

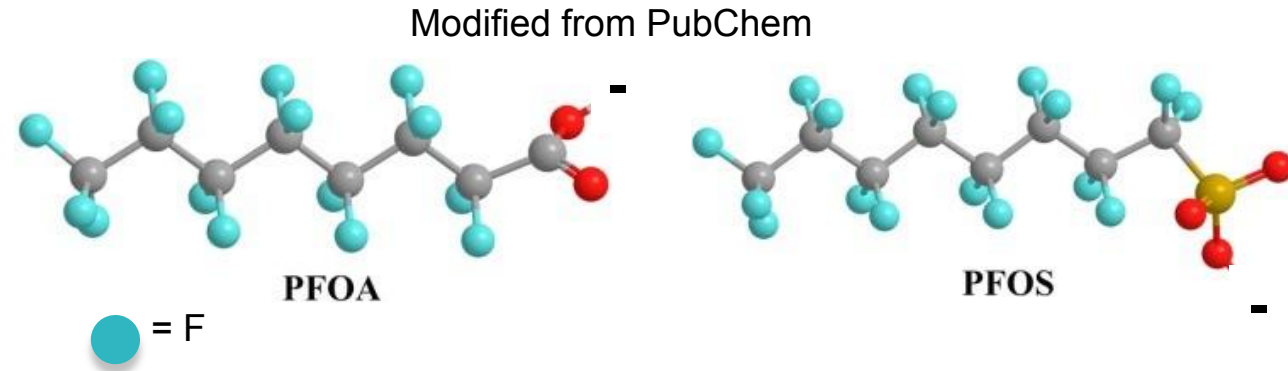
# Research and analysis – PFAS in biosolids

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# Per- and polyfluoroalkyl substances (PFAS)

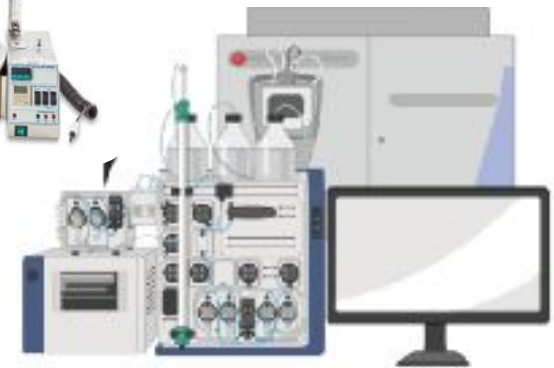
- Synthetic compounds (>5000)
- Highly fluorinated alkyl region
  - Often charged
  - Variable length for chain



- Used in many industrial and consumer processes
  - Wastewater treatment plants are collectors
  - Released in both liquid and solid effluent streams

# How are PFAS analyzed?

- EPA 4<sup>th</sup> draft method 1633
- Sample collection and storage
  - HDPE bottle (up to 3/4 full)
  - Up to 90 days (dark; fridge or freezer, freezer preferred)
- Sample extraction
  - Use isotopically labeled standard
  - Basic methanol to extract
  - Clean up with carbon and solid phase extraction
  - Evaporate solvent
- PFAS analysis
  - Analytical standard
  - Liquid chromatography with tandem mass spectrometry (LC-MS-MS)



# Why is PFAS analysis tricky?

- EPA 4<sup>th</sup> draft method 1633
  - Sample collection and storage
    - HDPE bottle (up to 3/4 full)
    - Up to 90 days (dark; fridge or freezer, freezer preferred)
  - Sample extraction
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    - Evaporate solvent
  - PFAS analysis
    - Analytical standard
    - Liquid chromatography with tandem mass spectrometry
- **CONTAMINATION**
  - **Representative?**
  - **Tricky matrix**
  - **Limited analytes**
  - **Expensive equipment**
  - **Expertise**

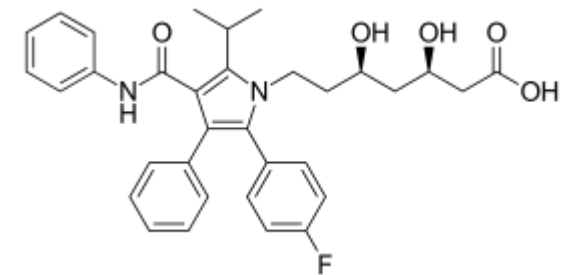
# Considerations for PFAS analysis in biosolids

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- Recall that there are thousands of compounds
- 1633 includes 40 compounds!
  - Incomplete picture
  - Estimated that a substantial portion of PFAS are not measured

# How do we get a better assessment?

- Continued efforts for quantitative methods
  - More analytical standards
  - New methods for extraction and analysis
- Estimates of total PFAS – Total oxidizable precursor (TOP) assay
- Semi quantitative suspect screening approaches
- Organic fluorine analysis (use with care)
  - Fluorinate pharmaceuticals
- More/better quantification
- Estimates other PFAS



# Perspectives

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- A range of analytical methods are needed so that we can assess PFAS concentrations in biosolids
- Data on which PFAS and their concentrations enables informed decision making
- Improvements are underway

Thank you for your time  
Question?

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