

## When analytical chemistry unveils nature

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### INTRODUCTION

Natural extracts contain a multitude of biologically active metabolites, but the analysis of their full metabolome remains challenging due to their high chemical diversity and great differences in relative metabolite concentrations.

### OUR EXPERTISE

Combining liquid-liquid fractionation, NMR spectroscopy assisted by chemometric tools, high resolution LC/MS and natural metabolite databases, we develop fast and reliable strategies to **deeply characterize natural extracts**.

### DELIVERABLES / SERVICES

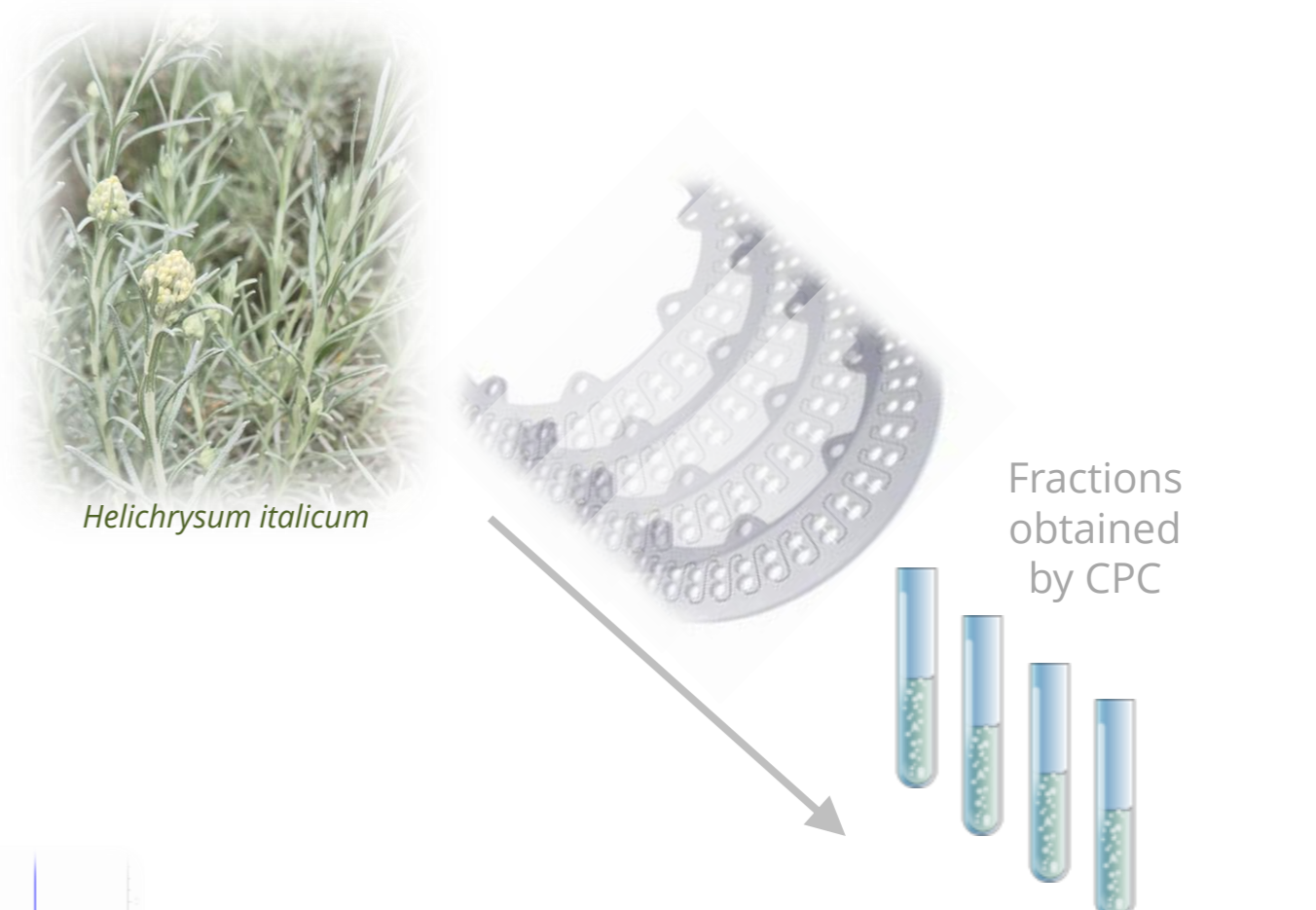
- Detailed chemical profiling of natural extracts
- Sample comparison
- Discovery of new molecules
- Targeted search for interesting molecules (activity-based)
- Targeted search for toxic molecules
- Coupling with biological tests



