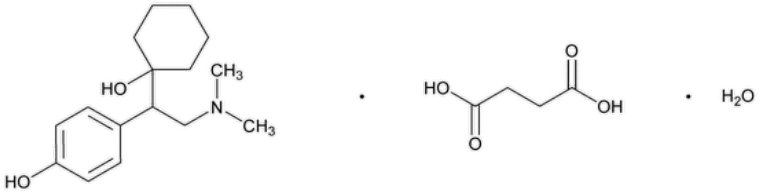
Status: Currently Official on 14-Feb-2025
Official Date: Official as of 01-Oct-2020
Document Type: USP Monographs
DocId: GUID-08C3103F-2401-4FCD-9915-CCA54B42543F_3_en-US
DOI: https://doi.org/10.31003/USPNF_M3651_03_01
DOI Ref: 5w48u

Desvenlafaxine Succinate



$C_{16}H_{25}NO_2 \cdot C_4H_6O_4 \cdot H_2O$ 399.48
$C_{16}H_{25}NO_2 \cdot C_4H_6O_4$ 381.47

Butanedioic acid, compound with 4-[2-(dimethylamino)-1-(1-hydroxycyclohexyl)ethyl]phenol (1:1), monohydrate;
1-[2-(Dimethylamino)-1-(4-hydroxyphenyl)ethyl]cyclohexanol hydrogen butanedioate monohydrate CAS RN®: 386750-22-7; UNII: ZB22ENF0XR.

Anhydrous CAS RN®: 448904-47-0; UNII: H9E1T0BI90.

DEFINITION

Desvenlafaxine Succinate contains NLT 98.0% and NMT 102.0% of desvenlafaxine succinate ($C_{16}H_{25}NO_2 \cdot C_4H_6O_4$), calculated on the anhydrous basis.

IDENTIFICATION

Change to read:

• **A.** ▲**Spectroscopic Identification Tests** ⟨197⟩, *Infrared Spectroscopy*: 197K or 197A▲ (ERR 1-Oct-2020)

• **B.** The retention time of the major peak of the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the *Assay*.

ASSAY

• **Procedure**

Buffer: 2.7 g/L of monobasic potassium phosphate in water

Solution A: Acetonitrile and *Buffer* (18:82)

Mobile phase: To each liter of *Solution A*, add 5.4 mL of triethylamine, and adjust with phosphoric acid to a pH of 4.0.

Standard solution: 0.05 mg/mL of USP Desvenlafaxine Succinate RS in *Mobile phase*. Sonication may be used to promote dissolution.

Sample solution: 0.05 mg/mL of Desvenlafaxine Succinate in *Mobile phase*. Sonication may be used to promote dissolution.

Chromatographic system

(See *Chromatography* ⟨621⟩, *System Suitability*.)

Mode: LC

Detector: UV 225 nm

Column: 4.6-mm × 25-cm; 5-µm packing L1

Flow rate: 1.5 mL/min

Injection volume: 10 µL

Run time: NLT 1.6 times the retention time of desvenlafaxine

System suitability

Sample: *Standard solution*

Suitability requirements

Tailing factor: NMT 1.5

Relative standard deviation: NMT 0.73%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of desvenlafaxine succinate ($C_{16}H_{25}NO_2 \cdot C_4H_6O_4$) in the portion of Desvenlafaxine Succinate taken:

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

r_U = peak response from the *Sample solution*

r_S = peak response from the *Standard solution*

C_S = concentration of USP Desvenlafaxine Succinate RS in the *Standard solution* (mg/mL)

C_U = concentration of Desvenlafaxine Succinate in the *Sample solution* (mg/mL)

Acceptance criteria: 98.0%–102.0% on the anhydrous basis

IMPURITIES

- **Residue on Ignition ⟨281⟩:** NMT 0.1%
- **Organic Impurities**

Buffer: 7.1 g/L of anhydrous dibasic sodium phosphate in water

Solution A: Acetonitrile and *Buffer* (10:90); adjusted with phosphoric acid to a pH of 3.0

Solution B: Acetonitrile and *Buffer* (60:40); adjusted with phosphoric acid to a pH of 3.0

Mobile phase: See *Table 1*.

