

Welcome to Today's Event

Thanks for joining us!

Today's Topic:

Biocompatibility Town Hall #2: Extractions for Chemical Analyses

September 23, 2026

Biocompatibility Town Hall #2: Extractions for Conducting Chemical Analysis for Biocompatibility Assessment

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Learning Objectives & Introduction

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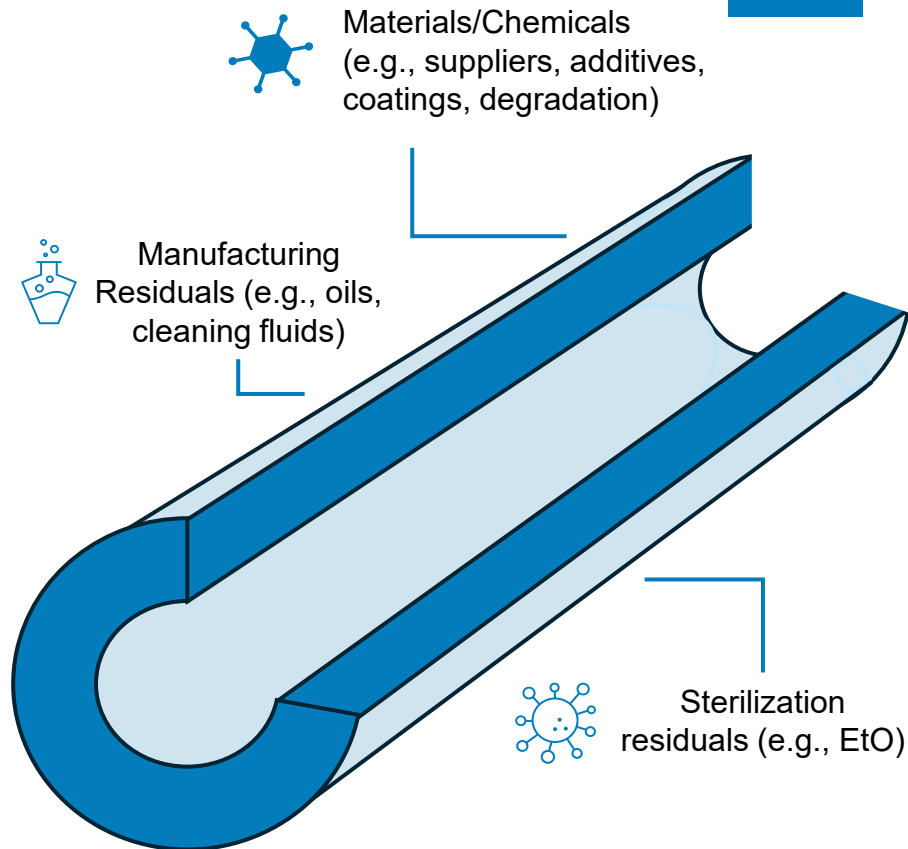
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Learning Objectives

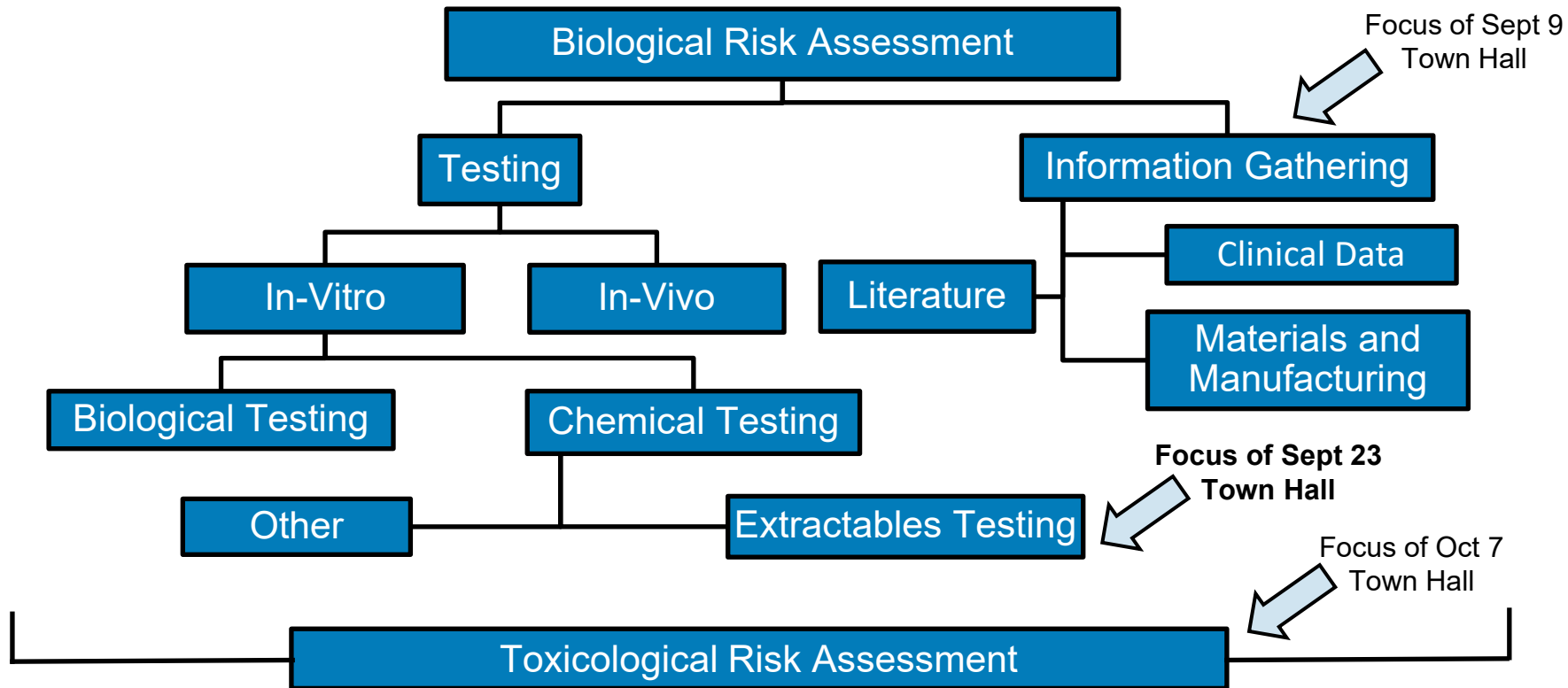
- Describe purpose of chemical testing to assess biocompatibility endpoints.
- Provide background for today's topic.
- Share approaches for conducting extractable testing based on recognized consensus standards and FDA's Biocompatibility guidance, focusing on extraction conditions.
- Identify common issues and considerations.

