PhytoLab GmbH & Co. KG Dutendorfer Straße 5-7 91487 Vestenbergsgreuth

Your contact at PhytoLab:
Reference Substances
Tel.: +49 9163 88-395
ref-substances@phytolab.de
https://phyproof.phytolab.com

Certificate of analysis

Article:	89723 Lutein
Certificate # / Lot Number:	206696
Material batch:	1000951
Sample-ID:	158496
End of analysis:	07/2024
Expiry date:	12/2025

Test	Unit	Specified value	Testresult
Appearance, SOP 100005		powder	conform
Color, SOP 100006		light orange – red-brown	conform
Identity test (UV spectrum from HPLC-DAD analysis) according to specification, SOP 204311		conform	conform
Identity test (1H-NMR-spectroscopy), (outsourced), SOP 206010		conform	conform
Identity test (13C-NMR-spectroscopy), (outsourced), SOP 206020		conform	conform
Identity test (HPLC-HR/MS), SOP 204125		conform	conform
Identity test (IR-spectroscopy), Ph. Eur. 2.2.24, Absorption Spectrophotometry, Infrared (01/2021:20224) and USP chapter 197, Spectroscopic Identification Tests (Official as of 01-Sep-2021), SOP 206000		conform	conform
Lutein (HPLC), method 2, (% AU), SOP 400631	%	≥ 90.00	96.94

PhytoLab
SAFEGUARDING BOTANICAL QUALITY.

Certificate of analysis

Article: 89723 Lutein
Material batch: 1000951

Test	Unit	Specified value	Testresult
Peakpurity, (HPLC), SOP 401367		conform	conform

Due to its relative instability we recommended to use the reference substance lutein for qualitative purposes only, not for quantitative analysis. The substance is sensitive to light, heat and oxidation.

Vestenbergsgreuth, 03/Dec/2024

Nicole Fuchs

QC Reference Substances

This is a computer print and valid without signature. A signed certificate of analysis can be taken on request.

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Certificate of analysis

Article:	89723 Lutein
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Further information:

Shelf life/stability: The stated expiry date applies when the reference substance is stored in the original unopened container within the specified temperature range. PhytoLab does not guarantee the stability of the reference substance once the vial has been opened.

Long-term storage and handling: The reference standard should be stored in the original unopened vial, protected against light and humidity in an airtight container, within the temperature range given on the label and accompanying data sheet. If stored below room temperature, the vial should be warmed up to room temperature in a desiccator before it is opened in order to avoid condensation of humidity. The user assumes responsibility for deciding how previously opened reference standard vials should be used and the user must ensure that the contents of opened vials are still suitable for their intended use.

Exact weight: the exact weight of each vial is given on the label of the inner vial to two decimal places. This information may be used to produce stock solutions of a known concentration without having to weigh in the reference substance again. If used for this purpose, the content of the vial must be quantitatively transferred to a volumetric flask and filled up to the required level. Please note that PhytoLab is unable to guarantee the stability of the reference standard in solution.

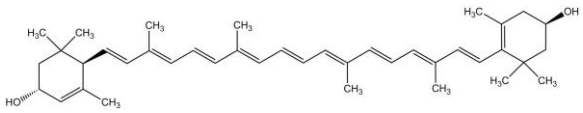
Intended use: this reference standard is solely intended for laboratory analytical purposes, research & development, and scientific teaching and training purposes. It may not be used for any other purpose and particularly not for use in, or the production of, food, animal feed, human or veterinary drugs, cosmetics, medicinal products or diagnostic agents, including in-vitro diagnostic agents. PhytoLab is unable to guarantee the suitability of this reference standard for any particular application other than its qualitative and quantitative use in chromatography and identification testing.

Further information about this reference standard can be found on the accompanying data sheet or in our webshop. Spectral and chromatographic data, and a description of the applied chromatographic method, are provided in the attachments to this COA. A detailed explanation of all data given on the COA can be found in the guide that is available from the download area in our webshop, where you can also download all of the safety data sheets.

Product Data Sheet

Lutein

Product #: 89723



Physicochemical Data

CAS #:	127-40-2
Molecular formula:	C40H56O2
Molecular weight [g/mol]:	568.89
Substance class:	Isoprenoids
Subgroup 1:	Terpenoid-type
Subgroup 2:	Tetraterpenes
Subgroup 3:	Carotinoids
Solubility:	soluble in acetone and dichloromethane; slightly soluble in ethanol Please note that this solubility information is based on in-house experience or taken from published data. It is not meant to guarantee solubility up to a specific concentration, nor does it guarantee stability of the reference substance in solution.