Table 1

Time (min)	Solution A (%)	Solution B (%)
0	100	0
5	100	0
30	50	50
35	35	65
37	100	0

System suitability solution: 1 mg/mL of USP Desvenlafaxine Succinate RS and 0.0015 mg/mL of USP Desvenlafaxine Related Compound B RS in *Solution A*. Sonication may be used to promote dissolution.

Standard solution: 0.001 mg/mL of USP Desvenlafaxine Succinate RS, equivalent to 0.0007 mg/mL of desvenlafaxine, in *Solution A*. Sonication may be used to promote dissolution.

Sensitivity solution: 0.5 µg/mL of USP Desvenlafaxine Succinate RS, equivalent to 0.35 µg/mL of desvenlafaxine, from the *Standard solution* in *Solution A*

Sample solution: 1 mg/mL of Desvenlafaxine Succinate in *Solution A*

Chromatographic system

(See *Chromatography ⟨621⟩, System Suitability*.)

Mode: LC

Detector: UV 225 nm

Column: 4.6-mm × 25-cm; 3-µm packing L1

Temperatures

Autosampler: 10°

Column: 50°

Flow rate: 1.5 mL/min

Injection volume: 20 µL

System suitability

Samples: *System suitability solution*, *Standard solution*, and *Sensitivity solution*

[Note—See *Table 2* for the relative retention times.]

Suitability requirements

Resolution: NLT 1.5 between desvenlafaxine related compound B and desvenlafaxine, *System suitability solution*

Relative standard deviation: NMT 5.0%, *Standard solution*

Signal-to-noise ratio: NLT 10, *Sensitivity solution*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of each impurity in the portion of Desvenlafaxine Succinate taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times (1/F) \times 100$$

r_U = peak response of each impurity from the *Sample solution*

r_S = peak response of desvenlafaxine succinate from the *Standard solution*

C_S = concentration of USP Desvenlafaxine Succinate RS in the *Standard solution* (mg/mL)

C_U = concentration of Desvenlafaxine Succinate in the *Sample solution* (mg/mL)

F = relative response factor (see *Table 2*)

Acceptance criteria: See *Table 2*. The reporting threshold is 0.05%.

Table 2

Name	Relative Retention Time	Relative Response Factor	Acceptance Criteria, NMT (%)
Fumaric acid	0.16	1.7	0.10
Succinic acid[a]	0.17	—	—
4-(Dimethylaminoethyl) phenol[b]	0.20	1.1	0.15
Didesmethyl desvenlafaxine[c]	0.91	0.94	0.15
Desvenlafaxine related compound B	0.96	0.80	0.15
Desvenlafaxine	1.0	—	—
Desvenlafaxine related compound A[d]	1.46	1.0	0.15
Venlafaxine[e]	1.55	0.97	0.15
Any individual unspecified impurity	—	1.0	0.10
Total impurities	—	—	1.0

[a] Included for identification only. This peak is due to the succinate counterion; hence it is not an impurity.

[b] 4-[2-(Dimethylamino)ethyl]phenol.

[c] 4-[2-Amino-1-(1-hydroxycyclohexyl)ethyl]phenol.

[d] 4-[1-(Cyclohex-1-en-1-yl)-2-(dimethylamino)ethyl]phenol.

[e] 1-[2-(Dimethylamino)-1-(4-methoxyphenyl)ethyl]cyclohexan-1-ol.

SPECIFIC TESTS

• **Water Determination** ⟨921⟩, *Method I*: 4.0%–5.2%

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in tight, light-resistant containers.

• **USP Reference Standards** ⟨11⟩

USP Desvenlafaxine Succinate RS

USP Desvenlafaxine Related Compound B RS

4-[1-(1-Hydroxycyclohexyl)-2-(methylamino)ethyl]phenol.

$C_{15}H_{23}NO_2$ 249.35

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

Topic/Question	Contact	Expert Committee
DESVENLAFAXINE SUCCINATE	Documentary Standards Support	SM42020 Small Molecules 4

Chromatographic Database Information: Chromatographic Database

Most Recently Appeared In:
Pharmacopeial Forum: Volume No. PF 43(5)

Current DocID: GUID-08C3103F-2401-4FCD-9915-CCA54B42543F_3_en-US

DOI: https://doi.org/10.31003/USPNF_M3651_03_01

DOI ref: 5w48u