Biological Risk

- Potential biocompatibility risks include:
 - Material or chemical toxicity
 - Unacceptable biological response to physical characteristics of the device, and
 - Aspects of manufacturing and processing that could alter the physicochemical characteristics of the device, resulting in an unacceptable risk



Biological Risk Assessment



Biocompatibility Risk-Based Evaluation*

- A risk-based assessment may be sufficient with lower risk and more knowns:
 - Well-known or standardized materials and processes
 - Unlikely to contain chemicals with known risk
 - Similarity to marketed device
- Biological/Chemical testing more likely with higher risk or higher uncertainty:
 - Novel materials
 - Chemicals with new or increased risks
 - Novel or unknown processes



- Metals and polymers conforming to an applicable standard or MAF.
- Similarity to previous versions or other marketed devices.
- Well-known suppliers and processes.
- Processing aid/chemical with SDS.



- Concerning or unknown chemicals (e.g., additives, extractables).
- Complex or novel polymers (e.g., absorbable, in situ polymerizing).
- Complex or unknown processes (e.g., electrospinning)

**Note: these are general examples; additional specific considerations may apply to the device under review*

Chemical Characterization

Chemical characterization (CC) is a process that identifies and quantifies the constituent chemicals of a specific device or its component and materials, which may have a direct or indirect human exposure from its clinical use

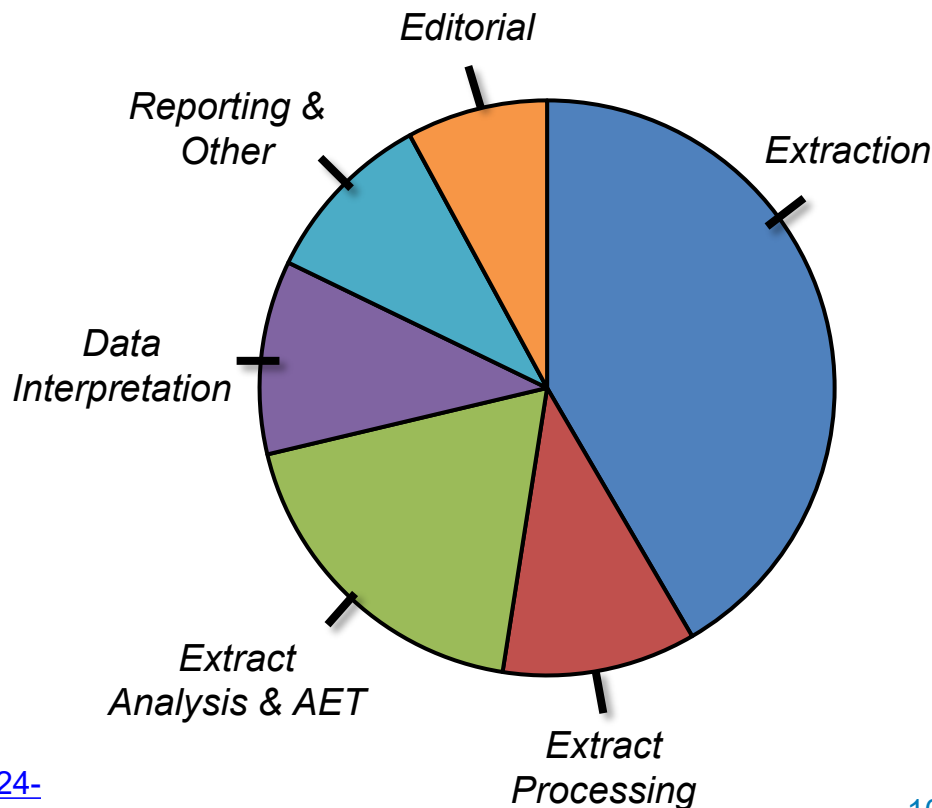
Resources:

- *ISO 10993-18:2020 Chemical Characterization of medical device materials within a risk management process (partial recognition: [CDRH Supplementary Information Sheet](#))*
- *FDA Guidance: [Use of International Standard ISO 10993-1, "Biological evaluation of medical devices - Part 1: Evaluation and testing within a risk management process" - Guidance for Industry and Food and Drug Administration Staff](#)*
- *Draft Guidance: [Chemical Analysis for Biocompatibility Assessment of Medical Devices](#) | [FDA](#) (published September 2024; draft guidance not for implementation at this time)*

Draft Chemical Analysis Guidance Comments



- Public comments were received on topics covering the entire chemical characterization process.
 - Comments were grouped into several major topic areas.
 - Focused discussion on these topics is intended to promote further understanding of considerations in these subject areas.



Draft Guidance: [Chemical Analysis for Biocompatibility Assessment of Medical Devices | FDA](#) (published September 2024; not for implementation)

Docket comments: <https://www.regulations.gov/docket/FDA-2024-D-4165>

Sampling of Deficiencies

- Approach: CC/TRA related deficiencies from set of FY25 audited letters
 - 19 letters contained 32 deficiencies related to chemical characterization (CC) or toxicological risk assessment (TRA), many with multiple parts
- Common Deficiencies:
 - Incomplete test report
 - Inadequate/unclear test article or prep
 - Inadequate or unclear extraction conditions
 - Extraction manipulation (e.g., pooling, concentration, dilution)
 - Inadequate equipment sensitivity
 - Inadequate or lacking appropriate surrogates/ standards
 - Inadequate or unclear specified values and calculations (e.g., analytical evaluation threshold (AET), uncertainty factor (UF), limit of quantification(LOQ))
 - Unidentified chemicals
 - Concern with identified chemicals

Biocompatibility Town Hall Series



Sept 9

Biocompatibility Risk Assessment

- Update on ISO 10993-1: 2025
- Risk Assessments, with examples from:
 - Material Mediated-Pyrogenicity
 - Systemic Toxicity, Genotoxicity, and Carcinogenicity

Sept 23

Chemical Characterization - Extractions

- | | | |
|---------------------|-------------------|----------------|
| • Test Article | • Volume & Vessel | • Particulates |
| • Solvent Selection | • Non-Volatile | • Replicates |
| • Time & Temp | Residue (NVR) | • Examples |

Oct 7

Toxicological Risk Assessment

- Overview of ISO 10993-17:2023 and ISO TS 21726:2019
- Key considerations for developing thresholds and screening
- Common deviations

