

THE MERCCK INDEX

AN ENCYCLOPEDIA OF
CHEMICALS AND DRUGS

EIGHTH EDITION

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dry. Solubility in water at 26° = 108 g/100 ml; at 100° = 210 g/100 ml. Sparingly sol in alcohol. Aq solns have a bitter taste and are acid to litmus.

USE: Fluorinating agent, see Lawton, Levy, *J. Am. Chem. Soc.* 77, 6083 (1955).

Sodium Fluoride. Villiaumite. Florocid; Flura-Drops; Zymafluor; Karidium. NaF; mol wt 42.00. Na 54.75%, F 45.24%. Prep'd by fusing cryolite with NaOH; by adding equivalent amounts of NaOH or Na₂CO₃ to 40% HF [precipitation is instantaneous and crystal size depends on pH, but too much HF yields sodium bifluoride (NaHF₂)]; Müller, *Chemiker-Ztg.* 52, 5 (1928). Technical grades are 90% and 95% NaF, light (37 cu in/lb) and dense (23 cu in/lb), and 98%. The impurities are mainly sodium and aluminum silicates.

Cubic or tetragonal crystals (NaCl lattice). d 2.78. mp 993°. bp 1704°. **Poisonous!** Solubility in water at 15° = 4.0 g/100 ml, at 25° = 4.3 g/100 ml, at 100° = 5.0 g/100 ml. Insoluble in alcohol. Aq solns have an alkaline reaction caused by partial hydrolysis. pH of freshly prep'd sat'd soln 7.4. Aq solns etch glass, but the dry crystals or powder may be kept in glass bottles. Sodium fluoride sold as household insecticide must be tinted Nile Blue.

USE: As insecticide, particularly for roaches and ants; in other pesticide formulations; constituent of vitreous enamel and glass mixes; as a steel degassing agent; in electroplating; in fluxes; in heat-treating salt compositions; in the fluoridation of drinking water; for disinfecting fermentation apparatus in breweries and distilleries; preserving wood, pastes and mucilage; manuf of coated paper; frosting glass; in dental laboratories.

MED USE: For prophylaxis of dental caries. **Formerly in hyperthyroidism,** rheumatoid arthritis, epilepsy. *Dose:* For caries prophylaxis, 0.7 to 1 ppm of drinking water; topically, 2% soln applied directly to teeth. *Human Toxicity:* Severe symptoms from ingestion of 0.25 to 0.45 g. Death from 4 g. *Sublethal:* nausea and vomiting, abdominal distress, diarrhea, stupor, weakness. *Lethal:* muscular weakness, tremors, convulsions, collapse, dyspnea, respiratory and cardiac failure, death. *Chronic:* mottling of tooth enamel, osteosclerosis.

VET USE: Poultry lice; roundworms of swine. *Dose:* swine, 1% in dry feed.

Sodium Folate. *Folic acid sodium salt;* sodium pteroylglutamate; sodium Folvite. C₁₉H₁₆N₇NaO₆; mol wt 463.39. C 49.24%, H 3.92%, N 21.16%, O 20.72%, Na 4.96%.

Sold only as sterile soln in ampuls. Clear, mobile liquid. Yellow to orange-yellow color. pH between 8.5 and 11.0. For spectrophotometric data see Folic Acid.

MED USE: In folic acid deficiency.

Sodium Formaldehydesulfoxylate. *Hydroxymethanesulfonic acid sodium salt;* formaldehyde sodium sulfoxylate; formaldehydesulfoxylic acid sodium salt; sodium hydroxymethanesulfinate; sodium methanesulfoxylate; Aldanil; Rongalite; Rongalite C. Na[HOCH₂SO₂]; mol wt 118.09. CH₃NaO₃S; C 10.17%, H 2.56%, Na 19.47%, O 40.65%, S 27.16%. Prep'n: Heyl, Greer, *Am. J. Pharm.* 94, 80 (1922); Binns, U.S. pat. 2,013,125 (1935 to Virginia Smelting Co.); Postnikov, Kunin, *J. Applied Chem. (U.S.S.R.)* 13, 185 (1940). Structure of dihydrate: Truter, *J. Chem. Soc.* 1955, 3064; 1962, 3400.

Obtained as the dihydrate, Na[HOCH₂SO₂].2H₂O, crystals, mp 63–64°, dec at higher temp. Odorless when freshly prep'd, but quickly develops a characteristic (garlic) odor. Freely sol in water; practically insol in abs alcohol, ether, benzene. Readily dec by dil acids. Aq soln is practically neutral. *Keep well closed in a cool place.* LD s.c. in mice, 4.0 g/kg; Rosenthal, *Public Health Rept. (U.S.)* 49, 908 (1934).

USE: In vat color printing pastes; Borstelmann, Fordemwalt, U.S. pat. 2,597,281 (1952 to Am. Cyanamid Co.). In polymerization of ethylenic compds: Brit. pats. 816,252 and 852,593 (1959 to Hercules Powder Co. and 1960 to Air Reduction Co.). In manuf of arspenamines: Krumwiede, *J. Am. Pharm. Assoc.* 8, 795 (1919); Heyl, Miller, *ibid.* 11, 432 (1922).

MED USE: Formerly to treat mercury poisoning. *Human Toxicity:* Very low toxicity. Up to 10 g i.v. is tolerated by humans.

