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# Mupirocin Nasal Ointment

» Mupirocin Nasal Ointment contains a quantity of Mupirocin Calcium equivalent to not less than 90.0 percent and not more than 105.0 percent of the labeled amount of mupirocin ($C_{26}H_{44}O_9$).

**Packaging and storage**—Preserve in collapsible tubes or in well-closed containers, and store at controlled room temperature.

**USP Reference standards ⟨11⟩**—

USP Mupirocin Lithium RS

**Identification**—

**A:** The retention time of the major peak in the chromatogram of the *Assay preparation* corresponds to that in the chromatogram of the *Standard preparation*, as obtained in the *Assay*.

**Microbial enumeration tests ⟨61⟩ and Tests for specified microorganisms ⟨62⟩**—The total aerobic microbial count does not exceed 100 cfu per g, and the total combined molds and yeasts count does not exceed 10 cfu per g. It meets the requirements of the tests for absence of *Staphylococcus aureus* and *Pseudomonas aeruginosa*.

**Minimum fill ⟨755⟩:** meets the requirements.

**Uniformity of dosage units ⟨905⟩:** meets the requirements.

**Related compounds**—

*Ammonium acetate buffer, Mobile phase, Sodium acetate buffer, Diluent A, Diluent B,* and *Chromatographic system*—Prepare as directed in the *Assay*.

*Test solution*—Transfer an accurately weighed portion of Mupirocin Nasal Ointment, equivalent to about 50 mg of mupirocin, to a suitable stoppered conical flask, add 5 mL of *Diluent A,* and shake vigorously on a mechanical shaker at full speed for 1 hour to disperse the ointment. Add 5 mL of *Sodium acetate buffer,* and shake vigorously on a mechanical shaker at full speed for 15 minutes. Pass through a filter having a porosity of 0.45 µm.

*Diluted test solution*—Dilute a portion of the *Test solution* quantitatively, and stepwise if necessary, with *Diluent B* to obtain a solution having a nominal concentration of about 0.1 mg of mupirocin per mL, based on the label claim.

***Change to read:***

*Procedure*—Separately inject equal volumes (about 20 µL) of the *Test solution* and the *Diluted test solution* into the chromatograph, and measure the peak area responses for all the peaks. Identify the peaks by the relative retention times shown in *Table 1.*

**Table 1**

| Name | Relative Retention Time | Limit (%) |
|---|---|---|
| Pseudomonic acid F[1] | 0.32 | 1.0 |
| Mupirocin impurity 1[2] | 0.56 | 5.0 |
| Mupirocin impurity 2[3] | 0.60 | 5.0 |
| Pseudomonic acid D[4] | 0.72 | 4.0 |
| Pseudomonic acid B[5] | 0.88 | 1.0 |
| Mupirocin | 1.0 | — |
| Mupirocin impurity 3[6] | 1.24 | 1.0 |
| Mupirocin impurity 4[6] | 1.36 | 1.0 |

 

| Name | Relative Retention Time | Limit (%) |
|---|---|---|
| Mupirocin impurity 5[7] and pseudomonic acid C[8] | 2.80 | 1.0 |
| Any individual unspecified impurity | — | 0.5 |
| Total impurities | — | 10.0 |

[1] 7-{(*E*)-4-[(2*S*,3*R*,4*R*,5*S*)-3,4-Dihydroxy-5-({(2*S*,3*S*)-3-[(2*S*,3*S*)-3-hydroxy butan-2-yl]oxiran-2-yl}methyl)tetrahydro-2*H*-pyran-2-yl]-3-methylbut-2-enoyloxy}heptanoic acid.

▲[2] 9-{(*E*)-4-[(2*R*,3a*S*,6*S*,7*S*)-2-{(1*RS*,2*S*,3*S*)-1,3-Dihydroxy-2-methylbutyl}-7-hydroxyhexahydro-2*H*-furo[3,2-c]pyran-6-yl]-3-methylbut-2-enoyloxy}nonanoic acid. ▲ (ERR 1-May-2022)

[3] 9-{(*E*)-4-[(2*R*,3*RS*,4a*S*,7*S*,8*S*,8a*R*)-3,8-Dihydroxy-2-{(2*S*,3*S*)-3-hydroxybutan-2-yl}octahydropyrano[3,2-c]pyran-7-yl]-3-methylbut-2-enoyloxy}nonanoic acid.

[4] (*E*)-9-{(*E*)-4-[(2*S*,3*R*,4*R*,5*S*)-3,4-Dihydroxy-5-({(2*S*,3*S*)-3-[(2*S*,3*S*)-3-hydroxy butan-2-yl]oxiran-2-yl}methyl)tetrahydro-2*H*-pyran-2-yl]-3-methylbut-2-enoyloxy}non-4-enoic acid.

[5] 9-{(*E*)-3-Methyl-4-[(2*S*,3*R*,4*S*,5*R*)-3,4,5-trihydroxy-5-({(2*S*,3*S*)-3-[(2*S*,3*S*)-3-hydroxybutan-2-yl]oxiran-2-yl}methyl)tetrahydro-2*H*-pyran-2-yl]but-2-enoyl oxy}nonanoic acid.

