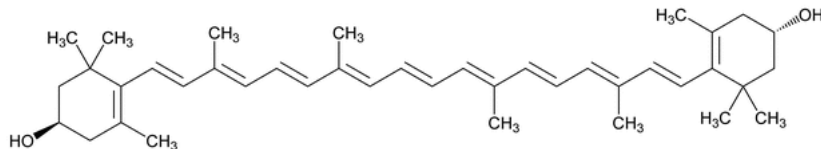


Status: Currently Official on 18-Feb-2025
 Official Date: Official as of 01-Jun-2023
 Document Type: Dietary Supplement Monographs
 DocId: GUID-C76D55DC-4940-4DC3-A222-03B1F101C228_3_en-US
 DOI: https://doi.org/10.31003/USPNF_M5933_03_01
 DOI Ref: m3ohr

© 2025 USPC
 Do not distribute

meso-Zeaxanthin

Change to read:



$C_{40}H_{56}O_2$ 568.88

β,β -Carotene-3,3'-diol (3*R*,3'*S*)-;

(3*R*,3'*S*)-zeaxanthin (ERR 1-Jun-2023) CAS RN®: 31272-50-1.

DEFINITION

meso-Zeaxanthin consists chiefly of the 3*R*,3'*S*-isomer of zeaxanthin. It contains NLT 80.0% of total carotenoids calculated as zeaxanthin ($C_{40}H_{56}O_2$) and NLT 74.0% of zeaxanthin ($C_{40}H_{56}O_2$) on the anhydrous basis.

IDENTIFICATION

• A.

Sample solution: Use the *Sample solution* of the test for *Content of Total Carotenoids*.

Analysis: Record the UV-Vis spectrum from 300 to 600 nm.

Acceptance criteria: The *Sample solution* shows a shoulder at about 427 nm and a maximum absorption at about 453 nm and at about 480 nm.

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

Change to read:

• C. The retention time of the major peak of the *Sample solution* corresponds to that of (3*R*,3'*S*)-zeaxanthin from the *Standard solution*, as obtained in the test for *Stereoisomeric Composition*.

COMPOSITION

• CONTENT OF TOTAL CAROTENOIDS

[NOTE—Use low-actinic glassware.]

Sample stock solution: Transfer 25.0 mg of meso-Zeaxanthin to a 100-mL volumetric flask, add 20 mL of chloroform, and place the flask in an ultrasonic bath at 30° for 2–5 min to obtain a clear solution. Dilute with cyclohexane to volume to obtain a solution containing 250 µg/mL.

Sample solution: 2.5 µg/mL of the *Sample stock solution* in cyclohexane

Instrumental conditions

(See [Ultraviolet-Visible Spectroscopy \(857\)](#).)

Analytical wavelength: 453 nm

Cell: 1 cm

Blank: Cyclohexane

Analysis

Sample: *Sample solution*

Calculate the percentage of total carotenoids as zeaxanthin ($C_{40}H_{56}O_2$) in the portion of meso-Zeaxanthin taken:

$$\text{Result} = A / (C \times F)$$

A = absorbance of the *Sample solution*

C = concentration of the *Sample solution* (g/mL)

F = coefficient of extinction ($E^{1\%}$) of zeaxanthin in cyclohexane ($100 \text{ mL} \cdot \text{g}^{-1} \cdot \text{cm}^{-1}$), 2540

Acceptance criteria: NLT 80.0% of total carotenoids (T) as zeaxanthin ($C_{40}H_{56}O_2$) on the anhydrous basis

• CONTENT OF ZEAXANTHIN

[NOTE—Use low-actinic glassware.]

Mobile phase: Hexane and ethyl acetate (75:25)

Standard solution: 150 µg/mL of [USP meso-Zeaxanthin RS](#) prepared as follows. Dissolve 15.0 mg of [USP meso-Zeaxanthin RS](#) in 10 mL of chloroform, swirling briefly, and dilute with *Mobile phase* to 100 mL.

Sample solution: Transfer 15.0 mg of sample to a 100-mL volumetric flask, add 10 mL of chloroform, and place the flask in an ultrasonic bath at 30° for 2–5 min to obtain a clear solution. Dilute with *Mobile phase* to volume.

Chromatographic system

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

Mode: LC

Detector: 453 nm

Column: 4.6-mm × 25-cm; 3-µm packing L3

Column temperature: 25°

Flow rate: 1.5 mL/min

Injection volume: 10 µL

System suitability

Sample: *Standard solution*

[NOTE—The approximate relative retention times for lutein and zeaxanthin are 0.95 and 1.0, respectively.]

Suitability requirements

Resolution: NLT 1.0 between zeaxanthin and lutein

Tailing factor: NMT 2.0

Relative standard deviation: NMT 2.0%

Analysis: Inject the *Sample solution*, and measure the peak areas. [NOTE—The peak response of zeaxanthin is NLT 90.0% of the sum of all the peak responses.]

Calculate the percentage of zeaxanthin ($C_{40}H_{56}O_2$) in the sample taken:

$$\text{Result} = (r_U/r_T) \times T$$

r_U = peak response of zeaxanthin

r_T = sum of all the peak responses

T = percentage of total carotenoids as determined in the test for *Content of Total Carotenoids*

Acceptance criteria: NLT 74.0% of zeaxanthin ($C_{40}H_{56}O_2$) on the anhydrous basis

• LUTEIN AND OTHER RELATED COMPOUNDS

[NOTE—Use low-actinic glassware.]

Mobile phase, Standard solution, Sample solution, and Chromatographic system: Proceed as directed in the test for *Content of Zeaxanthin*.

Analysis

Sample: *Sample solution*

[NOTE—The peak response of lutein is NMT 9.0% of the sum of all the peak responses.]

Calculate the percentage of lutein in the portion of *meso-Zeaxanthin* taken:

$$\text{Result} = (r_U/r_T) \times T$$

r_U = peak response of lutein

r_T = sum of all the peak responses

T = percentage of total carotenoids as determined in the test for *Content of Total Carotenoids*

Calculate the percentage of other related compounds in the portion of *meso-Zeaxanthin* taken:

$$\text{Result} = (r_U/r_T) \times 100$$

r_U = individual peak response of any other peak (excluding zeaxanthin and lutein)

r_T = sum of all the peak responses

Acceptance criteria

Lutein: NMT 8.5%

Other related compounds: NMT 1.0% of any other individual related compound

Change to read:

• STEREOISOMERIC COMPOSITION

[NOTE—Use low-actinic glassware.]