Chemical Characterization – Extraction Considerations

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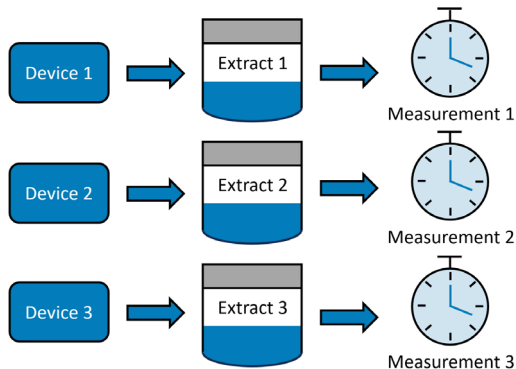
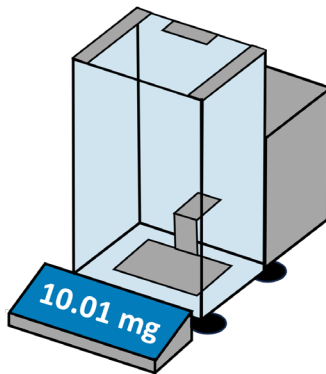
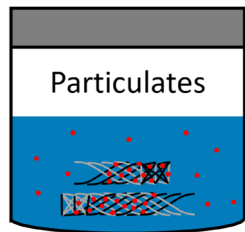
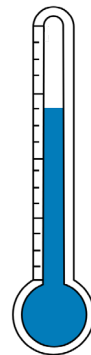
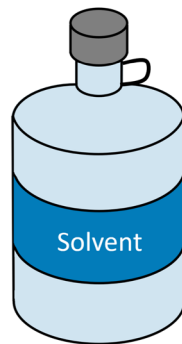
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Extraction Considerations

- Test Article Selection and Preparation
- Solvent Selection
- Extraction Duration and Temperature
- Extraction Vessel and Solvent Volume
- Non-Volatile Residue (NVR)
- Particulates
- Replicates



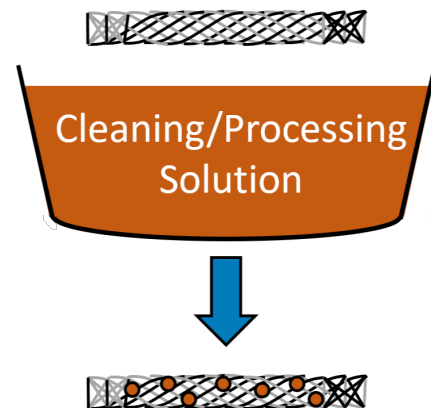
Test Article Selection and Preparation

General Test Article Considerations

- FDA's Biocompatibility Guidance explains that test article preparation is a critical consideration for evaluating biocompatibility.
 - Final, finished form or representative test article accounting for materials, manufacturing and sterilization processes, and user manipulation, if applicable.
- ISO 10993-12 describes the importance of characterizing device manufacturing residuals:
 - *“Any residue from the manufacturing processes, intentional or unintentional additives or contaminants, shall be considered integral to the medical device, medical device portion or component, or representative sample.”*
(Clause 8)

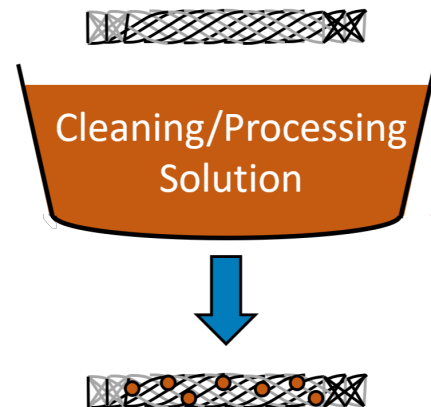
Manufacturing

- Relevant considerations about test article selection and manufacturing processes to ensure a worst-case profile of extractables is produced:
 - Those that produce the greatest quantity of *residuals* (e.g., cleaning detergent)
 - Those that affect the device material in such a way that it releases a greater quantity of extractables (e.g., heating a polymer during molding)
- For reprocessed, reused medical devices, FDA reprocessing guidance provides recommendations for assessment of residuals and device performance over the intended device life cycle:
 - FDA guidance: [Reprocessing Medical Devices in Health Care Settings: Validation Methods and Labeling](#)



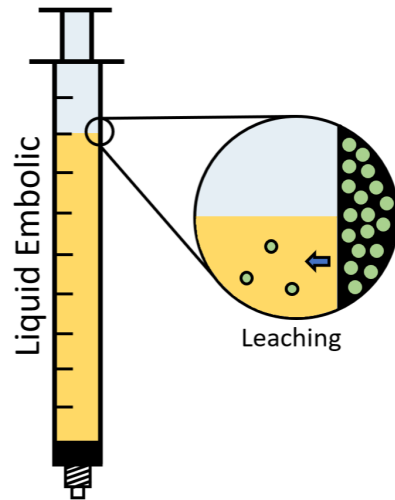
Test Article Preparation

- Any steps in the instructions for use performed by a user that may affect the extractable profile of the device should be followed unless justified (per Section III.A, V.A, and V.B of FDA's Biocompatibility Guidance).
- Examples:
 - End user sterilization, cleaning or rinsing steps prior to (first) use
 - Mixing of components as part of an in-situ polymerizing device.



Shelf Life Considerations

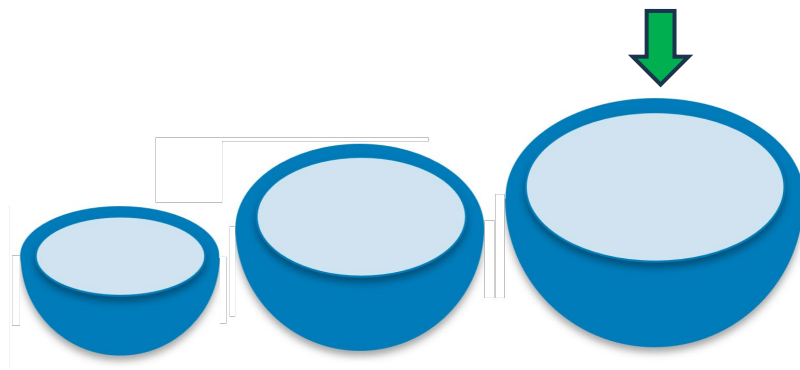
- For some devices, testing a device at shelf life may be an important consideration to characterize expected differences in the extractable profile.
- Examples:
 - Devices which are powders, liquid, or gel-like (e.g., absorbable hydrogels) due to the risks of packaging leachables or degradants.
 - A combination product may accumulate leachables or degradants into the drug substance over the product shelf life. Exhaustive extraction may be recommended for a limited contacting device if it is not at its maximum intended shelf life to ensure the study captures leachables that may migrate into the drug substance.



Device Size / Configuration Considerations



- Minimize cutting to avoid exposing device surfaces that would otherwise not have tissue contact, which may affect the device extractable profile (see Annex G.3 of ISO 10993-18).
- Use the device model/configuration with the largest surface area of each material as the test article to produce the worst-case profile of extractables.