Additional Information

Please note:	Packed under nitrogen. Recommended to be stored under inert atmosphere. Avoid exposure to oxygen.
Handling instructions:	Due to its relative instability we recommended to use the reference substance lutein for qualitative purposes only, not for quantitative analysis. The substance is sensitive to light, heat and oxidation.
Source:	botanical origin
Long-term storage conditions:	< -15 °C

Manufacturer:

Phytolab GmbH & Co.KG
Dutendorfer Straße 5-7
91487 Vestenbergsgreuth
Germany

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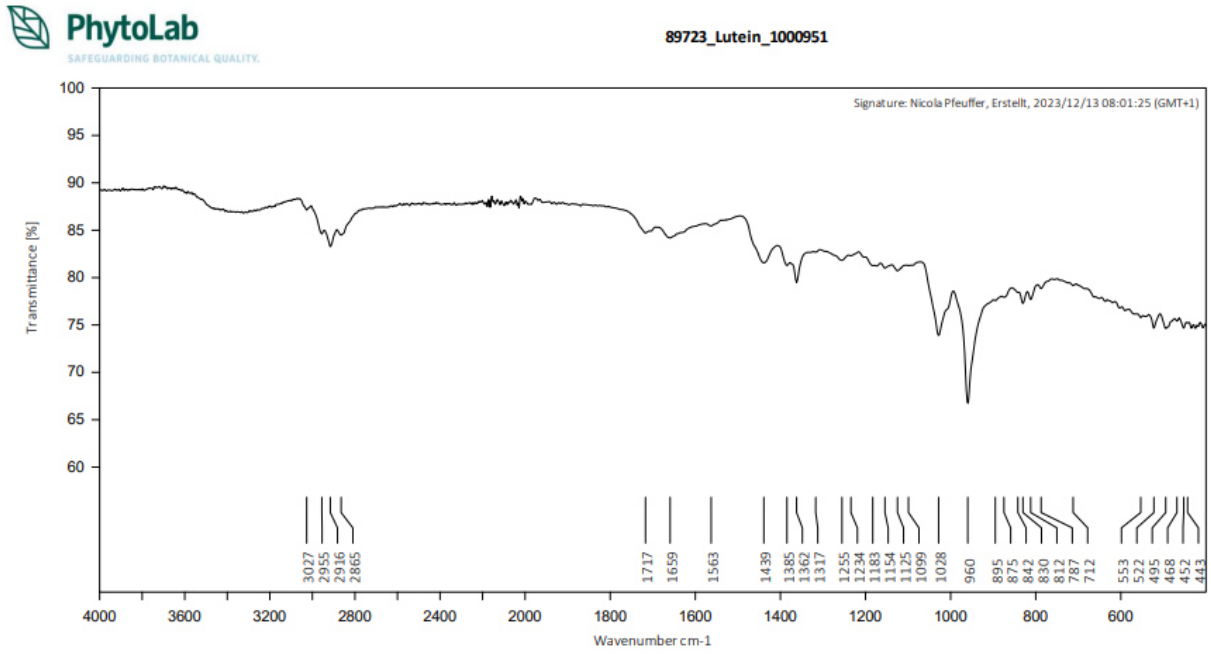
Fax: +49 9163 88-456
Mail: ref-substances@phytolab.de
Shop: https://phyproof.phytolab.com

Supplements

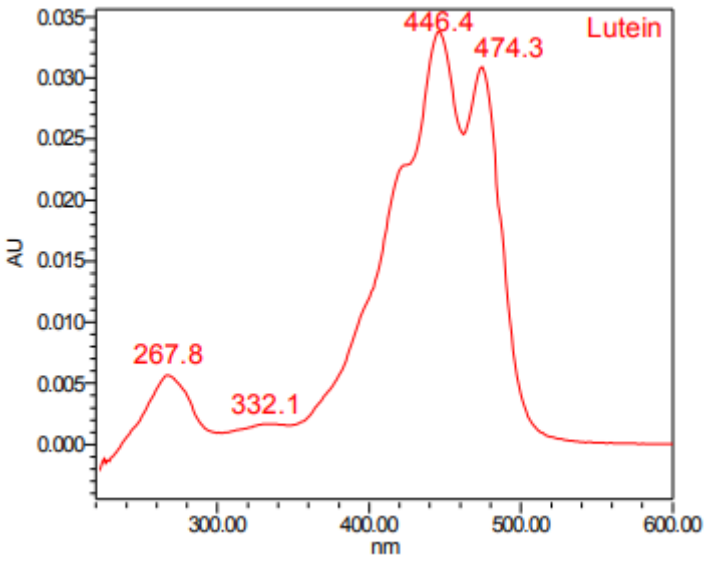
Lutein **Batch # 1000951**
Product # 89723

