CDER Standards Information Sheet

Recognition Category: ☐ Revision ☐ Reaffirmation ☑ New recognition

CDER Recognition Number: 2026-0010

Standards Developing Organization (SDO) Name: ASTM

Standard Number: E3324-22

Title of Standard: Standard Test Method for Lipid Quantitation in Liposomal Formulations Using Ultra-High-Performance Liquid Chromatography (UHPLC) with Triple Quadrupole Mass Spectrometry (TQMS)

Scope/Abstract:
Excerpted from the ASTM website:

1.1 This test method describes the determination of lipid components in liposomal formulations, which includes sample solubilization in methanol followed by separation of the analytes using ultra-high-performance liquid chromatography (UHPLC) and detection with tandem mass-spectrometry (MS/MS). This test method adheres to multiple reaction monitoring (MRM) mass spectrometry on a triple quadrupole mass spectrometer (TQMS).

1.2 This test method is specific for liposomal formulations containing cholesterol, 1,2- distearoyl-sn-glycero-3-phosphoethanolamine-N-[methoxy (polyethylene glycol)-2000] (DSPE- PEG 2000), and hydrogenated (soy) L-α-phosphatidylcholine (HSPC).

1.3 This test method is applicable to report the absolute concentrations of cholesterol, DSPE-PEG 2000, and HSPC and their ratio (DSPE-PEG 2000: HSPC: cholesterol) in liposomal formulations. Assessment of the stability of the analytes in terms of their degradation as a result of oxidation or hydrolysis is beyond the scope of this test method.

1.4 This test method includes calibration and standardization, sample preparation, UHPLC-TQMS instrumentation, potential interferences, method validation with acceptance criteria, sample analysis, and data reporting.

1.5 The detection limits for cholesterol, DSPE-PEG 2000, and HSPC using this test method are 5.3, 0.5, and 0.5 ng/g, respectively. In addition, the quantitation limits for cholesterol, DSPE-PEG 2000, and HSPC are 10.6, 0.8, and 0.5 ng/g, respectively.

1.6 This test method is intended for concentration ranges of 8-1600 ng/g for cholesterol, and of 2-400 ng/g for DSPE-PEG 2000 and HSPC.

Extent of Recognition:

Complete Recognition

Rationale for Complete Recognition:

This standard is relevant to products regulated by CDER and is recognized based on its scientific and technical merit and/or because it supports existing regulatory policies.

Relevant Regulations, Guidance and/or Supporting Publications:

Guidance for Industry Drug Products, Including Biological Products, that Contain Nanomaterials (April 2022)

Guidance for Industry Liposome Drug Products: Chemistry, Manufacturing, and Controls; Human Pharmacokinetics and Bioavailability; and Labeling Documentation (April 2018)

Guidance for Industry Bioanalytical Method Validation (May 2018)

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