Different Models/Sizes of Acetabular Cups

Alternative Test Articles and Coupons

- Alternative test articles (e.g., coupons) can be challenging to justify; some examples where alternatives may be appropriate:
 - Devices which are composed of a homogenous material delivered by volume or weight (e.g., dry powder, hydrogel).
 - Devices which are composed of non-permeable, non-degradable metals.
- Per Section V of FDA's Biocompatibility Guidance, -considerations for representative devices include:
 - Chemical, physical and surface properties as final finished device.
 - Ratio of component materials as final finished device (e.g., equivalent percentage of the surface area contributed by each patient-contacting material as the final, finished device).
 - Manufacturing and sterilization processes
 - Rationale for any differences

Solvent Selection

Solvent Types

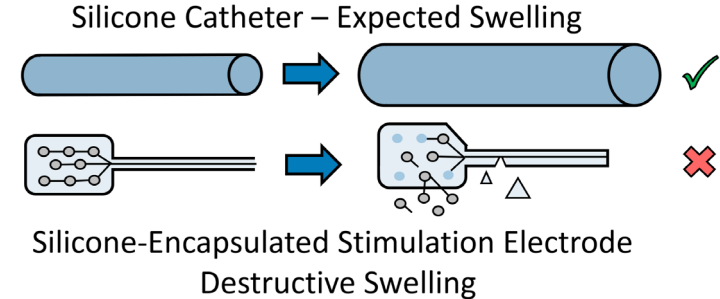
- Extraction solvents should be selected to optimize compatibility with the device materials and provide information on the types of chemicals that are likely to be extracted in clinical use (FDA's Biocompatibility Guidance).
- Annex D of ISO 10993-18 recommends extraction solvents based on the contact categories in ISO 10993-1:

Contact Category	Extraction Type
Limited ($\leq$ 24 hours)	Exaggerated Extraction
Prolonged (>24 hours, $\leq$ 30 Days)	Exaggerated <u>OR</u> Exhaustive Extraction
Long Term (>30 Days)	Exhaustive Extraction

- Alternative solvent combinations, including the use of 2 solvents for long-term contact, may be considered with appropriately documented solvent incompatibility or well-established simulated use conditions that preclude the relevance of a solvent class.

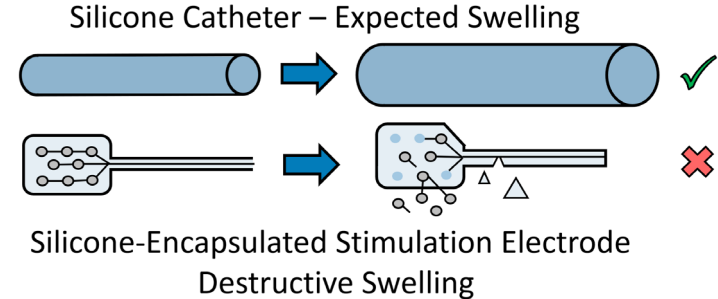
Swelling Considerations

- Swelling most commonly occurs with elastomeric materials (e.g., rubbers) and is often transitory.
- During swelling, the solvent permeates the material and accelerates extraction of substances that may be slowly released during long term tissue exposure.
 - Swelling alone is not an indication of solvent incompatibility.
 - Extraction of material oligomers alone is not an indication of degradation.
 - Extraction of a large quantity of Non-volatile Residue (NVR) alone is not an indication of degradation.



Swelling Considerations

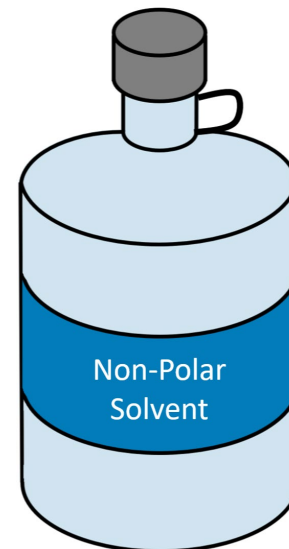
- Destructive swelling may occur if it results in irreversible damage during extraction.
- For example:
 - Silicone encapsulates a metal lead and swelling causes the silicone to shred/shear from the device.
 - An elastomeric O-ring of a hermetic seal is broken during swelling, causing extraction of non-contacting portions of the device.



Unintended Degradation Considerations



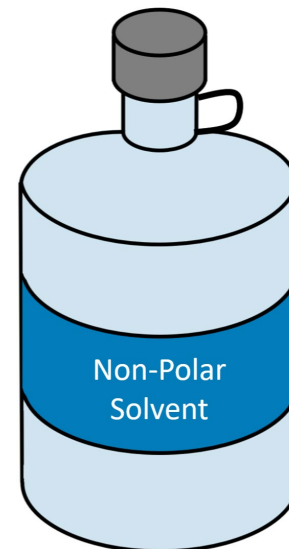
- Evaluating at least two additional alternative solvents of similar polarity if a device/material is not compatible with your first solvent choice ensures appropriate forethought in study design.
 - Ensure understanding of what is not degradation (refer to previous two slides on Swelling).
 - Maintain post-extraction photographs to document degradation.
 - Consider alternatives of similar polarity but very different properties (e.g. number of carbons, functional group)
- FDA acknowledges that there may be a very limited set of materials for which a compatible polar, semi-polar, or non-polar solvent may not exist under certain circumstances.



Unintended Degradation Considerations

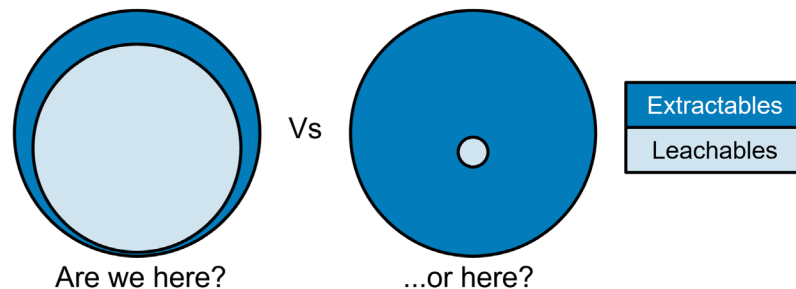


- The Q-submission process is a good way to discuss alternative approaches with the relevant review division if destructive swelling or device degradation occur.
 - Consider Clause 3.7 of ISO 10993-12 which states that extract conditions are expected to be at least as aggressive as the conditions of clinical use when proposing alternative approaches and how that impacts the TRA (e.g., whether the approach can generate an accurate total quantity (TQ) within a practical timeframe).
- Consistent with Section III of FDA's Biocompatibility Guidance, adequately complete information on the device materials and manufacturing process may be used to assess relevant biocompatibility risks.



