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# Challenges of PFAS Testing in Consumer Products

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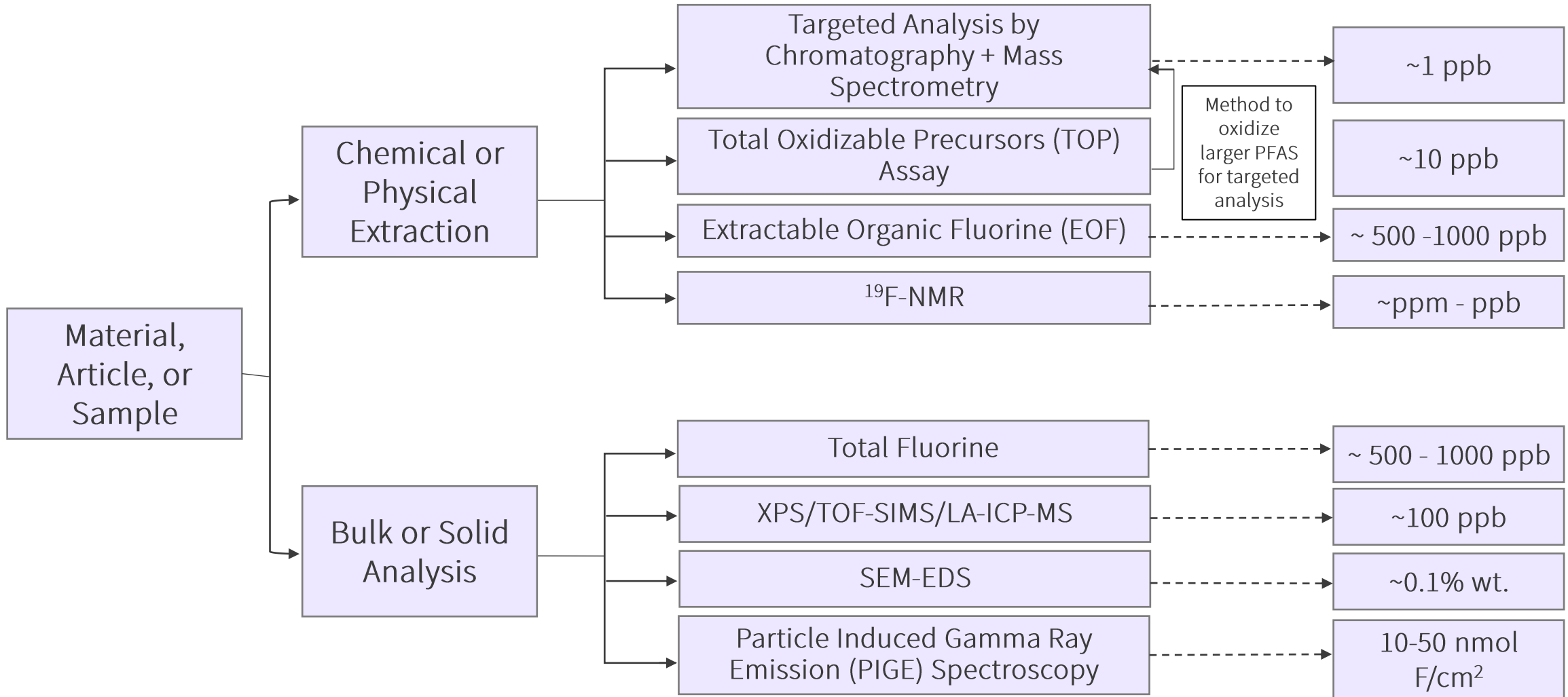
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# Key Questions

- What are the challenges with utilizing available PFAS testing methodologies for products?
- What are the advantages/disadvantages to sample extraction versus bulk analysis?
- How can we better understand the contribution of inorganic fluoride to final products from processing and raw materials?

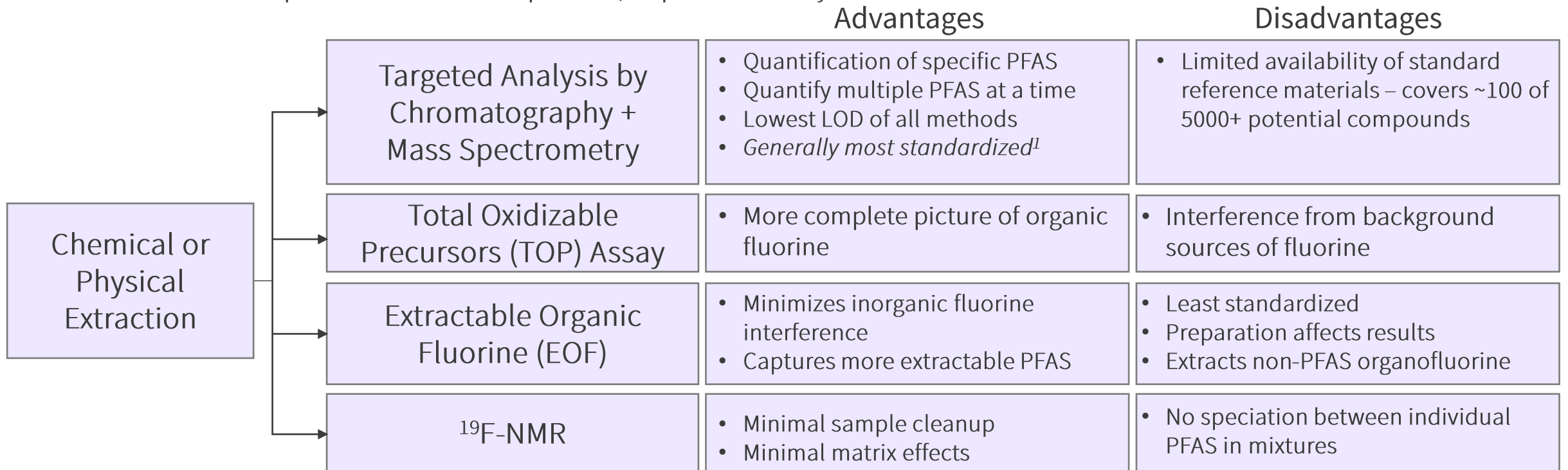
# Current Analytical Toolbox for PFAS Analysis

