

**System suitability—**

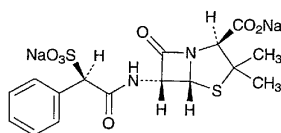
**System performance:** When the procedure is run with 10  $\mu\text{L}$  of the standard solution under the above operating conditions, sulbactam and the internal standard are eluted in this order with the resolution between these peaks being not less than 1.5.

**System repeatability:** When the test is repeated 6 times with 10  $\mu\text{L}$  of the standard solution under the above operating conditions, the relative standard deviation of the peak areas of sulbactam is not more than 2.0%.

**Containers and storage** Containers—Tight containers.

## Sulbenicillin Sodium

スルベニシリンナトリウム



$\text{C}_{16}\text{H}_{16}\text{N}_2\text{Na}_2\text{O}_7\text{S}_2$ : 458.42

Disodium (2*S*,5*R*,6*R*)-3,3-dimethyl-7-oxo-6-[(2*R*)-2-phenyl-2-sulfonatoacetyl-amino]-4-thia-1-azabicyclo[3.2.0]heptane-2-carboxylate [28002-18-8]

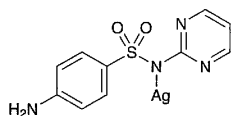
Sulbenicillin Sodium conforms to the requirements of Sulbenicillin Sodium in the Requirements for Antibiotic Products of Japan.

**Description** Sulbenicillin Sodium occurs as a white to light yellowish white powder.

It is very soluble in water, freely soluble in methanol, slightly soluble in ethanol (95), and practically insoluble in diethyl ether.

## Sulfadiazine Silver

スルファジアジン銀



$\text{C}_{10}\text{H}_9\text{AgN}_4\text{O}_2\text{S}$ : 357.14

Monosilver 4-amino-*N*-(pyrimidin-2-yl)-benzenesulfonamide [22199-08-2]

Sulfadiazine Silver, when dried, contains not less than 99.0% and not more than 102.0% of  $\text{C}_{10}\text{H}_9\text{AgN}_4\text{O}_2\text{S}$ .

**Description** Sulfadiazine Silver occurs as a white to pale yellow, crystalline powder. It is odorless.

It is practically insoluble in water, in ethanol (95) and in diethyl ether.

It dissolves in ammonia TS.

It is gradually colored by light.

Melting point: about 275°C (with decomposition).

**Identification** Determine the infrared absorption spectrum of Sulfadiazine Silver, previously dried, as directed in the paste method under the Infrared Spectrophotometry, and compare the spectrum with the Reference Spectrum or the spectrum of previously dried Sulfadiazine Silver Reference Standard: both spectra exhibit similar intensities of absorption at the same wave numbers.

**Purity (1) Nitrate—**To 250 mL of water add 1.0 g of Sulfadiazine Silver, shake well for 50 minutes, filter, and use this filtrate as the sample solution. Separately, weigh accurately 0.25 g of potassium nitrate, and dissolve in water to make exactly 2000 mL. Pipet 5 mL of this solution and add water to make exactly 200 mL, and use this solution as the standard solution. Pipet 2.0 mL each of the sample solution and the standard solution, and add 5 mL of a solution of cromotropic acid in sulfuric acid (1 in 10,000) and sulfuric acid to make exactly 10 mL. Determine the absorbances,  $A_T$  and  $A_S$ , of the sample solution and the standard solution at 408 nm as directed under the Ultraviolet-visible Spectrophotometry, using a solution, prepared with exactly 2.0 mL of water in the same manner, as the blank:  $A_T$  is not larger than  $A_S$  (not more than 0.05%).

**(2) Related substances—**Dissolve 0.050 g of Sulfadiazine Silver in 5 mL of a mixture of ethanol (95) and ammonia solution (28) (3:2), and use this solution as the sample solution. Pipet 2 mL of the sample solution, and add a mixture of ethanol (95) and ammonia solution (28) (3:2) to make exactly 20 mL. Pipet 2 mL of this solution, add a mixture of ethanol (95) and ammonia solution (28) (3:2) to make exactly 20 mL, and use this solution as the standard solution. Perform the test with these solutions as directed under the Thin-layer Chromatography. Spot 5  $\mu\text{L}$  each of the sample solution and the standard solution on a plate of silica gel with fluorescent indicator for thin-layer chromatography. Develop the plate with a mixture of chloroform, methanol and ammonia solution (28) (10:5:2) to a distance of about 15 cm, and air-dry the plate. Examine under ultraviolet light (main wavelength: 254 nm): the spots other than the principal spot and spot of the starting point from the sample solution are not more intense than the spot from the standard solution.

**Loss on drying** Not more than 0.5% (1 g, in vacuum, phosphorus (V) oxide, 80%, 4 hours).

**Residue on ignition** 41.0 – 45.0% (1 g).

**Silver content** Weigh accurately about 0.05 g of Sulfadiazine Silver, previously dried, dissolve in 2 mL of nitric acid, and add water to make exactly 100 mL. Pipet 1 mL of this solution, add water to make exactly 100 mL, and use this solution as the sample solution. Measure accurately a suitable quantity of Standard Silver Solution for Atomic Absorption Spectrophotometry, dilute with water to make a solution containing 1.0 to 2.0  $\mu\text{g}$  of silver (Ag:107.87) per mL, and use this solution as the standard solution. Perform the test with the sample solution and the standard solution as directed under the Atomic Absorption Spectrophotometry according to the following conditions, and calculate the silver content of the sample solution from the calibration curve obtained from the absorbance of the standard solution: it contains not less than 28.7% and not more than 30.8% of sil-

ver.