### MAIN WORKFLOW

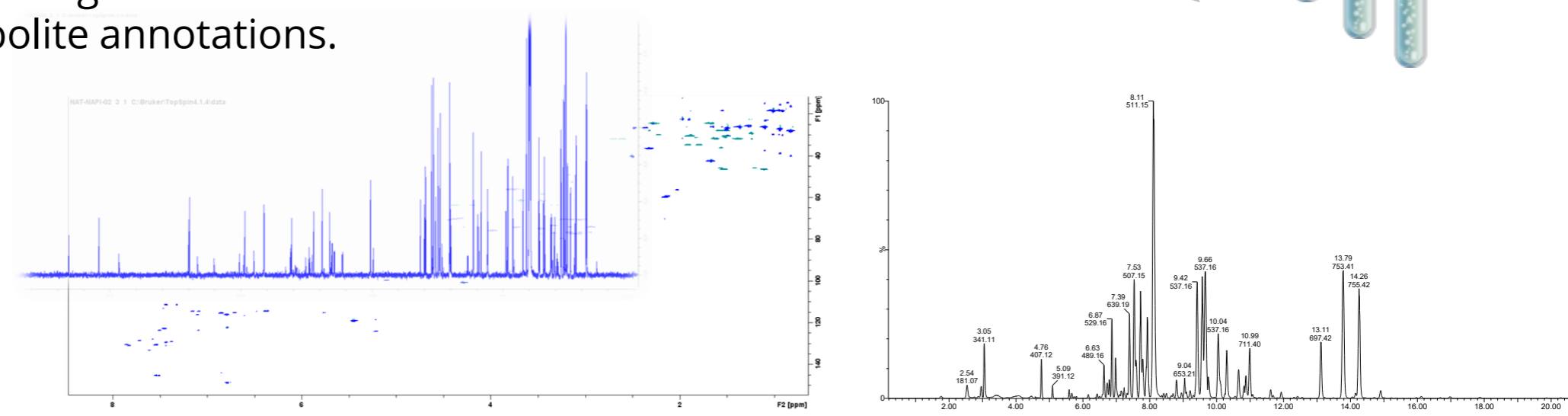
#### 1. Liquid-liquid fractionation by CPC

Centrifugal Partition Chromatography (CPC) is a liquid-liquid separation technique allowing compounds to be separated based on their polarity, without any loss of biomass.