Identity tests:

IR spectrum

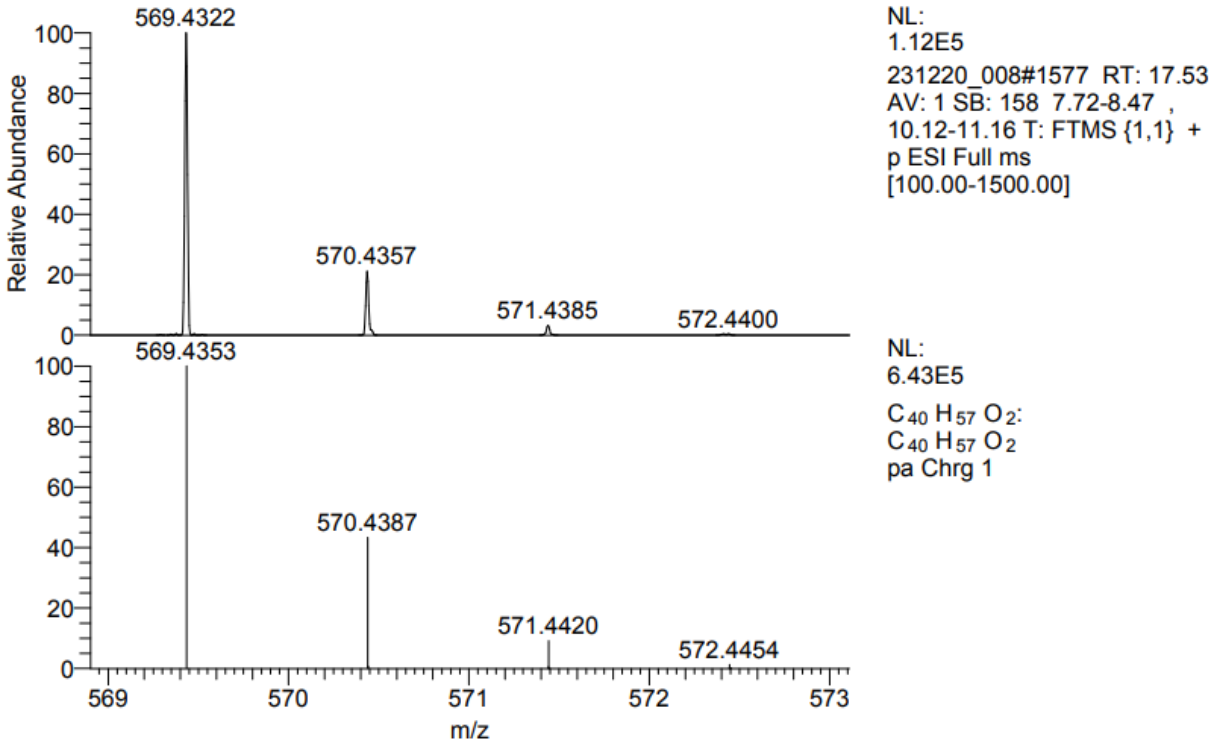


UV spectrum (derived from HPLC/PDA)



