

Customer Application Brief

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Determination of Coenzyme Q10 by High Pressure Liquid Chromatography

Steve Baugh, Jessica Revell, and Kim Eastman
ChromaDex, Irvine, CA 92618

Coenzyme Q10 (2,3 dimethoxy-5 methyl-6-decaprenyl benzoquinone) is a fat-soluble, vitamin-like quinone commonly known as ubiquinone, CoQ, or vitamin Q10. Coenzyme Q10 is used by cells to produce energy needed for cell growth and maintenance. Coenzyme Q10 is a compound that is made naturally in the body and is found in most body tissues. The highest amounts of CoQ10 are found in the heart, liver, kidneys, and pancreas while the lowest amounts are found in the lungs. The tissue levels of Coenzyme Q10 decrease as people age.

Coenzyme Q10 is a powerful antioxidant that acts as an electron shuttle between flavoproteins and cytochromes in the electron-transport chain. It is the only electron shuttle that is not covalently bonded or tightly bound to a protein. Coenzyme Q10 (Figure 1) is a naturally occurring antioxidant. As a dietary supplement, it is used to prevent or to treat congestive heart failure, to delay the onset of Parkinson's syndrome, and to prevent or to treat certain forms of cancer. Coenzyme Q10 is easily separated on the Acclaim® PA II column (Figure 2).

Laboratory Supplies

Analytical balance
Ultrasonication bath
Assorted and volumetric glassware
Syringes and syringe filters
HPLC/GC glass vials and caps

Solvents and Reagents

Ethanol (EtOH)
Milli-Q® Water
Tetrahydrofuran (THF)
Acetonitrile (CH₃CN)
Ferric Chloride (FeCl₃)

Solution Preparation

Diluent and Mobile Phase – 55:40:5 (v/v) CH₃CN:THF:Water

To prepare the solution, 550 mL of CH₃CN and 400 mL of THF were added to a 1 L volumetric flask, diluted to volume with Milli-Q water, and mixed well.

0.1% (w/v) FeCl₃ in EtOH Solution

100 mg of FeCl₃ and 50 mL of EtOH were added to a 100 mL volumetric flask and sonicated for 30 min. After equilibration, the solution was diluted to volume with EtOH and mixed well.

Standard Preparation

Stock Standard Solution

The stock standard was prepared by weighing 12.24 mg of Coenzyme Q10 into a 10 mL volumetric flask. Then, 5 mL of diluent and 1 mL of 0.1% FeCl₃ were added and sonicated for 25 min. The solution was then allowed to re-equilibrate to ambient temperature, brought to volume with diluent, and mixed well.

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Instrument Parameters

Instrument: Dionex HPLC System
 Detection: UV-vis
 Mobile Phase: Isocratic
 Column: Dionex Acclaim Polar Advantage PA II
 150 × 3.0 mm, 3 μm particle
 Temperature: 25 °C
 Inj. Volume: 20 μL
 UV Detection: 275 nm

Samples

CoQ10 stock standard (Chromadex)
 Lot #: 03703-50630
 CDXA #: CDXA-136.7.8

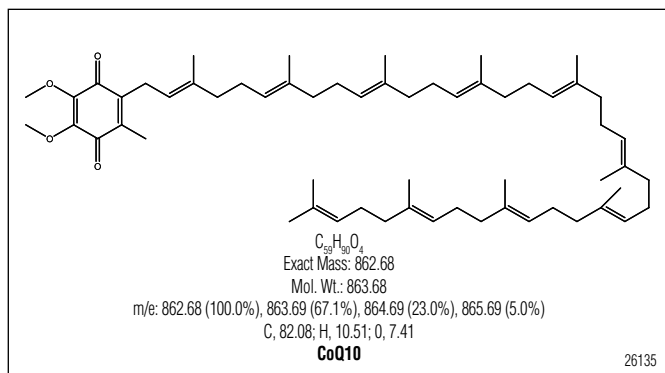


Figure 1 Structure of CoQ10.

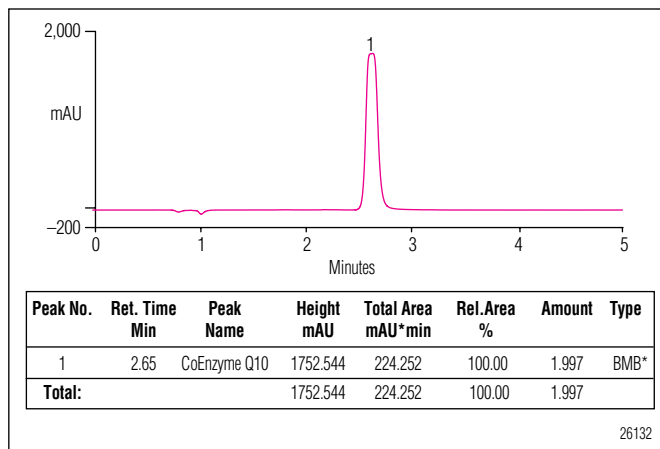


Figure 2. CoQ10 stock standard.

Related Documents

1. ChromaDex Analytics Laboratory Notebook 73, pages 114-115.
2. ChromaDex Analytics Laboratory Notebook 136, page 128.
3. ChromaDex SOP "Routine Laboratory Calculations."

This is a customer submitted application brief published as is.
 No ISO data available for included figures.

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Dionex Corporation North America

1228 Titan Way
 P.O. Box 3603
 Sunnyvale, CA
 94088-3603
 (408) 737-0700

U.S./Canada (847) 295-7500

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 Japan (81) 6 6885 1213 Korea (82) 2 2653 2580 Singapore (65) 6289 1190
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www.dionex.com



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