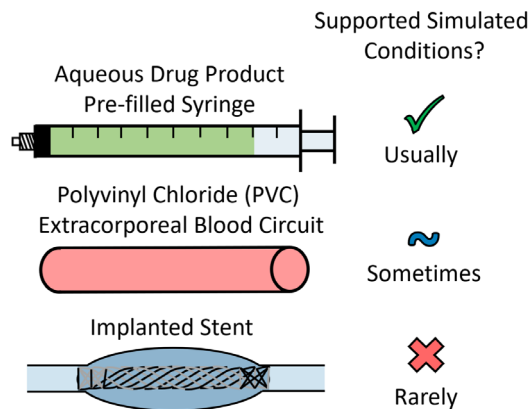
Alcohol: Water Mixtures

- Neat solvents are preferred to represent a “worst case” extraction in extractables studies, but mixed solvents often proposed as alternatives.
- Mixed solvents (e.g., alcohol/water) generally discouraged because:
 - Mixed solvents may have unpredictable solvency which can underestimate risks.
 - The materials evaluated in literature do not account for the variety of materials used in medical devices or account for formulation/manufacturer specific considerations (e.g., polymer molecular weight distribution).
 - The exposure conditions may not be representative of the varied tissue environments encountered by medical devices.



Alcohol: Water Mixtures

- FDA acknowledges publications purporting to show equivalence of alcohol and water mixtures for the purposes of leachable simulation under certain conditions.
- Performing a follow up study to understand the rates of release for a specific substance may be helpful if an unacceptable risk is identified
 - In alignment with Annex D of ISO 10993-18, the simulated extraction conditions are justified based on the best available evidence of what conditions are appropriate to simulate the environment the device would be exposed to clinically.
 - Because the available literature in this space is continuously evolving, it is not possible to generalize the design of these studies which will vary by material and tissue.



Alternative Solvents

Some examples of alternative solvents include:

- Where corrosion is identified as a concern, PBS may be helpful for simulating release of metal ions. However, PBS may be detrimental in chemical characterization studies.
- Acidic extraction media can be helpful for simulating release of leachables for devices (or parts of devices) in contact with gastric fluids (e.g., feeding tubes).
 - Extreme conditions of the local tissue environment may greatly affect the type and extent of organic and inorganic extractables in comparison to normal polar solvents (e.g., water) commonly used in chemical characterization studies.

Extraction Duration and Temperature

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Contact Category and Extraction Duration

- ISO 10993-18 recommends extraction conditions based on the contact categories in ISO 10993-1.

Contact Category	Extraction Type
Limited ($\leq$ 24 hours)	Exaggerated Extraction
Prolonged (>24 hours, $\leq$ 30 Days)	Exaggerated <u>OR</u> Exhaustive Extraction
Long Term (>30 Days)	Exhaustive Extraction

See Table 2 in ISO 10993-18 for more information on classifying the contact category of devices

- For prolonged contacting devices where the contact duration is 24-72 hours, a single exaggerated extraction for 72 hours may be an acceptable approach. Exhaustive extraction is otherwise the most conservative approach for prolonged-contacting devices.

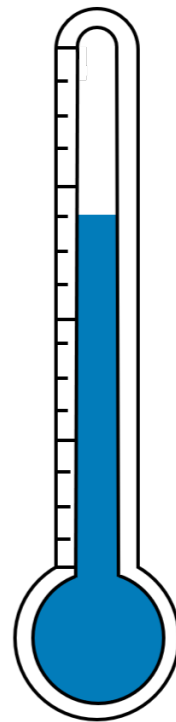
Exhaustive Extraction

- ISO 10993-12 describes the duration of each iteration of exhaustive extraction process (e.g., sequential 72-hour extractions).
 - *“A series of successive extractions is carried out by extracting the test sample in the selected solvent for a fixed period (e.g. 24 h)” (Annex D.2)*
 - A **fixed** duration ensures a valid comparison can be made. Changing the duration (e.g., an initial 72-hour extraction followed by repeated 24-hour extractions) may result in an inaccurate determination of exhaustion due to differences in kinetics
 - While most frequently performed using **sequential 72-hour** extractions, alternative durations (e.g., sequential 24-hour instead of 72-hour extractions) may be acceptable if the device generates sufficient NVR.

For example: 10 mg of NVR is generated in the first extraction cycle and the balance can precisely measure NVR that is $\leq 10\%$ of this value (i.e., 1 mg) to demonstrate the point at which exhaustion is achieved.

Extraction Exaggeration

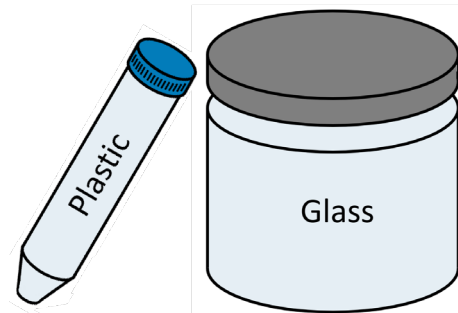
- Clause 10.3.1 of ISO 10993-12 recommends standardized extraction conditions that exaggerate time **and** temperature.
 - A temperature of 50°C is most frequently used for generation of extracts used in other in-vitro biocompatibility tests, even though it is greater than that of the human body.
 - A duration of 24 hours is most frequently used for generation of extracts used in biocompatibility in-vitro testing of limited (≤ 24 hours) contacting devices, even when those devices may only have tissue contact for several hours or minutes.
- Starting from standardized conditions simplifies study design and achieves alignment across test facilities.
 - Alternative approaches may be acceptable with appropriate justification. See Clause 10.3.2 and Annex C of ISO 10993-12.



Extraction Vessel and Solvent Volume

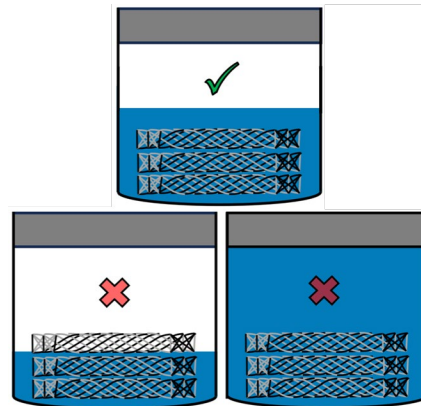
Vessel Size Considerations

- ISO 10993-12 makes several recommendations regarding selection of extraction vessels.
 - “...extraction shall be performed in clean, chemically inert, closed containers with minimal dead space.” (Clause 10.2)
 - “Ensure that all contacting portions are covered by the selected extraction volume.” (Clause 9.5)
- Compliance is limited by the sizes of commercially available extraction vessels.
 - Dependent on the packing efficiency of the device in the extraction vessel (e.g., shape and size); can be an iterative study design consideration.
 - Alternative chemically inert extraction vessels (e.g., reusable fluoro-polymer containers) or use of smaller, representative devices or coupons may provide additional flexibility.