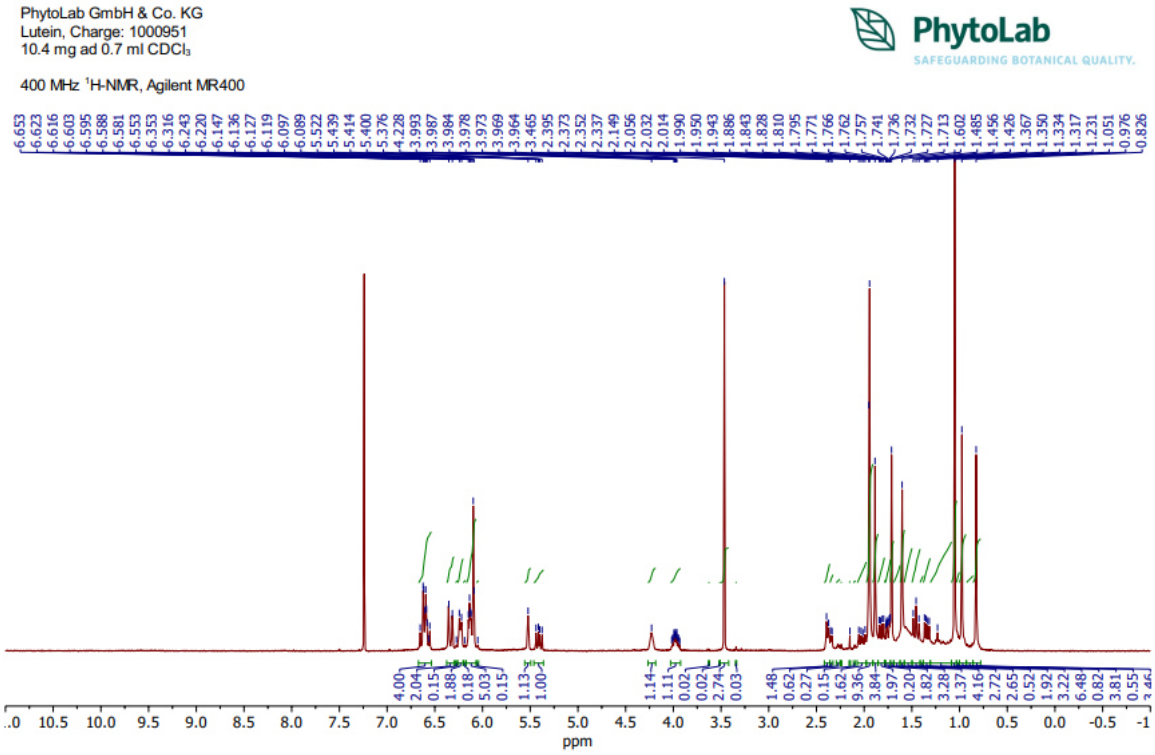
MS spectrum (ESI)

Detection: positive mode (compared with predicted spectrum)