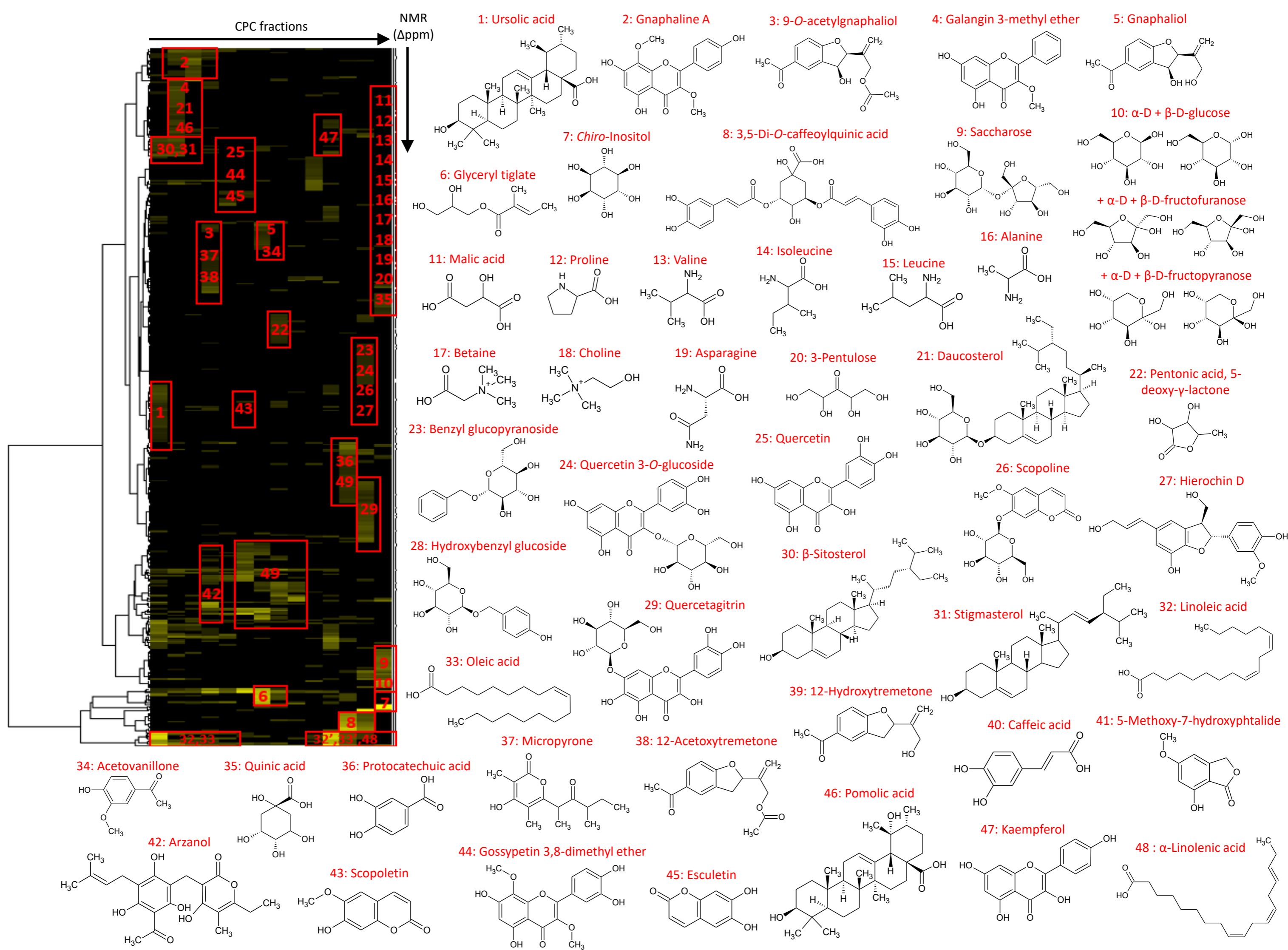
#### 2. Spectroscopic analyses

Nuclear Magnetic Resonance (NMR) is used to detect carbon and proton positions of CPC fraction constituents, along with liquid chromatography coupled to high resolution mass spectrometry for further minor metabolite annotations.



#### 3. Classification and identification of metabolites

<sup>13</sup>C NMR fingerprints with similar chromatographic profiles are grouped into clusters using Hierarchical Clustering Analysis. Metabolites are identified by cross-referencing a NMR natural metabolite database, and the correct chemical structures are validated by rigorous scrutinization of 2D NMR data.



### CURRENT STRENGTHS AND FOCUS

- **Revolutionizing** the analysis of natural extracts
- **Rapid** and accurate compound identification
- Non-destructive : Fractions are preserved and can be further tested on biological models
- Semi-quantitative information on metabolite concentration