats). Concentrations up to and including 200 µg/plate showed no bacteriotoxic effects. At the higher concentration levels the substance had a weak, strain-specific bacteriotoxic effect. No concentration-dependent, biologically relevant increase in revertant count was observed either with or without metabolic activation. Pure 6-amino-4-hydroxy-2-naphthalenesulfonic acid was therefore not mutagenic under these test conditions (Bayer, 1992).

### 7.6.2 In vivo

No information available.

## 7.7 Carcinogenicity

No information available.

## 7.8 Reproductive toxicity

No information available.

## 7.9 Effects on the immune system

No information available.

## 7.10 Neurotoxicity

No information available.

## 7.11 Other effects

No information available.

# 8 Experience in humans

No information available.

# 9 Classifications and threshold limit values

No information available.

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