[6] 9-((*E*)-4-{(2*S*,3*R*,4*R*,5*S*)-3,4-Dihydroxy-5-[(3-hydroxy-4,5-dimethyltetra hydrofuran-2-yl)methyl]tetrahydro-2*H*-pyran-2-yl}-3-methylbut-2-enoyl oxy)nonanoic acid.

[7] 9-((*E*)-4-((2*S*,3*R*,4*R*,5*S*)-5-((4*S*,5*S*)-2-Chloro-3,5-dihydroxy-4-methylhexyl)-3,4-dihydroxytetrahydro-2*H*-pyran-2yl)-3-methylbut-2-enoyloxy)nonanoic acid.

[8] 9-((*E*)-4-{(2*S*,3*R*,4*R*,5*S*)-3,4-Dihydroxy-5-[(4*R*,5*S*,*E*)-5-hydroxy-4-methylhex-2-enyl]tetrahydro-2*H*-pyran-2-yl}-3-methylbut-2-enoyloxy)nonanoic acid.

Calculate the percentage of each related compound in the portion of Mupirocin Nasal Ointment taken by the formula:

$$(100 \times r_i)/(D \times r_S)$$

in which $r_i$ is the peak response of any impurity in the *Test solution; D* is the dilution factor used to convert the *Test solution* to the *Diluted test solution;* and $r_S$ is the peak response for the mupirocin peak in the *Diluted test solution*. The specified and unspecified impurities meet the limits listed in *Table 1*.

**Assay**—

*Ammonium acetate buffer*—Dissolve about 7.7 g of ammonium acetate in water, and dilute with water to 1000 mL. Mix, and adjust with acetic acid to a pH of 5.7. Filter this solution prior to preparation of the *Mobile phase.*

*Mobile phase*—Prepare a mixture of *Ammonium acetate buffer* and tetrahydrofuran (75:25). Make adjustments if necessary (see *System suitability* under *Chromatography ⟨621⟩*). The *Mobile phase* is extremely sensitive to changes in tetrahydrofuran concentration. Degas the *Mobile phase* by helium sparging or ultrasonication before use.

*Sodium acetate buffer*—Dissolve about 13.6 g of sodium acetate in water, and dilute with water to 1000 mL. Mix, and adjust with acetic acid to a pH of 4.0.

*Diluent A:* a mixture of tetrahydrofuran and water (75:25).

*Diluent B:* a mixture of *Diluent A* and *Sodium acetate buffer* (1:1).

*Standard preparation*—Prepare a solution of USP Mupirocin Lithium RS in *Diluent B,* containing about 0.1 mg per mL of mupirocin.

*Assay preparation*—Transfer an accurately weighed portion of Mupirocin Nasal Ointment, equivalent to about 10 mg of mupirocin, to a 100-mL volumetric flask, add 50.0 mL of *Diluent A,* and shake vigorously on a mechanical shaker at full speed for 1 hour to disperse the ointment. Dilute with *Sodium acetate buffer* to volume, and shake vigorously on a mechanical shaker at full speed for 15 minutes. Prior to use, pass through a filter having a porosity of 0.45 µm.

*Chromatographic system* (see *Chromatography ⟨621⟩*)—The liquid chromatograph is equipped with a 240-nm detector and a 4.6-mm×25-cm column that contains 7-µm packing L7. The flow rate is about 1.5 mL per minute. [Note—The flow rate may be adjusted if needed to obtain a retention time of about 13 minutes for the mupirocin peak.] Chromatograph the *Standard preparation,* and record the peak responses as directed for *Procedure:* the resolution, *R,* between the peaks for pseudomonic acid D and mupirocin is not less than 3.5; the column efficiency for the mupirocin peak is not less than 3000 theoretical plates; the tailing factor for the mupirocin peak is not more than 2.0; and the relative standard deviation of the mupirocin peak for five replicate injections is not more than 2.0%.

 

*Procedure*—Separately inject equal volumes (20 µL) of the *Standard preparation* and the *Assay preparation* into the chromatograph, and measure the responses for the major peaks. Calculate the percentage of the label claim of mupirocin in the portion of Mupirocin Nasal Ointment taken by the formula:

$$(P/1000)(C_S/C_U)(r_U/r_S)(100)$$

in which $(P/1000)$ is the potency, converted from µg per mg to mg per mg, of mupirocin in USP Mupirocin Lithium RS; $C_S$ is the concentration, in mg per mL, of mupirocin in the *Standard preparation;* $C_U$ is the nominal concentration, in mg per mL, of mupirocin in the *Assay preparation;* and $r_U$ and $r_S$ are the peak responses for the mupirocin peak in the *Assay preparation* and the *Standard preparation,* respectively.

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

| Topic/Question | Contact | Expert Committee |
|---|---|---|
| MUPIROCIN NASAL OINTMENT | Documentary Standards Support | SM12020 Small Molecules 1 |

**Chromatographic Database Information:** Chromatographic Database

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