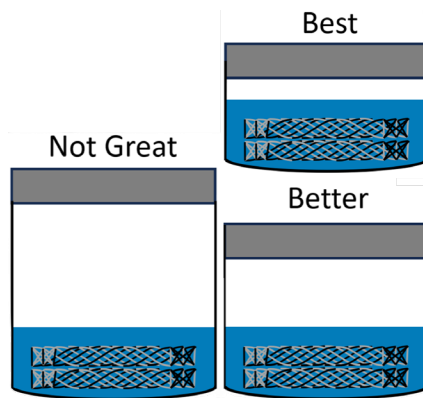
Extraction Volume Considerations

- Extraction conditions that ensure complete, continuous solvent coverage of the device throughout the extraction process in an appropriately inert extraction vessel may be unable to comply with the ratios described in ISO 10993-12.
 - Consider the impact on the AET (e.g., number of devices extracted, extraction volume, concentration and/or dilution factor(s)) to ensure $AET > LOQ$ per Annex E of ISO 10993-18.
 - Minimize extraction volume to lowest practical volume to reduce impact from concentration (or to improve signal intensity for identification when concentration is not performed).
 - Extraction ratios may not be relevant for indirect-contacting fluid pathway devices extracted by filling the interior (see Section V.E of FDA Biocompatibility Guidance).



Extraction Volume Considerations

- Minimal dead space reduces loss of volatile extractables into the gas above the extraction solvent.
 - Risk of loss of volatile extractables may be mitigated through solvent-free HS-GC-MS.
- Inert fillers (e.g., glass beads) may be both beneficial and detrimental to extraction.
 - Filler can improve packing efficiency and potentially reduce dead space. It may also weigh down buoyant devices.
 - Filler may obstruct contact with the full surfaces of the device, require rinsing after extraction to account for solvent /extractable adhesion, complicate the process of solvent replacement during exhaustive extraction and require careful cleaning between uses to avoid cross contamination.
 - The practical downsides from using inert filler may outweigh the potential benefits.



Vessel Material Compatibility

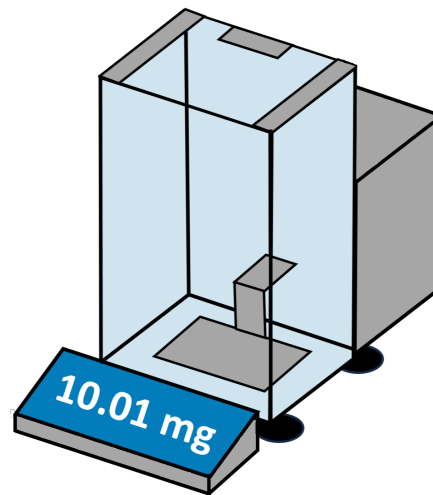
- Extraction vessels composed of glass may leach excessive amounts of certain elements depending on the quality of the glass and if the extraction vessel has been reused.
 - More likely to occur under acidic conditions. Acidifying extracts stored in glass containers prior to ICP-MS analysis may increase the leaching of metals.
 - Elements extracted from glass extraction vessels may differ between control and test article extracts depending on the batch/lot or extent of vessel reuse.
 - Reusable borosilicate glassware releases fewer elements than single-use soda lime glassware.

Solvent / Solution Conditions	Example Vessel Material
Neutral Aqueous, Organic	Glass (e.g., Reusable borosilicate)
Acidic	Polymeric (e.g., Polypropylene)

Non-Volatile Residue (NVR)

Balance Sensitivity Considerations

- Balance sensitivity is established and regularly verified based on USP <41> (*Balances*) minimum weight, which specifies an accuracy to within 0.1% of the measured weight.
 - Most analytical balances with a readability of 10-100 μg have a rated minimum weight of 5-50 mg (e.g., 10 $\pm$ 0.01 mg).
 - For the purposes of demonstrating exhaustion, an ability to accurately measure **10-100 μg** within **10-20%** is typically appropriate (e.g., 0.100 $\pm$ 0.01 mg).

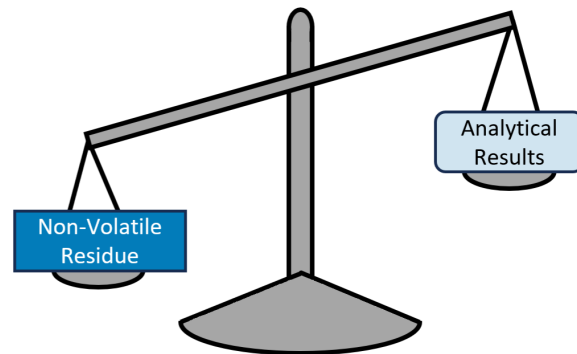


Balance Sensitivity Considerations

- For devices that produce minimal NVR, demonstrating exhaustion per ISO 10993-18 can pose challenges:
 - Important that the amount of NVR in the initial extraction cycle be sufficient to demonstrate exhaustion (i.e., 10% of the initial NVR amount detectable).
 - May be mitigated by dedicating an entire extract for NVR determination and extracting the same number of devices used clinically (e.g., if someone may be exposed to up to 3 implants at the same time, extract ≥ 3 devices)
- When detectable NVR cannot be generated even with appropriate mitigation, alternative approaches (e.g., separate analytical testing of each extract iteration) may be acceptable. Important considerations are:
 - Experimentally demonstrate NVR cannot be generated.
 - Justify the new approach, including the number of prepared extract iterations (e.g., minimum of 3).

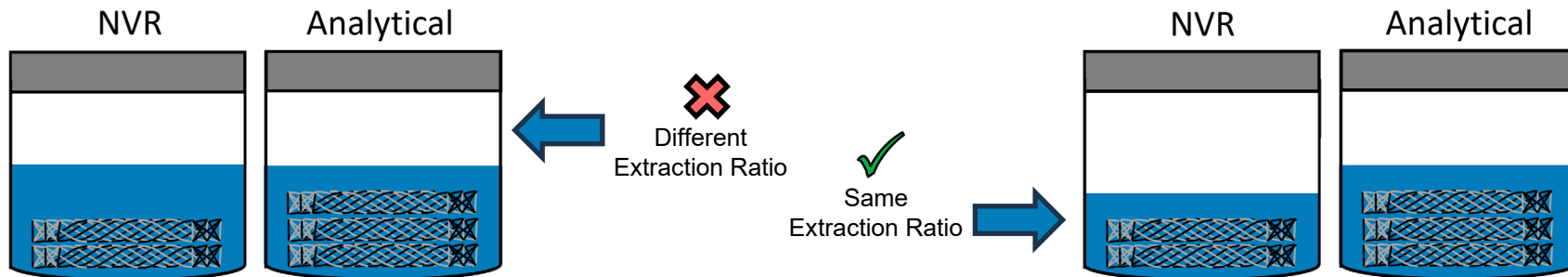
Mass Balance Considerations

- FDA recognizes that 100% mass balance is improbable because of the mismatch in detection of NVR analysis and analytical testing.
 - Comparison provides a performance check of the ability of a study to detect **most** substances extracted from a device.
 - FDA has observed significant mass balance discrepancies (e.g., 10-fold or greater NVR). In most cases this discrepancy can be attributed to large molecular weight oligomers through subsequent analyses (e.g., GPC).
- FDA recommends continued collaborative work toward developing well established and universally recognized analytical methods and performance criteria. At such time, NVR may not be as useful of a performance check.



