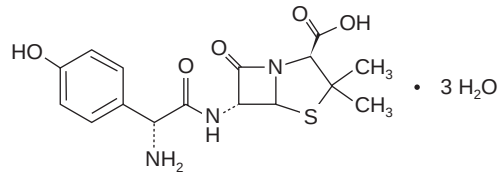

$C_{16}H_{19}N_3O_5S{\cdot}3H_2O$ 419.45

4-Thia-1-azabicyclo [3.2.0] heptane-2-carboxylic acid, 6-[[amino (4-hydroxyphenyl) acetyl]amino]-3, 3-dimethyl-7-oxo-,trihydrate [2*S*-[2α,5α,6β(*S**)]]-;
(2*S*,5*R*,6*R*)-6-[(*R*)-(–)-2-Amino-2-(*p*-hydroxyphenyl) acetamido]-3,3-dimethyl-7-oxo-4-thia-1-azabicyclo [3.2.0] heptane-2-carboxylic acid trihydrate [61336-70-7].
Anhydrous 365.41 [26787-78-0].

Definition—Amoxicillin contains NLT 900 µg and NMT 1,050 µg of $C_{16}H_{19}N_3O_5S$ per milligram, calculated on the anhydrous basis.
Identification—*Infrared absorption* (197K)

Assay

- **Procedure**

Diluent: 6.8 g/L of monobasic potassium phosphate in water. Adjust with a 45% (w/w) solution of potassium hydroxide to a pH of 5.0 ± 0.1.
Mobile phase: Acetonitrile and *Diluent* (1:24)
Standard solution: 1.2 mg/mL of USP Amoxicillin RS in *Diluent*. (Note—Use this solution within 6 hours.)
Sample solution: 1.2 mg/mL of Amoxicillin in *Diluent*. (Note—Use this solution within 6 hours.)
Chromatographic system (see *Chromatography* [621], *System Suitability*)
Mode: LC
Detector: UV 230 nm
Column: 4-mm × 25-cm; packing L1
Flow rate: 1.5 mL/min
Injection size: 10 µL
System suitability
Sample: Standard solution
Suitability requirements
Tailing factor: NMT 2.5
Relative standard deviation: NMT 2.0%

Analysis
Samples: Standard solution and Sample solution
Calculate the quantity, in µg/mg, of $C_{16}H_{19}N_3O_5S$ in the portion of Amoxicillin taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times P$$

r_U = peak response from the *Sample solution*
r_S = peak response from the *Standard solution*
C_S = concentration of USP Amoxicillin RS in the *Standard solution* (mg/mL)
C_U = concentration of *Sample solution* (mg/mL)
P = potency of amoxicillin in USP Amoxicillin RS (µg/mg)

Acceptance criteria: 900 to 1050 µg of $C_{16}H_{19}N_3O_5S$ per milligram on the anhydrous basis

Impurities

Organic Impurities

- **Procedure**

Solution A: 2.72 g/L of monobasic potassium phosphate. Adjust with 1 N potassium hydroxide or 20% phosphoric acid to a pH of 5.0 ± 0.1.
Solution B: Methanol
Mobile phase: See the gradient table below.

TIME (MIN)	SOLUTION A (%)	SOLUTION B (%)
0	97	3
10	97	3
22	75	25
26	97	3

Standard solution: 12.5 µg/mL of USP Amoxicillin RS in *Solution A*
System suitability solution: 12.5 µg/mL each of USP Amoxicillin Related Compound A RS and USP Amoxicillin Related Compound D RS in *Solution A*
Sample solution: 1.25 mg/mL of Amoxicillin in *Solution A*. (Note—Store this solution at 4 degrees and use within 4 hours)
Chromatographic system (see *Chromatography* [621], *System Suitability*)
Mode: LC
Detector: UV 210 nm
Column: 4.6-mm × 10-cm; 5-µm packing L1
Column temperature: 40 degrees
Flow rate: 1.5 mL/min
Injection size: 10 µL
Autosampler temperature: 4 degrees
System suitability
Samples: Standard solution and System suitability solution

Suitability requirements

(Note—Identify peaks by the relative retention times in *Impurity Table 1*.)
Resolution: NLT 1.5 between Amoxicillin related compound A and the second peak for Amoxicillin related compound D, *System suitability solution*
Relative standard deviation: NMT 10%, *Standard solution*

Analysis
Samples: Standard solution and Sample solution
Calculate the percentage of each impurity in the portion of *Amoxicillin taken:*

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times F \times 100$$

r_U = peak response of each impurity from the *Sample solution*
r_S = peak response of amoxicillin from the *Standard solution*
C_S = concentration of USP Amoxicillin RS in the *Standard solution* (µg/mL)
C_U = nominal concentration of Amoxicillin in the *Sample solution* (mg/mL)
F = unit conversion factor (0.001 mg/µg)

(*Continued*)

FIGURE 1.3 Amoxicillin.