

Quinapril and Hydrochlorothiazide Tablets

DEFINITION
Quinapril and Hydrochlorothiazide Tablets contain NLT 95.0% and NMT 105.0% of the labeled amounts of quinapril ($C_{25}H_{30}N_2O_5$) and hydrochlorothiazide ($C_7H_8ClN_3O_4S_2$).

IDENTIFICATION

- A.** The relative retention times of the major peaks of the *Sample solution* correspond to those of the *Standard solution*, as obtained in the Assay.

Add the following:

- B.** The UV spectra of the major peaks of the *Sample solution* correspond to those of the *Standard solution*, as obtained in the Assay. (USP 1-May-2023)

ASSAY

Change to read:

- PROCEDURE**

Solution A: Dissolve 1.36 g (USP 1-May-2023) of [monobasic potassium phosphate](#) in 1000 mL of (USP 1-May-2023) [water](#), add 2 mL of [triethylamine](#), and adjust with [phosphoric acid](#) to a pH of 3.0. Pass through a suitable (USP 1-May-2023) filter of 0.45-µm pore size.

Solution B: [Acetonitrile](#)

Mobile phase: See [Table 1](#).

Table 1

Time (min)	Solution A (%)	Solution B (%)
0	75	25
8	40	60
12	40	60
13	75	25
18	75	25

Diluent: *Solution A* and *Solution B* (50:50)

Standard stock solution A: 0.45 mg/mL of [USP Quinapril Hydrochloride RS](#) in *Diluent*

Standard stock solution B: 0.5 mg/mL of [USP Hydrochlorothiazide RS](#) in *Diluent*

Standard solution: Known concentrations of [USP Quinapril Hydrochloride RS](#) and [USP Hydrochlorothiazide RS](#) in *Diluent* from (USP 1-May-2023) *Standard stock solution A* and *Standard stock solution B* (USP 1-May-2023) as given in [Table 2](#).

Table 2

▲

Tablet Strength Quinapril/Hydrochlorothiazide (mg/mg)	USP Quinapril Hydrochloride RS (mg/mL)	USP Hydrochlorothiazide RS (mg/mL)
10/12.5	0.0225	0.025
20/12.5	0.0225	0.0125
20/25	0.0225	0.025

▲ (USP 1-May-2023)

Sample stock solution: Transfer 5 Tablets into a 250-mL volumetric flask, add 50 mL of *Diluent*, and sonicate for 15 min. Add about 50 mL of [acetone](#), and sonicate for 15 min with shaking. Add 50 mL of *Diluent*, and sonicate for 15 min. Dilute with *Diluent* to volume. ▲ Pass through a suitable filter of 0.45-μm pore size. ▲ (USP 1-May-2023)

Sample solution: ▲ Nominally ▲ (USP 1-May-2023) 0.02 mg/mL of quinapril in *Diluent* from the *Sample stock solution*. [NOTE—The hydrochlorothiazide concentration may vary depending on the ratio of quinapril ▲ (USP 1-May-2023) to hydrochlorothiazide in the Tablet.]

Chromatographic system

(See [Chromatography \(621\)](#), [System Suitability](#).)

Mode: LC

Detector: UV 215 nm. ▲ For *Identification B*, use a diode array detector in the range of 190–400 nm. ▲ (USP 1-May-2023)

Column: 4.6-mm × 15-cm; 5-μm packing [L1](#)

Column temperature: 35°

Flow rate: 1 mL/min

Injection volume: 20 μL

System suitability

Sample: *Standard solution*

Suitability requirements

▲ (USP 1-May-2023)

Tailing factor: NMT 2.0 for quinapril and hydrochlorothiazide

Relative standard deviation: NMT 2.0% for quinapril and hydrochlorothiazide

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of ▲ the labeled amount of ▲ (USP 1-May-2023) quinapril ($C_{25}H_{30}N_2O_5$) in the portion of Tablets taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times (M_{r1}/M_{r2}) \times 100$$

r_U = peak response of quinapril from the *Sample solution*

r_S = peak response of quinapril from the *Standard solution*

C_S = concentration of [USP Quinapril Hydrochloride RS](#) in the *Standard solution* (mg/mL)

C_U = nominal concentration of quinapril in the *Sample solution* (mg/mL)

M_{r1} = molecular weight of quinapril, 438.52

M_{r2} = molecular weight of quinapril hydrochloride, 474.98

Calculate the percentage of ▲ the labeled amount of ▲ (USP 1-May-2023) hydrochlorothiazide ($C_7H_8ClN_3O_4S_2$) in the portion of Tablets taken:

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

r_U = peak response of hydrochlorothiazide from the *Sample solution*

r_S = peak response of hydrochlorothiazide from the *Standard solution*

C_s = concentration of [USP Hydrochlorothiazide RS](#) in the *Standard solution* (mg/mL)

C_u = nominal concentration of hydrochlorothiazide in the *Sample solution* (mg/mL)

Acceptance criteria: 95.0%–105.0% ▲ for both quinapril and hydrochlorothiazide ▲ (USP 1-May-2023)

PERFORMANCE TESTS

Change to read:

- [DISSOLUTION \(711\)](#)

Medium: [Water](#); 900 mL

Apparatus 1: 100 rpm

Time: 20 min

Solution A, ▲Solution B, ▲ (USP 1-May-2023) **Mobile phase, ▲Diluent, Standard stock solution A, Standard stock solution B, Standard solution, ▲** (USP 1-May-2023) **Chromatographic system, and System suitability:** Proceed as directed in the Assay.

▲ (USP 1-May-2023)

Sample solution: Pass a portion of the solution under test through a suitable ▲ (USP 1-May-2023) filter of 0.45-μm pore size, discarding the first few milliliters.

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of ▲ the labeled amount of ▲ (USP 1-May-2023) quinapril ($C_{25}H_{30}N_2O_5$) dissolved:

$$\text{Result} = (r_u/r_s) \times (C_s/L) \times V \times (M_{r1}/M_{r2}) \times 100$$

r_u = peak response of quinapril from the *Sample solution*

r_s = peak response of quinapril from the *Standard solution*

C_s = concentration of [USP Quinapril Hydrochloride RS](#) in the *Standard solution* ▲ (mg/mL) ▲ (USP 1-May-2023)

L = label claim for quinapril ▲ (USP 1-May-2023) (mg/Tablet)

V = volume of *Medium*, 900 mL

M_{r1} = molecular weight of quinapril, 438.52

M_{r2} = molecular weight of quinapril hydrochloride, 474.98

Calculate the percentage of ▲ the labeled amount of ▲ (USP 1-May-2023) hydrochlorothiazide ($C_7H_8ClN_3O_4S_2$) dissolved:

$$\text{Result} = (r_u/r_s) \times (C_s/L) \times V \times 100$$

r_u = peak response of hydrochlorothiazide from the *Sample solution*

r_s = peak response of hydrochlorothiazide from the *Standard solution*

C_s = concentration of [USP Hydrochlorothiazide RS](#) in the *Standard solution* ▲ (mg/mL) ▲ (USP 1-May-2023)

L = label claim for hydrochlorothiazide (mg/Tablet)

V = volume of *Medium*, 900 mL

Tolerances: NLT 80% (Q) of the labeled amounts of quinapril ▲ ($C_{25}H_{30}N_2O_5$) ▲ (USP 1-May-2023) and hydrochlorothiazide ($C_7H_8ClN_3O_4S_2$) is dissolved.

- [UNIFORMITY OF DOSAGE UNITS \(905\)](#): Meet the requirements

IMPURITIES

Change to read:

- **ORGANIC IMPURITIES**