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Theophylline Sodium Glycinate

Glycine, mixture with 3,7-dihydro-1,3-dimethyl-1*H*-purine-2,6-dione, monosodium salt.
Theophylline sodium mixture with glycine

CAS RN®: 8000-10-0; UNII: 2S36N8T753.

» Theophylline Sodium Glycinate is an equilibrium mixture containing Theophylline Sodium ($C_7H_7N_4NaO_2$) and Glycine ($C_2H_5NO_2$) in approximately equimolecular proportions buffered with an additional mole of Glycine. Dried at 105° for 4 hours, it contains theophylline sodium glycinate equivalent to not less than 44.5 percent and not more than 47.3 percent of anhydrous theophylline ($C_7H_8N_4O_2$).

Packaging and storage—Preserve in tight containers.

USP Reference standards ⟨11⟩—
USP Glycine RS
USP Theophylline RS

Identification—

A: Dissolve about 1 g in 20 mL of warm water, and neutralize the solution with 6 N acetic acid: a white, crystalline precipitate of theophylline is formed. Filter, wash the precipitate with small portions of cold water, and dry it at 105° for 1 hour: the theophylline so obtained melts between 270° and 274°, the procedure for *Class I* being used (see *Melting Range or Temperature* ⟨741⟩). Retain the remaining portion of the theophylline for use in *Identification* test *B*.

Change to read:

B: ▲*Spectroscopic Identification Tests* ⟨197⟩*, Infrared Spectroscopy: 197K*.▲ (CN 1-May-2020) Residue obtained in *Identification* test *A*.

C: Ignite it: the residue colors a nonluminous flame intensely yellow and effervesces with acids.

pH ⟨791⟩**:** between 8.5 and 9.5, in a saturated solution.

Loss on drying ⟨731⟩—Dry it at 105° for 4 hours: it loses not more than 2.0% of its weight.

Glycine content—

Mobile phase—Prepare a solution containing 470 mg of sodium acetate trihydrate and 1 mL of glacial acetic acid in 2 liters of water. Adjust with 10 N sodium hydroxide to a pH of 4.3. Mix 3 volumes of the resulting solution with 7 volumes of acetonitrile. Make adjustments if necessary (see *System Suitability* under *Chromatography* ⟨621⟩).

Standard preparation—Dissolve an accurately weighed quantity of USP Glycine RS in *Mobile phase*, and dilute quantitatively with *Mobile phase* to obtain a solution having a known concentration of about 1.3 mg per mL.

Test preparation—Transfer about 153 mg of Theophylline Sodium Glycinate, accurately weighed, to a 50-mL volumetric flask, dissolve in *Mobile phase*, dilute with *Mobile phase* to volume, and mix.

Chromatographic system (see *Chromatography* ⟨621⟩)—The liquid chromatograph is equipped with a 200-nm detector and a 3.9-mm × 30-cm column that contains packing L8. The flow rate is about 1.5 mL per minute. Chromatograph the *Standard preparation*, and record the peak responses as directed for *Procedure:* the column efficiency determined from the analyte peak is not less than 2000 theoretical plates, the tailing factor for the glycine peak is not more than 2.0, and the relative standard deviation for replicate injections is not more than 2.0%.

Procedure—Separately inject equal volumes (about 20 µL) of the *Standard preparation* and the *Test preparation* into the chromatograph, record the chromatograms, and measure the responses for the glycine peaks. Calculate the quantity, in mg, of $C_2H_5NO_2$ in the portion of Theophylline Sodium Glycinate taken by the formula:

$$50C(r_U/r_S)$$

in which C is the concentration, in mg per mL, of USP Glycine RS in the *Standard preparation*, and r_U and r_S are the peak responses obtained from the *Test preparation* and the *Standard preparation*, respectively: not less than 42.0 percent and not more than 48.0 percent, on the dried basis, is found.

Assay—

Buffer solution, Mobile phase, Internal standard solution, Standard preparation, and *Chromatographic system*—Prepare as directed in the *Assay* under *Theophylline*.

Assay preparation—Transfer about 550 mg of Theophylline Sodium Glycinate, previously dried and accurately weighed, to a 250-mL volumetric flask, add about 125 mL of *Mobile phase*, shake by mechanical means until solution is complete, dilute with *Mobile phase* to volume, and mix. Transfer 10.0 mL of this solution to a 100-mL volumetric flask, add 20.0 mL of *Internal standard solution*, dilute with *Mobile phase* to volume, and mix.

Procedure—Proceed as directed for *Procedure* in the *Assay* under *Theophylline.* Calculate the quantity, in mg, of anhydrous theophylline ($C_7H_8N_4O_2$) in the portion of Theophylline Sodium Glycinate taken by the formula:

$$2500C(R_U/R_S)$$

in which the terms are as defined therein.

Auxiliary Information - Please check for your question in the FAQs before contacting USP.

Topic/Question	Contact	Expert Committee
THEOPHYLLINE SODIUM GLYCINATE	Documentary Standards Support	SM52020 Small Molecules 5
REFERENCE STANDARD SUPPORT	RS Technical Services RSTECH@usp.org	SM52020 Small Molecules 5

Chromatographic Database Information: Chromatographic Database

Most Recently Appeared In:
Pharmacopeial Forum: Volume No. Information currently unavailable

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