Sodium sulfate, anhydrous (Natrii sulfas anhydricus)

Molecular formula. Na$_2$SO$_4$

Relative molecular mass. 142.0

Chemical name. Disodium sulfate; sulfuric acid disodium salt, anhydrous; CAS Reg. No. 7757-82-6 (anhydrous).

Description. A white powder; odourless.

Solubility. Freely soluble in water; practically insoluble in ethanol (~750 g/l) TS.

Category. Laxative.

Storage. Anhydrous sodium sulfate should be kept in a well-closed container.

Additional information. Anhydrous sodium sulfate is hygroscopic.

Requirements

Definition. Anhydrous sodium sulfate contains not less than 99.0% and not more than 100.5% of Na$_2$SO$_4$, calculated with reference to the dried substance.

Identity tests

A. When tested for sodium as described under 2.1 General identification tests, yields the characteristic reactions. If reaction B is to be used, prepare a 20 mg/mL solution.

B. A 20 mg/mL solution yields reaction A described under 2.1 General identification tests as characteristic of sulfates.

Heavy metals. Use 0.5 g for the preparation of the test solution as described under 2.2.3 Limit test for heavy metals, Procedure 1; determine the heavy metals content according to Method A; not more than 45 μg/g.

Ammonium salts. Transfer 0.5 g to a test-tube, add about 0.3 g of potassium hydroxide R and heat the mixture; a moistened red litmus paper R placed in the evolved vapours does not turn blue.

Arsenic. Use a solution of 2.0 g in 35 mL of water and proceed as described under 2.2.5 Limit test for arsenic; the arsenic content is not more than 5 μg/g.

Calcium. To two separate comparison tubes transfer 0.2 mL of ethanolic calcium standard (100 μg/mL Ca) TS, add 1.5 mL of ammonium oxalate (25 g/l) TS, allow to stand for 1 minute, and then add 1 mL of acetic acid (~120 g/l) TS. To one tube add a solution of the substance to be examined containing 0.22 g in 15 mL of water, and to the second tube add 10 mL of calcium standard (10 μg/mL Ca) TS and 5 mL of water. Observe any opalescence produced after 15 minutes; the opalescence in the first tube is not more intense than that in the second tube (450 μg/g).

Chlorides. Dissolve 0.55 g in a mixture of 2 mL of nitric acid (~130 g/l) TS and 30 mL of water and proceed as described under 2.2.1 Limit test for chlorides; the chloride content is not more than 0.45 mg/g.

Iron. Using 0.44 g prepare a solution in 40 mL of water and proceed as described under 2.2.4 Limit test for iron; not more than 90 μg/g.

Magnesium. Dissolve 0.22 g in 10 mL of water, add 1 mL of glycerol R, 0.15 mL of titan yellow TS, 0.25 mL of ammonium oxalate (50 g/l) TS, and 5 mL of sodium hydroxide (~80 g/l) TS, and shake; any pink colour produced is not more intense than that of a similarly treated mixture of 5 mL of magnesium standard (10 μg/mL Mg) TS and 5 mL of water.

Clarity and colour of solution. A solution of 0.22 g in 10 mL of carbon-dioxide-free water R is clear and colourless.

Reducing substances. Dissolve 0.25 g in 5 mL of water, add 1 mL of sulfuric acid (~100 g/l) TS and 0.20 mL of potassium permanganate (0.002 mol/l) VS. Allow to stand for 15 minutes; no discoloration is observed.

Loss on drying. Dry to constant weight at 130°C; it loses not more than 50 mg/g.

Acidity or alkalinity. Dissolve 0.22 g in 10 mL of carbon-dioxide-free water R and add 0.1 mL of bromothymol blue/ethanol TS; not more than 0.5 mL of carbonate-free sodium hydroxide (0.01 mol/l) VS or 0.5 mL of hydrochloric acid (0.01 mol/l) VS is required to obtain the midpoint of the indicator (green).

Assay. Dissolve about 0.1 g, accurately weighed, in 250 mL of water, add 10 mL of hydrochloric acid (~70 g/l) TS, heat to boiling, and add a sufficient quantity of barium chloride (50 g/l) TS. Heat on a water-bath for 30 minutes, stirring occasionally. Collect the precipitate, wash, dry and ignite at 600 °C. Each g of residue is equivalent to 0.608 g of Na$_2$SO$_4$. 