Gas: Combustible gas—Acetylene

Supporting gas—Air

Lamp: A silver hollow cathode lamp

Wavelength: 328.1 nm

**Assay** Weigh accurately about 0.1 g each of Sulfadiazine Silver and Sulfadiazine Silver Reference Standard, each previously dried, and add ammonia TS to make exactly 100 mL, respectively. Pipet 1 mL each of these solutions, add water to make exactly 100 mL, and use these solutions as the sample solution and the standard solution, respectively. Determine the absorbances,  $A_T$  and  $A_S$ , of the sample solution and the standard solution at 255 nm, using a solution, prepared with exactly 1 mL of ammonia TS and a sufficient water to make exactly 100 mL, as the blank.

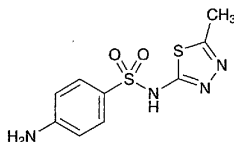
$$\begin{aligned} & \text{Amount (mg) of } C_{10}H_9AgN_4O_2S \\ &= \text{amount (mg) of Sulfadiazine Silver} \\ & \quad \text{Reference Standard} \\ & \quad \times \frac{A_T}{A_S} \end{aligned}$$

**Containers and storage** Containers—Well-closed containers.

Storage—Light-resistant.

## Sulfamethizole

スルファメチゾール



$C_9H_{10}N_4O_2S_2$ : 270.33  
4-Amino-*N*-(5-methyl-1,3,4-thiadiazol-2-yl)-benzenesulfonamide [144-82-1]

Sulfamethizole, when dried, contains not less than 99.0% of  $C_9H_{10}N_4O_2S_2$ .

**Description** Sulfamethizole occurs as white to yellowish white crystals or crystalline powder. It is odorless.

It is slightly soluble in ethanol (95), and in acetic acid (100) and practical insoluble in water and in diethyl ether.

It dissolves in dilute hydrochloric acid and in sodium hydroxide TS.

It is gradually colored by light.

**Identification** Determine the infrared absorption spectrum of Sulfamethizole, previously dried, as directed in the potassium bromide disk method under the Infrared Spectrophotometry, and compare the spectrum with the Reference Spectrum: both spectra exhibit similar intensities of absorption at the same wave numbers.

**Melting point** 208 – 211°C

**Purity (1)** Clarity and color of solution—Dissolve 0.5 g of Sulfamethizole in 3 mL of sodium hydroxide TS and 20 mL of water: the solution is clear and colorless.

(2) Acid—To 1.0 g of Sulfamethizole add 50 mL of water, warm at 70°C for 5 minutes, allow to stand for 1 hour in an ice bath, and filter. To 25 mL of the filtrate add 2 drops of methyl red TS and 0.60 mL of 0.1 mol/L sodium hydroxide VS: a yellow color develops.

(3) Heavy metals—Proceed with 1.0 g of Sulfamethizole according to Method 2, and perform the test. Prepare the control solution with 2.0 mL of Standard Lead Solution (not more than 20 ppm).

(4) Arsenic—Prepare the test solution with 1.0 g of Sulfamethizole according to Method 3, and perform the test using Apparatus B (not more than 2 ppm).

(5) Related substances—Dissolve 0.10 g of Sulfamethizole in acetone to make 10 mL, and use this solution as the sample solution. Pipet 1 mL of the sample solution, add acetone to make exactly 50 mL, then pipet 5 mL of this solution, add acetone to make exactly 20 mL, and use this solution as the standard solution. Perform the test with these solutions as directed under the Thin-layer Chromatography. Spot 5  $\mu$ L each of the sample solution and the standard solution on a plate of silica gel with fluorescent indicator for thin-layer chromatography. Develop the plate with a mixture of ethyl acetate and acetic acid (100) (20:1) to a distance of about 10 cm, and air-dry the plate. Examine under ultraviolet light (main wavelength: 254 nm): the spots other than the principal spot from the sample solution are not more intense than the spot from the standard solution.

**Loss on drying** Not more than 0.5% (1 g, 105°C, 4 hours).

**Residue on ignition** Not more than 0.10% (1 g).

**Assay** Weigh accurately about 0.4 g of Sulfamethizole, previously dried, dissolve in 5 mL of hydrochloric acid and 50 mL of water, add 10 mL of a solution of potassium bromide (3 in 10), cool below 15°C, and titrate with 0.1 mol/L sodium nitrite VS according to the potentiometric titration method or the amperometric titration method under the Endpoint Detection Methods in Titrimetry.

$$\begin{aligned} & \text{Each mL of 0.1 mol/L sodium nitrite VS} \\ &= 27.034 \text{ mg of } C_9H_{10}N_4O_2S_2 \end{aligned}$$

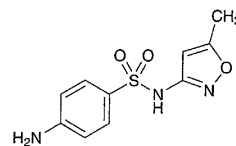
**Containers and storage** Containers—Well-closed containers.

Storage—Light-resistant.

## Sulfamethoxazole

### Sulfisomezole

スルファメトキサゾール



$C_{10}H_{11}N_3O_3S$ : 253.28  
4-Amino-*N*-(5-methylisoxazol-3-yl)benzenesulfonamide [723-46-6]