Extraction Consistency Considerations

- Maintaining an equivalent extraction ratio between determining NVR and analytical testing would not typically affect the point at which exhaustive extraction occurs.
 - A change in the number of devices used for analytical testing may be acceptable provided the ratio is maintained and there is sufficient volume to perform all testing.



Particulates

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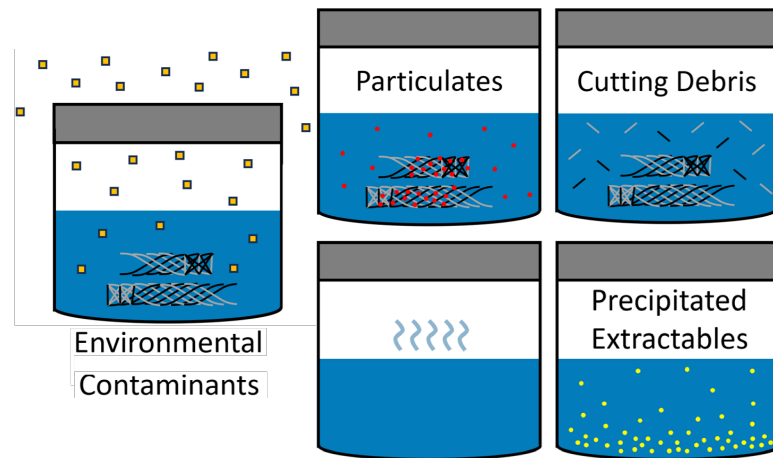
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Particulate Source Observations

- Particulates may be observed in extracts.
- Sources may include:
 - Environmental contamination
 - Cutting debris or test article preparation
 - Device degradation/deformation
 - Sample cooling or concentration



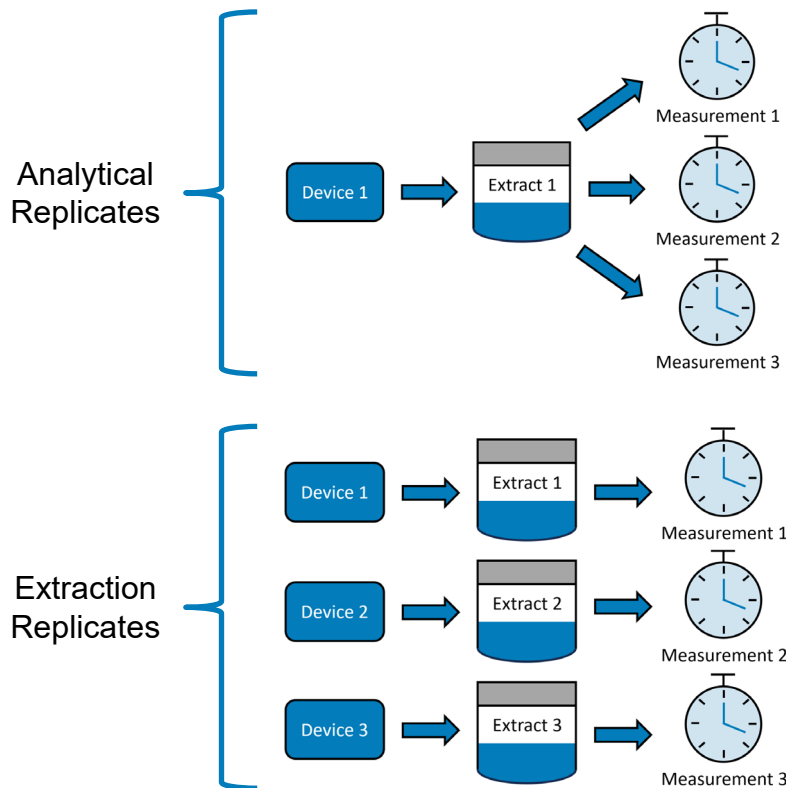
Particulate or Precipitate Considerations

- When particulates are observed in an extract:
 - Investigate the identity and source of the particulates.
 - If particulates are not precipitated extractables:
 - Removal may be warranted so they are not included in NVR determination.
 - If removed, describe removal processes and how the process does not affect dissolved extractables.
 - If particulates are thought to be precipitated extractables,
 - Accounted in NVR when determining the exhaustive endpoint.
 - Redissolution prior to subsequent analysis.
 - If particulate release is demonstrated to occur during device clinical use, additional information is relevant to address concerns related to the clinical safety of the released particulates.

Replicates

Analytical vs Extraction Replicates

- Analytical replicates are not the same as extraction replicates.
 - **Analytical Replicate:** Performing a second (or more) injection of the same device extract during analytical testing and reporting separate results. Assesses the variability arising from the instrumental analysis.
 - **Extraction Replicate:** Preparing a second (or more) extract of another device which is subjected to separate analytical testing and reporting of results. Assesses the variability between individual device batches/lots.

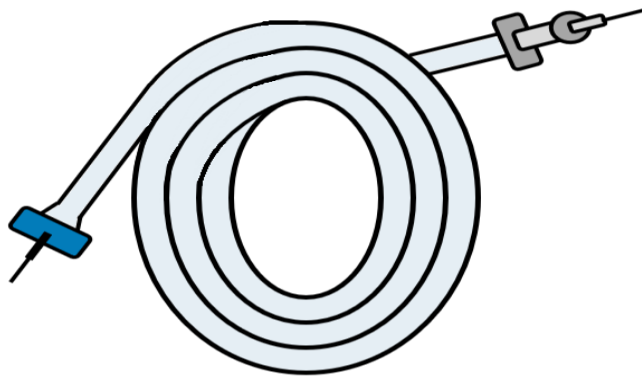


Replicate Considerations

- Extractions are typically performed in triplicate (i.e., **extraction replicates**), and analysis performed on each replicate separately to assess device variability.
- ISO 10993-18 (Clause 5.6) emphasizes the importance of extraction replicates in specific circumstances.
 - Where there is information (e.g., engineering data) indicating the device may have variability between individual device batches/lots or in the extraction/device preparation process itself.
For example: devices containing fixed tissues, in-situ polymerizing devices, historical information on device extractable variability.
 - Triplicate extraction may not be necessary for some **highly uniform** device materials if three or more devices are pooled for the extraction study. In such cases, a rationale for use of a single extraction replicate of a single device per solvent may also be considered.
For example: large metal implants with extraction vessel packing efficiency limitations.

