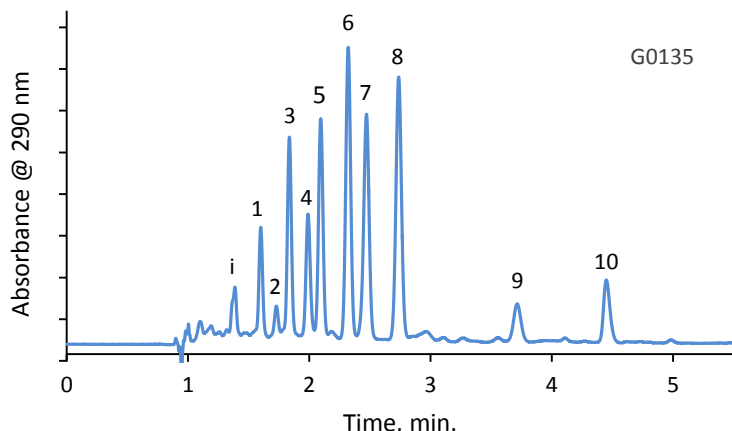


Application Note: 146-V

Rapid Separation of Vitamin E Congeners on HALO PFP



PEAK IDENTITIES:

1. δ -Tocotrienol
 2. β -Tocotrienol
 3. γ -Tocotrienol
 4. α -Tocotrienol
 5. δ -Tocopherol
 6. β -Tocopherol
 7. γ -Tocopherol
 8. α -Tocopherol
 9. α -Tocopherol acetate
 10. α -Tocopherol nicotinate
- i = impurity

TEST CONDITIONS:

Column: HALO PFP, 4.6 x 150 mm, 2.7 μ m
Part Number: 92814-709

A= Water
B= Methanol

Gradient:

Time (min.)	%B
0.00	92
2.75	92
3.00	95
5.00	95

Flow Rate: 1.5 mL/min.

Pressure: 380 bar

Temperature: 25 °C

Injection Volume: 5 μ L

Sample Solvent: Ethanol

Detection: UV 290 nm, PDA

Data Rate: 40 Hz

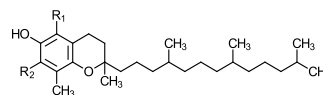
Response Time: 0.05 sec.

Flow Cell: 1 μ L

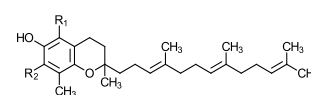
LC System: Shimadzu Nexera X2

STRUCTURES:

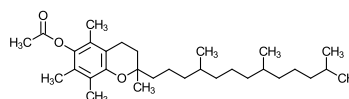
Tocopherol/Tocotrienol	R ₁	R ₂
Alpha (α)	CH ₃	CH ₃
Beta (β)	CH ₃	H
Gamma (γ)	H	CH ₃
Delta (δ)	H	H



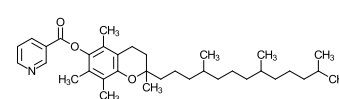
Tocopherol



Tocotrienol



α -Tocopherol acetate



α -Tocopherol nicotinate

Vitamin E capsules can contain up to eight related, but different constituents, including up to four tocopherols and four tocotrienols. Ester derivatives of Vitamin E are made to increase the stability of the compound. Vitamin E is important for its antioxidant properties in both the body and in food and cosmetics.

The sample used for analysis was combination of standards and a vitamin supplement purchased locally. The soft gel vitamin supplement contained the four tocotrienols and α -tocopherol. Only the liquid in the soft gel was used for the analysis. The four tocopherols, α -tocopherol acetate, and α -tocopherol nicotinate were standards obtained from Sigma-Aldrich. The small, unidentified peaks are unknown materials from the soft gel capsule.