Typical Sample Preparation      Analytical Technique      Typical Limits of Detection



# Chemical Extraction: Considerations

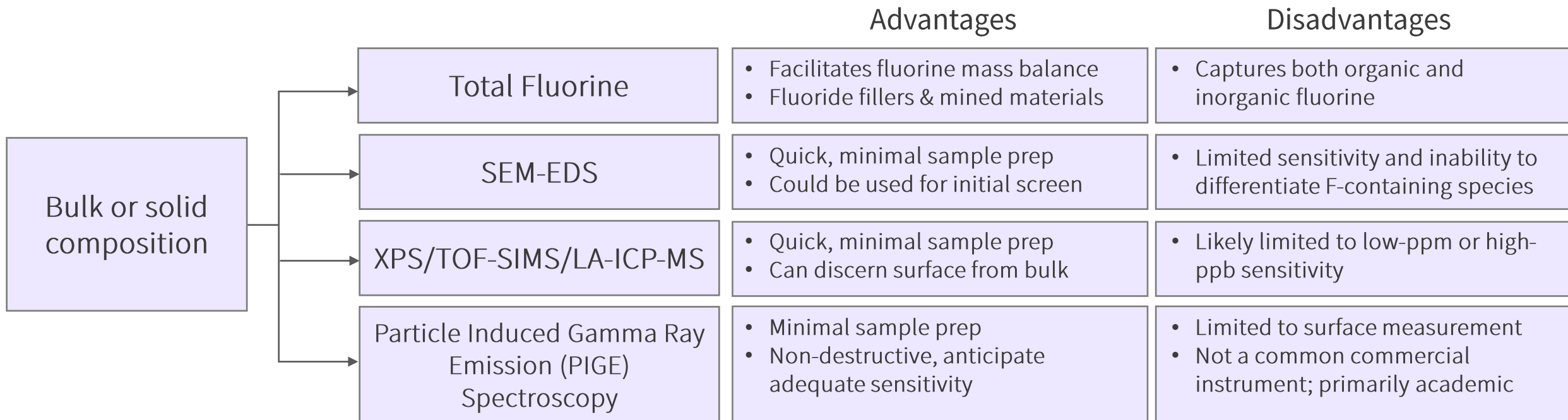
- Overall Advantages
  - Lower limits of detection and quantification through concentration steps
  - Simultaneous detection of multiple analytes in one run
- Overall Disadvantages/Limitations
  - Sample preparation will strongly impact final results
  - Extractability depends on matrices and specific PFAS that are present in the sample
  - More labor- and cost-intensive than bulk analyses
  - Does not capture entire PFAS composition; requires solubility



<sup>1</sup>There are EPA approved methods for environmental media that leverage targeted LC-MS analysis for certain PFAS analytes. Commercial laboratories have adapted these methodologies for testing raw materials and products.

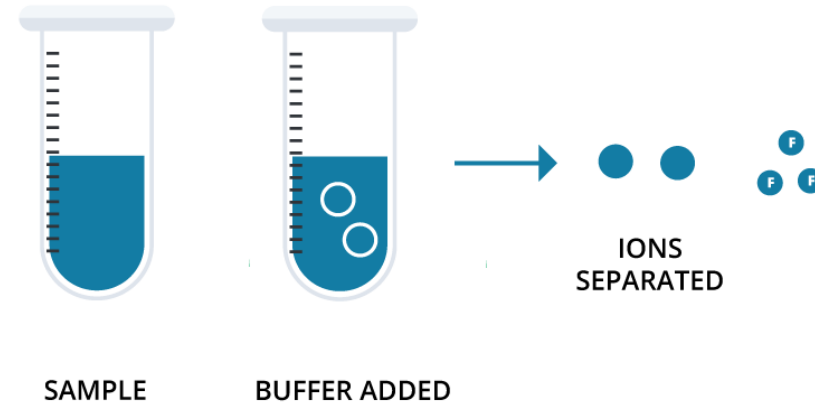
# Bulk Analysis: Considerations

- Overall Advantages
  - Generally more rapid screen to determine any presence of fluorine in sample without the need for extraction or lengthy sample prep
  - Typically lower monetary and labor cost
- Overall Disadvantages/Limitations
  - No speciation of individual compounds
  - May need to utilize other tools to support regulatory or risk assessment objectives



# Understanding the contribution of inorganic fluoride

- Inorganic fluoride is present in many important raw materials
  - E.g., plastic fillers, silica and other mined materials can contain fluoride
- In theory, the inorganic fluoride methodologies currently being used by commercial labs utilize water, phosphate, or other buffer solutions to solubilize and measure non-carbon fluoride ions.
- In reality, the procedure for extracting inorganic fluoride from a sample is not efficient and may not readily solubilize inorganic fluoride bound within a matrix (e.g., synthetic fibers or plastics)



**Total Organic Fluorine  $\neq$  Total Fluorine – Inorganic Fluoride**

# Thank you!

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