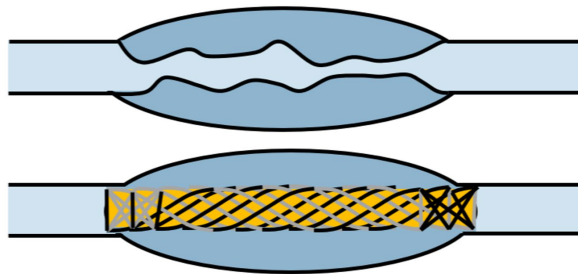
Hypothetical Examples

Example 1: Blood Collection/Infusion Set



Extraction Considerations	
Contact duration	Prolonged/indirect
Extraction solvents	Polar and nonpolar
Extraction duration/temperature	Exaggerated over the duration or temperature
Extraction vessel	Fill the inside of the tubing

Example 2: Drug Eluting Degradable Scaffold



Extraction Considerations

Contact duration	Long-term
Extraction solvents	Polar, semi-polar and nonpolar
Extraction duration/temperature	Exhaustive extraction. Ensure temperature does not result in polymer phase change or impact drug stability when not clinically relevant
Test article option	Due to the small device size, coupons manufactured with equivalent procedures (including packaging and sterilization) with comparable relevant physicochemical characteristics, accompanied with an appropriate gap analysis, can be considered

Chemical Analysis – Extractions Closing Remarks

Summary

- Extraction is an essential step for chemical analysis, involving substantial considerations of device materials and manufacturing, clinical use scenario, solvent suitability, and instrumental compatibility, etc.
- Extraction experimental details, including sample selection, extraction conditions, NVR, replicate, etc., are critical for generating extracts for later analysis.
- Consideration of other issues (e.g., extract manipulation, system suitability, AET) are important for extract analysis.

Solvent Exchange
Extract Storage LOQ Quantification
Identification ICH M7 LC-MS
ISO 10993-18 NVR
ICH Q3D ICP-MS AET DBT
Standards HS-GC-MS Replicates UF System Suitability
Chromatograms USP <1663> Concentration
Solvents Endpoints
GC-MS Degradation

Resources

Slide	FDA Guidance / Resource	Link
9	[Standard] ISO 10993-18:2020 Chemical Characterization of medical device materials within a risk management process (partial recognition: CDRH Supplementary Information Sheet)	www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfStandards/detail.cfm?standard_identification_no=43772
9, 10	[Draft Guidance] Chemical Analysis for Biocompatibility Assessment of Medical Devices (<i>Not for Implementation</i>)	www.fda.gov/media/181952/download
9	[Guidance] Use of International Standard ISO 10993-1, "Biological evaluation of medical devices - Part 1: Evaluation and testing within a risk management process"	www.fda.gov/media/142959/download
10	[Draft Chemical Analysis Guidance Docket Comments] FDA-2024-D-4165	www.regulations.gov/docket/FDA-2024-D-4165
11	November 20, 2025 MDUFA V Performance Report	https://www.fda.gov/media/190104/download?attachment

Resources

Slide	FDA Guidance / Resource	Link
12, 59	CDRH Town Hall – Biocompatibility Risk Assessment	www.fda.gov/medical-devices/medical-devices-news-and-events/town-hall-biocompatibility-risk-assessment-09092026
12, 59	CDRH Town Hall – Biocompatibility and Chemical Characterization Testing - Extractions	www.fda.gov/medical-devices/medical-devices-news-and-events/town-hall-biocompatibility-and-chemical-characterization-testing-extractions-09232026
12, 59	CDRH Town Hall – Biocompatibility and Toxicological Risk Assessment	www.fda.gov/medical-devices/medical-devices-news-and-events/town-hall-biocompatibility-and-toxicological-risk-assessment-10072026
17	[Guidance] Reprocessing Medical Devices in Health Care Settings: Validation Methods and Labeling	www.fda.gov/media/80265/download

Additional Resources

FDA Guidance / Resource	Link
[Public Workshop] Public Workshop - Accreditation Scheme for Conformity Assessment and Use of Chemical Analysis to Support Biocompatibility of Medical Devices	www.fda.gov/medical-devices/medical-devices-news-and-events/public-workshop-accreditation-scheme-conformity-assessment-and-use-chemical-analysis-support#comments
[Article] Sussman, et al. “Chemical Characterization and Non-targeted Analysis of Medical Device Extracts: A Review of Current Approaches, Gaps, and Emerging Practices”. ACS Biomater. Sci. Eng. 2022. 8 (3): 939–963	https://doi.org/10.1021/acsbiomaterials.1c01119
[Article] Saylor, et al. “Inter-laboratory study for extraction testing of medical devices”. J Pharm Biomed Anal. 2025 Jan 1. Vol. 252.	www.sciencedirect.com/science/article/pii/S0731708524005387?via%3Dihub

Biocompatibility Town Hall Series



Sept 9

Biocompatibility Risk Assessment

- Update on ISO 10993-1: 2025
- Risk Assessments, with examples from:
 - Material Mediated-Pyrogenicity
 - Systemic Toxicity, Genotoxicity, and Carcinogenicity

Sept 23

Chemical Characterization - Extractions

- Test Article
- Solvent Selection
- Time & Temp
- Volume & Vessel
- Non-Volatile Residue (NVR)
- Particulates
- Replicates
- Examples

Oct 7

Toxicological Risk Assessment

- Overview of ISO 10993-17:2023 and ISO TS 21726:2019
- Key considerations for developing thresholds and screening
- Common deviations



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Additional Panelists

Joshua Young, PhD

Chemist

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Nahid Ilyas, PhD

Chemist

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Office of Health Technology 4

Jiwen Zheng, PhD

Chemist

Office of Product Evaluation and Quality
Office of Health Technology 2

**Center for Devices and Radiological Health
U.S. Food and Drug Administration**

Previously Submitted Questions

Thanks for Joining Today!



- **Presentation, Slides and Transcript will be available at CDRH Learn**

- www.fda.gov/Training/CDRHLearn

- **Additional questions about today's topic**

- Email: CDRH.Biocomp@fda.hhs.gov

- **Additional questions about today's event**

- Email: DICE@fda.hhs.gov

- **Upcoming CDRH Events**

- www.fda.gov/CDRHEvents

Start Here/The Basics! (Updated 10/3/2024) ▼

[MDUFA Small Business Program, Registration and Listing](#)

How to Study and Market Your Device - (Updated module 9/11/24) ▼

510k, De Novo, IDE, PMA, HUD/HDE, Q-Submissions, Standards, Classification

Postmarket Activities (New module 10/7/24) ▼

Quality System, QMSR, Exporting, Device Recalls, MDR, Inspection - Global Harmonization

In Vitro Diagnostics - (Updated 9/27/24) ▼

IVD Development, CLIA, and Virtual Town Hall Series

Unique Device Identification (UDI) System ▼

Specialty Technical Topics - (Updated 10/8/24) ▼

Radiation-Emitting Products ▼

510(k) Third Party Review Program (for Third Party Review Organizations) ▼

Industry Basics Workshop Series ▼



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