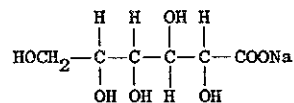
Sodium Formate. HCOONa; mol wt 68.02. CHNaO₂; C 17.66%, H 1.48%, O 47.05%, Na 33.81%, formic acid 67.67%.

White, deliquescent granules or cryst powder; slight odor of formic acid. d 1.92. mp 253°; at higher temp dec into sodium oxalate and hydrogen, then into sodium carbonate. Soluble in about 1.3 parts water; sol in glycerol, slightly in alcohol. The aq soln is neutral pH about 7. Has buffering action. *Keep well closed.*

USE: In dyeing and printing fabrics; also in anal. chemistry as a precipitant for the "noble" metals. Solubilizes trivalent metal ions in soln by forming complex ions. Buffering action adjusts the pH of strong mineral acids to higher values.

MED USE: Has been used as caustic, astringent.

Sodium Gluconate. *Gluconic acid sodium salt.* C₆H₁₁NaO₇; mol wt 218.13. C 33.04%, H 5.08%, Na 10.54%, O 51.34%. The normal sodium salt of gluconic acid.



Crystals. The technical grade may have a pleasant odor. Solubility in water at 25° = 59 g/100 ml. Sparingly sol in alcohol. Insoluble in ether. Aq solns are stable to short boiling periods.

USE: As sequestering agent forming water-sol complexes with calcium in alkaline media and with iron in near neutral solns. Used in metal plating, mineral tanning of hides, mordanting fabrics, and in water-paste paints. Has been suggested as a photographic processing aid.

Sodium Glutamate. *Glutamic acid sodium salt;* monosodium glutamate; Ajinomoto; Glutacyl; RL-50; Vetsin; Chinese seasoning; MSG; Accent; Zest; Glutavene. The monosodium salt of the naturally occurring L-form of glutamic acid. HOOCCH(NH₂)CH₂CH₂COONa; mol wt 169.12. Glutamic acid: 86.98%. C₅H₈NNaO₄; C 35.51%, H 4.77%, O 37.84%, N 8.28%, Na 13.60%. Produced by hydrolysis of vegetable proteins (see also Glutamic Acid): Ikeda, Suzuki, Brit. pat. 9440; C.A. 5, 836 (1910); U.S. pat. 1,015,891; C.A. 6, 717 (1912); from Steffens waste from beet-sugar molasses by acid hydrolysis: Ikeda, U.S. pat. 1,721,820; C.A. 23, 4591 (1929); see also Bartow, Albrook, U.S. pat. 1,992,804; C.A. 29, 2548 (1935); Royal, U.S. pat. 2,373,342; C.A. 39, 4510 (1945); by alkaline hydrolysis: Masuda, Royal, Marshall, U.S. pat. 1,947,563 (1934 to Larrowe-Suzuki Co.); Shafor *et al.*, U.S. pat. 2,829,161 (1958 to Internat. Minerals). Prep'n of cryst Na-glutamate: Shildneck, U.S. pat. 2,306,646; C.A. 37, 3107 (1943). As a rule, wheat gluten, corn gluten, and sugar beet products are used in the U.S., while soya bean protein is used in the Orient. Flow sheets and condensed descriptions of mfg methods: Faith, Keyes, Clark, *Industrial Chemicals*, 2nd ed (Wiley, New York, 1957), p 522.

White or almost white, cryst powder. The monohydrate, C₅H₈NNaO₄.H₂O, forms needles. Slight peptone-like odor. Meat-like taste. The optimum concn is from 0.2 to 0.5% in normally salted food. NaCl must be present to produce an attractive glutamate taste. A 1% concn or more is liable to produce a sweetish taste. L-Sodium glutamate is slightly levorotatory in water, but dextrorotatory in acid solns (the free L-acid is dextrorotatory). [α]_D²⁵ +24.2° to +25.5° (c = 8.0 in 1.0N HCl). pH of 0.2% soln = 7.0. Very sol in water; sparingly sol in alcohol.

USE: To impart meat flavor to foods, to enhance other natural food flavors. To improve the taste of tobacco.

MED USE: To reduce blood ammonia levels in ammoniacal azotemia. Has also been used in psychosis and mental retardation. *Dose:* i.v. 29 g in 1000 ml of 5% dextrose soln for hepatic coma.

Sodium Glycerophosphate. Na₂C₃H₅(OH)₂PO₄.5½H₂O; mol wt 315.15. C₃H₇Na₂O₆P. Anhydr salt 68.56%, H₂O 31.44%, glycerophosphoric acid 54.61%, glycerol 29.21%, H₃PO₄ 31.10%, P 9.84%, Na 14.59%, C 11.43%, H 5.76%, O 58.39%. The so-called beta form is usually obtained as a solid and is the medicinal form described here. The alpha form is difficult to crystallize and is usually obtained as a syrup. Structure: see Glycerophosphoric Acid.

White, odorless, scale-like crystals; dec above 130°. Soluble in about 1.5 parts water; more sol in hot water; insol in alcohol. The aq soln is alkaline. pH about 9.5.

MED USE: Has been used as tonic.

VET USE: Formerly used as a so-called "nervine tonic." *Dose:* dogs: 300 mg.