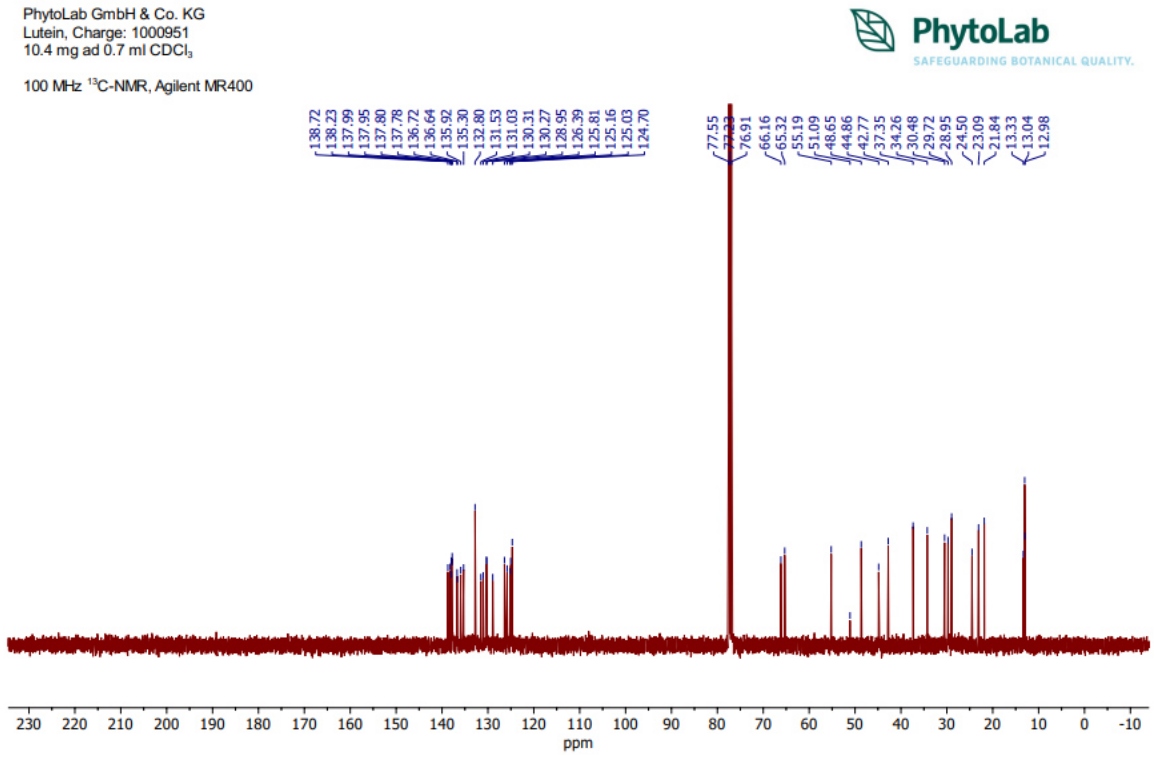


NMR spectra

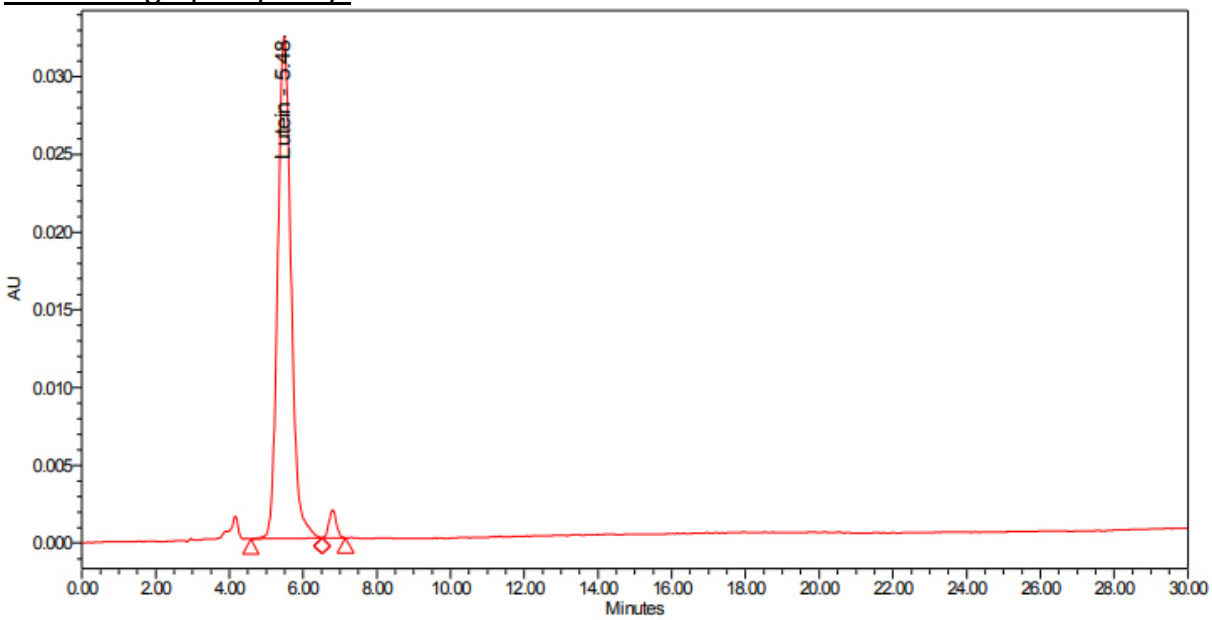
^{1}H-NMR



^{13}C-NMR



Chromatographic purity:



Peak Results

	Name	RT	Area	Height	Chromatographic_Purity	Amount	Units
1	Lutein	5.484	812845	32323	96.97	0.500	mg/100mL
2		6.799	25401	1810	3.03		

Analytical conditions

Column: Suplex PKB 100, 250 x 4.6mm, 5µm

Mobile Phase: eluent A: 50 mg BHT dissolved in 20 mL 2-propanol + 0.2 mL N-Ethyldiisopropylamine + 25 mL 0.2% ammonium acetate solution + 455 mL CH_3CN + 455 mL CH_3OH diluted to 1 L with CH_3OH

eluent B: -

Mode: gradient

Time [min]	Eluent A [%]	Eluent B [%]
0	100	0
30	100	0

Flow: 1.0 ml/min

Injection Volume: 20 µl

Column Temperature: 23 °C

Sample concentration: approx. 0.5 mg/100 ml

Sample preparation: dissolved in dichloromethane and diluted with n-hexane

Detection: UV, 445 nm

Special note: -

Please note: Values on the certificate of analysis may vary as these are average values of at least six injections while above chromatogram and report is only one example. Non-integrated peaks originate from the blank injection.